Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number/ Agreement Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Funding Commitment	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Non-Caltrans ROW Area Treated (in acres) Total Project	Cooperative Agreement Status at FY End	Sediment Load Reduction (tons/year)	Temperature Load Reduction (acres)
1	-	Mendocino County DOT	Fish Rock Road Sediment Reduction Project	Rehabilitate stream crossing culverts	Garcia River	Sediment	TBD	$482,211	The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. • Existing Load = 251 tons/year • LA = 100 tons/year • Reduction Needed = 60% • Sediment Load Reduction = 150 tons/year	Not relevant	Not relevant	Executed	150.5	–
1	-	Salmon River Restoration Council	Windler Bar Habitat Enhancement Project	-	Klamath River	Temperature	-	$1,000,000	The temperature TMDL assigns LAs as the percent of shade along a stream segment and Caltrans' responsibility is riparian shade that cannot exist within the intersection of Caltrans' highways and streamside riparian corridor. Caltrans is required to conduct riparian restoration according to its proportional responsibility of 61 acres of riparian shade. Caltrans is identified as a responsible party based on land use for temperature WLAs. The following are Caltrans-specific proportional responsibility for restoration of riparian shade: • Source: Excess Solar Radiation (expressed as effective shade) - Allocation: The shade provided by topography and full potential vegetation conditions at a site, with an allowance for natural disturbances such as floods, wind throw, disease, landslides, and fire. • Source: Increased Sediment Loads - Allocation: Zero temperature increase caused by substantial human-caused sediment-related channel alterations. • Source: Impounded Discharges - Allocation: Zero temperature increase above natural temperature.	Not relevant	Not relevant	Executed	0	10
1	-	Humboldt County Resource Conservation District	Lower Eel River and South Fork Eel River Salmon Habitat Restoration Priorities (SHaRP) and Conceptual Designs	Increase pool depth, create riparian shade	Lower Main Eel River	Sediment/ Temperature	TBD	$700,000	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. The U.S. EPA did not assign a specific sediment WLA to Caltrans. The TMDL includes LAs for various sediment discharge sources and provides a LA for all roads of 33 tons per square mile per year. • Existing Load = 354 tons/year • LA = 74 tons/ year • Reduction Needed = 79% • Sediment Load Reduction = 280 tons/year Temperature Load Allocation: Point source WLAs are not assigned. Nonpoint sources are responsible for most heat loading in the watershed. The temperature TMDLs assign LAs as the percent of riparian shade along a stream segment. • Caltrans Proportional Responsibility of Riparian Shade for the Eel River, Lower Hydrologic Area = 37 acres	Not relevant	Not relevant	Executed	97.8	2.1
1	D43CIAEEL0001	MCRCD	MCRCD Eel River TMDL Proposal: Eel River Ranch Road Implementation	-	Middle Fork Eel River	Sediment and Temperature	-	$312,228	The WLA is expressed as equivalent to the LAs. Existing Load = 147 tons/year LA = 105 tons/ year Reduction Needed = 28% Sediment Load Reduction = 41 tons/year Although Caltrans is not assigned a specific allocation, roads in general are a source. The LA is best achieved by allowing trees to grow to provide the equivalent amount of shade that would be provided under natural conditions. The temperature TMDLs assign LAs as the percent of riparian shade along a stream segment. Caltrans Proportional Responsibility of Riparian Shade for the Middle Fork Eel River = 17 acres	Not relevant	Not relevant	Executed	5	-
1	-	National Park Service and Redwoods Rising	Prairie River Creek Road Decommissioning	-	Redwood Creek	Sediment	-	$5,637,500	The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. Existing Load – 5,337 tons/year LA – 856 tons/year Reduction Needed – 84% Sediment Load Reduction – 4,481 tons/year	Not relevant	Not relevant	Executed	4,480.8	0
1	D43CIASCT0004	California Trout	Noyes Valley Creek Sediment Reduction and Riparian Health Project	Reduce channel slope	Scott River	Sediment and Temperature	TBD	$950,922	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 153 tons/year • LA = 67 tons/ year • Reduction Needed = 57% • Sediment Load Reduction = 87 tons/year Temperature Load Allocation: Caltrans plans to reduce temperature loads in each TMDL watershed by implementing TMDL BMPs and control projects that increase effective shade to streams. Increasing effective shade to streams will be accomplished through restoration of riparian acreage via TMDL BMPs and control projects. The riparian acreage to be restored is equal to the roadway area within the riparian setback. • Caltrans Proportional Responsibility of Riparian Shade for the Scott River = 28 acres	Not relevant	Not relevant	Executed	0	9.5
1	D43CIASCT0003	California Trout	Lower French Creek Sediment Reduction and Habitat Restoration Project	-	Scott River	Sediment and Temperature	-	$549,482	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 153 tons/year • LA = 67 tons/ year • Reduction Needed = 57% • Sediment Load Reduction = 87 tons/year Temperature Load Allocation: Caltrans plans to reduce temperature loads in each TMDL watershed by implementing TMDL BMPs and control projects that increase effective shade to streams. Increasing effective shade to streams will be accomplished through restoration of riparian acreage via TMDL BMPs and control projects. The riparian acreage to be restored is equal to the roadway area within the riparian setback. • Caltrans Proportional Responsibility of Riparian Shade for the Scott River = 28 acres	Not relevant	Not relevant	Executed	0	5.5
1	D43CIASCT0002	Scott River Watershed Council	Scott River Recovery Action Plan Project (Sediment)	-	Scott River	Sediment and Temperature	-	-	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 153 tons/year • LA = 67 tons/ year • Reduction Needed = 57% • Sediment Load Reduction = 87 tons/year Temperature Load Allocation: Caltrans plans to reduce temperature loads in each TMDL watershed by implementing TMDL BMPs and control projects that increase effective shade to streams. Increasing effective shade to streams will be accomplished through restoration of riparian acreage via TMDL BMPs and control projects. The riparian acreage to be restored is equal to the roadway area within the riparian setback. • Caltrans Proportional Responsibility of Riparian Shade for the Scott River = 28 acres	Not relevant	Not relevant	Executed	26.9	5

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Regional Board	EA Number/ Agreement Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Funding Commitment	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Non-Caltrans ROW Area Treated (in acres) Total Project	Cooperative Agreement Status at FY End	Sediment Load Reduction (tons/year)	Temperature Load Reduction (acres)
1	-	CalTrout/ Wildlands Conservancy	Big Mill Creek-East Fork Sediment Reduction and Habitat Restoration Project (Sediment and Temperature)	-	Scott River	Sediment and Temperature	-	$1,163,900	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 153 tons/year • LA = 67 tons/ year • Reduction Needed = 57% • Sediment Load Reduction = 87 tons/year Temperature Load Allocation: Caltrans plans to reduce temperature loads in each TMDL watershed by implementing TMDL BMPs and control projects that increase effective shade to streams. Increasing effective shade to streams will be accomplished through restoration of riparian acreage via TMDL BMPs and control projects. The riparian acreage to be restored is equal to the roadway area within the riparian setback. • Caltrans Proportional Responsibility of Riparian Shade for the Scott River = 28 acres	Not relevant	Not relevant	Executed	22.6	-
1	D43CIAEEL0005	Redwood Forest Foundation, Inc.	Indian Creek Sedimentation Reduction Project	Decommissioning stream crossing roads	South Fork Eel River	Temperature and Sediment	TBD	$2,567,867	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 18,027 tons/year • LA = 4,871 tons/ year • Reduction Needed = 73% • Sediment Load Reduction = 13,157 tons/year	Not relevant	Not relevant	Executed	1,664.8	0
1	-	MCRCD	MCRCD Eel River TMDL Proposal: Ten Mile Creek Ranch Implementation	-	South Fork Eel River	Temperature and Sediment	-	$765,073	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 18,027 tons/year • LA = 4,871 tons/ year • Reduction Needed = 73% • Sediment Load Reduction = 13,157 tons/year	Not relevant	Not relevant	Executed	391	-
1	-	MCRCD	MCRCD Eel River TMDL Proposal: Jack of Hearts Road Implementation	-	South Fork Eel River	Temperature and Sediment	-	$812,016	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 18,027 tons/year • LA = 4,871 tons/ year • Reduction Needed = 73% • Sediment Load Reduction = 13,157 tons/year	Not relevant	Not relevant	Executed	372	-
1	-	MCRCD	MCRCD Eel River TMDL Proposal: Jack of Hearts Road Assessment	-	South Fork Eel River	Temperature and Sediment	-	$29,225	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 18,027 tons/year • LA = 4,871 tons/ year • Reduction Needed = 73% • Sediment Load Reduction = 13,157 tons/year	Not relevant	Not relevant	Executed	17	-
1	-	Bureau of Land Management	Red Mountain Road Stormproofing	-	South Fork Eel River	Temperature and Sediment	-	$1,044,779	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 18,027 tons/year • LA = 4,871 tons/ year • Reduction Needed = 73% • Sediment Load Reduction = 13,157 tons/year	Not relevant	Not relevant	Executed	1,676	0
1	-	Mendocino County Resource Conservation District	Vassar Habitat Enhancement and Sediment Control Project	-	South Fork Eel River	Temperature and Sediment	-	$1,267,351	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 18,027 tons/year • LA = 4,871 tons/ year • Reduction Needed = 73% • Sediment Load Reduction = 13,157 tons/year	Not relevant	Not relevant	Executed	114	10.6
1	-	Trinity County Resource Conservation District	Sediment reduction and improved riparian corridors	-	South Fork Trinity	Sediment	-	$1,050,000	The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. Existing Load – 1,983 tons/year LA – 358 tons/year Reduction Needed – 82% Sediment Load Reduction – 1,625 tons/year	Not relevant	Not relevant	Executed	1,312.7	0
1	-	Trinity County Resource Conservation District	Trinity River (Grass Valley Creek) TMDL Sediment Reduction Project	Stream crossing repair	Trinity River	Sediment	TBD	$525,000	Sediment Load Allocation: The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. • Existing Load = 7,725 tons/year • LA = 89 tons/ year • Reduction Needed = 85% • Sediment Load Reduction = 6,875 tons/year	Not relevant	Not relevant	Executed	75.3	0
1	-	Trinity County Resource Conservation District	Trinity River Sediment Reduction Project	-	Trinity River	Sediment	-	$1,050,000	Sediment Load Allocation: The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. • Existing Load = 7,725 tons/year • LA = 89 tons/ year • Reduction Needed = 85% • Sediment Load Reduction = 6,875 tons/year	Not relevant	Not relevant	Executed	1,312.7	0
1	-	Bureau of Land Management	Butte Creek/Larabee Buttes Roads Upgrading	Culvert replacements, drainage improvements and rock surfacing.	Van Duzen River	Sediment	TBD	$2,206,141	The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. • Existing Load = 447 tons/year • LA = 68 tons/ year • Reduction Needed = 85% • Sediment Load Reduction = 379 tons/year	Not relevant	Not relevant	Executed	130.2	0
1	-	Yurok Tribe	Blue Creek Restoration	Riparian planting	Klamath River	Temperature	TBD	$3,000,000	The temperature TMDL assigns LAs as the percent of shade along a stream segment and Caltrans' responsibility is riparian shade that cannot exist within the intersection of Caltrans' highways and streamside riparian corridor. Caltrans is required to conduct riparian restoration according to its proportional responsibility of 61 acres of riparian shade. Caltrans is identified as a responsible party based on land use for temperature WLAs. The following are Caltrans-specific proportional responsibility for restoration of riparian shade: • Source: Excess Solar Radiation (expressed as effective shade) - Allocation: The shade provided by topography and full potential vegetation conditions at a site, with an allowance for natural disturbances such as floods, wind throw, disease, landslides, and fire. • Source: Increased Sediment Loads - Allocation: Zero temperature increase caused by substantial human-caused sediment-related channel alterations. • Source: Impounded Discharges - Allocation: Zero temperature increase above natural temperature.	Not relevant	Not relevant	Planned	–	30

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1	-	Yurok Tribe	Water Quality Enhancement in the Blue Creek Watershed	-	Klamath River	Temperature	-	$3,000,000	The temperature TMDL assigns LAs as the percent of shade along a stream segment and Caltrans' responsibility is riparian shade that cannot exist within the intersection of Caltrans' highways and streamside riparian corridor. Caltrans is required to conduct riparian restoration according to its proportional responsibility of 61 acres of riparian shade. Caltrans is identified as a responsible party based on land use for temperature WLAs. The following are Caltrans-specific proportional responsibility for restoration of riparian shade: • Source: Excess Solar Radiation (expressed as effective shade) - Allocation: The shade provided by topography and full potential vegetation conditions at a site, with an allowance for natural disturbances such as floods, wind throw, disease, landslides, and fire. • Source: Increased Sediment Loads - Allocation: Zero temperature increase caused by substantial human-caused sediment-related channel alterations. • Source: Impounded Discharges - Allocation: Zero temperature increase above natural temperature.	Not relevant	Not relevant	Planned	0	30
1	-	Yurok Tribal Fisheries Department	Ah Pah Creek Habitat Improvement Project	-	Klamath River	Temperature	-	$575,000	The temperature TMDL assigns LAs as the percent of shade along a stream segment and Caltrans' responsibility is riparian shade that cannot exist within the intersection of Caltrans' highways and streamside riparian corridor. Caltrans is required to conduct riparian restoration according to its proportional responsibility of 61 acres of riparian shade. Caltrans is identified as a responsible party based on land use for temperature WLAs. The following are Caltrans-specific proportional responsibility for restoration of riparian shade: • Source: Excess Solar Radiation (expressed as effective shade) - Allocation: The shade provided by topography and full potential vegetation conditions at a site, with an allowance for natural disturbances such as floods, wind throw, disease, landslides, and fire. • Source: Increased Sediment Loads - Allocation: Zero temperature increase caused by substantial human-caused sediment-related channel alterations. • Source: Impounded Discharges - Allocation: Zero temperature increase above natural temperature.	Not relevant	Not relevant	Planned	0	5.8
1	-	Yurok Tribe Watershed and Roads Department	Pecwan Creek Sediment Reduction and Road Improvement Project	-	Klamath River	Temperature	-	$988,705	The temperature TMDL assigns LAs as the percent of shade along a stream segment and Caltrans' responsibility is riparian shade that cannot exist within the intersection of Caltrans' highways and streamside riparian corridor. Caltrans is required to conduct riparian restoration according to its proportional responsibility of 61 acres of riparian shade. Caltrans is identified as a responsible party based on land use for temperature WLAs. The following are Caltrans-specific proportional responsibility for restoration of riparian shade: • Source: Excess Solar Radiation (expressed as effective shade) - Allocation: The shade provided by topography and full potential vegetation conditions at a site, with an allowance for natural disturbances such as floods, wind throw, disease, landslides, and fire. • Source: Increased Sediment Loads - Allocation: Zero temperature increase caused by substantial human-caused sediment-related channel alterations. • Source: Impounded Discharges - Allocation: Zero temperature increase above natural temperature.	Not relevant	Not relevant	Planned	0	9.9
1	0Q050	-	In Mendocino County from Junction Route 1 to 0.2 miles south of Big Oaks Drive. Navarro River Stormwater Mitigation - FCO	Stormwater mitigation	Navarro River	Sediment and Temperature	39.091844, -123.480357	$8,343,000	The WLA is expressed as equivalent to the LAs. The U.S. EPA did not assign a specific sediment WLA to Caltrans. Existing Load = 2,868 tons/year LA = 1,364 tons/ year Reduction Needed = 52% Sediment Load Reduction = 1,504 tons/year Caltrans reduces temperature loads in each TMDL watershed by implementing TMDL BMPs and control projects that increase effective shade to streams. Increasing effective shade to streams is accomplished through restoring riparian acreage via TMDL BMPs and control projects. The riparian acreage to be restored is equal to the roadway area within the riparian setback. Caltrans Proportional Responsibility of Riparian Shade for the Navarro River Hydrologic Area = 61 acres	95	-	Planned	-	-
1	0N370	-	In Humboldt County at Redwood Creek watershed. Stormwater mitigation FCO to decommission up to ten miles of former logging roads. Work includes road reoccupation, temporary road construction, and permanently removing approximately 60 watercourse crossings.	Decommissioning stream crossing roads	Redwood Creek	Sediment	41.335457, -124.030683	$5,698,000	The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. Existing Load – 5,337 tons/year LA – 856 tons/year Reduction Needed – 84% Sediment Load Reduction – 4,481 tons/year	57	-	Planned	-	-
1	-	Shasta Valley Resource Conservation District	Riparian Planting Phase 1	Riparian planting	Shasta River	Temperature and Dissolved Oxygen	41.782155, -123.035039	$15,000	Point source WLAs are not assigned. Nonpoint sources are responsible for most heat loading in the watershed. The temperature TMDLs assign LAs as the percent of riparian shade along a stream segment. • Caltrans Proportional Responsibility of Riparian Shade = 131 acres	Not relevant	Not relevant	Planned	–	0.2
1	-	Shasta Valley Resource Conservation District	Tailwater Mitigation Phase 2	-	Shasta River	Temperature and Dissolved Oxygen	-	$1,357,466.50	Point source WLAs are not assigned. Nonpoint sources are responsible for most heat loading in the watershed. The temperature TMDLs assign LAs as the percent of riparian shade along a stream segment. • Caltrans Proportional Responsibility of Riparian Shade = 131 acres	Not relevant	Not relevant	Planned	-	1.36
1	-	California Trout	Hole in the Ground Water Quality and Flow Enhancement Project	-	Shasta River	Temperature and Dissolved Oxygen	-	$600,000	Point source WLAs are not assigned. Nonpoint sources are responsible for most heat loading in the watershed. The temperature TMDLs assign LAs as the percent of riparian shade along a stream segment. • Caltrans Proportional Responsibility of Riparian Shade = 131 acres	Not relevant	Not relevant	Planned	0	6
1	-	Montague Water Conservation District	Safe Harbor Flow Augmentation Adaptive Management Project	-	Shasta River	Temperature and Dissolved Oxygen	-	$600,000	Point source WLAs are not assigned. Nonpoint sources are responsible for most heat loading in the watershed. The temperature TMDLs assign LAs as the percent of riparian shade along a stream segment. • Caltrans Proportional Responsibility of Riparian Shade = 131 acres	Not relevant	Not relevant	Planned	0	6
1	-	Salmonid Restoration Federation	Holland Reservoir Habitat Enhancement Project – Phase II (Final Design and Permitting)	-	South Fork Eel River	Temperature and Sediment	-	$1,033,300	Sediment Load Allocation: The WLA is expressed as equivalent to the LAs. • Existing Load = 18,027 tons/year • LA = 4,871 tons/ year • Reduction Needed = 73% • Sediment Load Reduction = 13,157 tons/year	Not relevant	Not relevant	Planned	0	15
1	-	Watershed Research and Training Center	Rattlesnake Creek Sediment Reduction Project	-	South Fork Trinity	Sediment	-	$1,043,634	The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. Existing Load – 1,983 tons/year LA – 358 tons/year Reduction Needed – 82% Sediment Load Reduction – 1,625 tons/year	Not relevant	Not relevant	Planned	307.3	0
1	-	Trinity County Resource Conservation District	South Fork Trinity River TMDL Butter Creek Sediment Reduction Project	-	South Fork Trinity	Sediment	-	$960,500	The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. Existing Load – 1,983 tons/year LA – 358 tons/year Reduction Needed – 82% Sediment Load Reduction – 1,625 tons/year	Not relevant	Not relevant	Planned	282.8	0

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1	-	Northwest CA Resource Conservation & Development Council	Little Grass Valley Creek Fisheries Restoration and Sediment Reduction Project	Stream crossing repair	Trinity River	Sediment	-	$1,035,911	Sediment Load Allocation: The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. • Existing Load = 7,725 tons/year • LA = 89 tons/ year • Reduction Needed = 85% • Sediment Load Reduction = 6,875 tons/year	Not relevant	Not relevant	Planned	195.1	0
1	-	The Watershed Research and Training Center	Trinity Meadows Restoration Project	-	Trinity River	Sediment	-	$2,292,984	Sediment Load Allocation: The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. • Existing Load = 7,725 tons/year • LA = 89 tons/ year • Reduction Needed = 85% • Sediment Load Reduction = 6,875 tons/year	Not relevant	Not relevant	Planned	431.8	0
1	-	The Watershed Research and Training Center	Weaver Creek Sediment Reduction Project	-	Trinity River	Sediment	-	$517,986	Sediment Load Allocation: The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. • Existing Load = 7,725 tons/year • LA = 89 tons/ year • Reduction Needed = 85% • Sediment Load Reduction = 6,875 tons/year	Not relevant	Not relevant	Planned	97.5	0
1	0Q040	-	In Mendocino and Humboldt Counties at various locations. Stormwater TMDL Mitigation FCO for Upper Main and South Fork Eel River.	Stormwater mitigation	Upper Main and South Fork Eel River	Sediment and Temperature	39.402796, -123.388570	$17,289,000	The WLA is expressed as equivalent to the LAs. Existing Load = 18,027 tons/year LA = 4,871 tons/year Reduction Needed = 73% Sediment Load Reduction = 13,157 tons/year Caltrans plans to reduce temperature loads in each TMDL watershed by implementing TMDL BMPs and control projects that increase effective shade to streams. Increasing effective shade to streams will be accomplished through restoration of riparian acreage via TMDL BMPs and control projects. The riparian acreage to be restored is equal to the roadway area within the riparian setback. Caltrans Proportional Responsibility of Riparian Shade for the South Fork Eel River = 143 acres	200	-	Planned	-	-
1	-	Trinity County Resource Conservation District	Van Duzen River TMDL Sediment Reduction Project	-	Van Duzen River	Sediment	-	$400,000	The TMDL does not include Caltrans-specific allocations nor proportionate contributions. On August 8, 2020, North Coast Water Board staff provided Caltrans-specific sediment LAs. • Existing Load = 447 tons/year • LA = 68 tons/ year • Reduction Needed = 85% • Sediment Load Reduction = 379 tons/year	Not relevant	Not relevant	Planned	65.1	0

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2	D43CIACC0001	Contra Costa County Phase II	Bay Point	HDS	San Francisco Bay	Mercury and PCBs	38.02156886, -121.9585984	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	21	N	75	$ 1,000,000	Constructed
2	D43CIARI0002	City of Richmond Phase III	Meeker Ditch Cutting Blvd. at S. 3rd St.	HDS	San Francisco Bay	Mercury and PCBs	37.93998857, -122.3253843	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	41	N	1,410	$ 5,678,133	Operational
2	-	Various Cities around Marin	15 Local Projects	DSBB, Trash Nets, HDS	San Francisco Bay	Mercury and PCBs	37.96762962, -122.5142904	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	235	N	1765	$ 12,500,000	Operational
2	D43CIAEPA0001	City of East Palo Alto	Alto's O'Connor Pump Station	Trash Screen	San Francisco Bay	Mercury and PCBs	37.46327775, -122.1357914	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	39	N	864	$ 521,000	Operational

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	D43CIAALA0001	City of Hayward	Arf	HDS	San Francisco Bay	Mercury and PCBs	37.63556793, -122.0972152	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	18	N	279	Included in Tennyson	Operational
2	-	Vallejo Wastewater	Austin Creek Nets Solano, Sonoma, & Mono St	Nets	San Francisco Bay	Mercury and PCBs	38.11840828, -122.2266211	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	388	N	9500	$ 4,000,000	Operational
2	D43CIAOAK0002	City of Oakland	Cary Ave	DSBB	San Francisco Bay	Mercury and PCBs	37.7410124, -122.1608773	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	38	Y	702	$ 5,891,403	Operational
2	-	City of San Pablo	Church Ln/Willow Rd	DSBB	San Francisco Bay	Mercury and PCBs	37.978848, -122.296428	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	5	N	500	$ 445,000	Operational

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	D43CIAALA0001	City of Hayward	Cotter Way	HDS	San Francisco Bay	Mercury and PCBs	37.68414135, -122.0883723	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	15	N	127	Included in Tennyson	Operational
2	-	City of San Mateo Phase I	Coyote Point	DSBB	San Francisco Bay	Mercury and PCBs	37.58261882, -122.3351276	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	26	N	Included in Poplar Dore	$ 1,473,000	Operational
2	D43CIASCL0001	City of Palo Alto	Embarcadero	HDS	San Francisco Bay	Mercury and PCBs	37.447965, -122.1213206	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	22	N	187	$ 774,837	Operational
2	-	City of East Palo Alto	Newbridge	Full Trash Capture Device	San Francisco Bay	Mercury and PCBs	37.46748287, -122.1528428	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	18	N	559	$ 1,500,000	Operational

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	D43CIAAC0001	Alameda County	Estudillo Canal	Multiple GSRDs in Parallel	San Francisco Bay	Mercury and PCBs	37.70453399, -122.1211761	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	256	N	2,651	$ 2,175,000	Operational
2	-	City of San Jose	HDS Units at Various Locations	HDS	San Francisco Bay	Mercury and PCBs	37.322209, -121.959792	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	480	N	2,441	$ 5,500,000	Operational
2	-	City of San Jose	Large Trash Capture (LTC) Phase VII Jose Figueres Ave/Alexian Dr. Eastridge Loop/Eastridge Blvd. Charcot Ave/Hartog Dr. Blossom Hill Rd/US85, Airport Blvd/ Guadalupe River, San Antonio St/Scharff Ave	HDS	San Francisco Bay	Mercury and PCBs	37.322209, -121.959792	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	247	N	1,233	$ 12,500,000	Operational
2	D43CIACON0001	City of Concord	Hillcrest Park	DSBB	San Francisco Bay	Mercury and PCBs	38.0009647, -122.0352666	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	90	N	539	$ 5,100,000	Operational

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	D43CIAEME0001	City of Emeryville	MacArthur	DSBB	San Francisco Bay	Mercury and PCBs	37.83161027, -122.2787335	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	7	N	83	$ 680,000	Operational
2	D43CIAOAK0001	City of Oakland	Mandela	DSBB	San Francisco Bay	Mercury and PCBs	37.81180343, -122.2827108	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	27	Y	584	$ 6,990,825	Operational
2	D43CIARI0001	City of Richmond Phase I	Marina Bay Pkwy at Regatta South 8th St at Potrero	HDS	San Francisco Bay	Mercury and PCBs	37.93359586, -122.3509690	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	74	N	892	$ 2,500,000	Operational
2	-	City of South San Francisco	Orange Memorial Park	Trash Box, Grit Chamber, and Infiltration Gallery	San Francisco Bay	Mercury and PCBs	37.67065332, -122.4546987	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	68	N	6,336	$ 15,500,000	Operational

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	-	City of San Mateo	Pacific Boulevard, South of 41st	GSRD	San Francisco Bay	Mercury and PCBs	37.5319172, -122.2910338	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	7	N	190	$ 630,000	Operational
2	-	City of San Mateo Phase I	Poplar Dore	DSBB	San Francisco Bay	Mercury and PCBs	37.57320009, -122.3244946	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	12	N	760	$ 650,000	Operational
2	-	City of San Mateo	Poplar Golf Course	Multiple GSRDs in Parallel	San Francisco Bay	Mercury and PCBs	37.57367827, -122.3339757	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	16	N	357	$ 330,000	Operational
2	-	Port of Oakland	Port of Oakland	HDS	San Francisco Bay	Mercury and PCBs	37.80850074, -122.3089035	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	19	N	225	$ 8,000,000	Operational

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	-	City of Suisun Amtrak Park & Ride Lot	Solano Green Stormwater Infrastructure Project/Amtrack Park & Ride Lot	Bioretention	San Francisco Bay	Mercury and PCBs	38.243298, -122.039439	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	4	N	NA	$ 893,270	Operational
2	-	Contra Costa County Phase I	Tara Hills	DSBB	San Francisco Bay	Mercury and PCBs	37.9921138, -121.3191379	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	41	N	393	$ 3,945,000	Operational
2	D43CIAALA0001	City of Hayward	Tennyson	HDS	San Francisco Bay	Mercury and PCBs	37.64197305, -122.0905305	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	68	N	318	$ 3,800,000	Operational
2	D43CIARI0002	City of Richmond	Bayview	HDS	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	49	N	154	Included in Meeker Ditch Cutting Blvd	Operational

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	D43CIAAC0002	Alameda County Public Works	LTC Program: Via Arriba	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	38	N	329	$ 9,500,000	Operational
2	-	City of San Leandro	Merced Street and 880 @ Marina	Trash Screen, CDS	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	26	N	559	$ 3,500,000	Operational
2	-	Contra Costa County	Saranap	HDS	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	18	N	130	Included in Tara Hills	Operational
2	D43CIALIV0001	City of Livermore	Southfront, El Charro	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	18	N	260	$ 1,480,000	Operational

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	D43CIADC0001	City of Daly City	Vista Grande	Gross Solids Removal Device (GSRD)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	141	N	1,635	$ 3,440,000	Operational
2	-	City of Oakland	45th & San Leandro	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	74	Y	1,605	$ 28,000,000	Planning
2	-	City of Oakland	47th & UPRR	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	16	Y	737	Included in 45th & San Leandro	Planning
2	-	City of Oakland	85th & G	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	7	Y	792	Included in 45th & San Leandro	Planning

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	-	City of Richmond	Burlingame & Monterey St	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	16	Y	65	$ 3,000,000	Planning
2	-	City of Hayward	Cabot	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	19	N	1,075	$ 3,000,000	Planning
2	-	City of Pittsburg	California Ave. SR-4/Willow Pass	Full Trash Capture Device	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	20	N	823	$ 2,040,000	Planning
2	-	City of Colma	Colma/Daly City/One Shoreline Colma Creek Site	GSRD	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	311	N	3,914	$ 6,900,000	Planning

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	-	City of Palo Alto	East Bayshore 1	TBD	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	TBD	N	TBD	$ 2,500,000	Planning
2	-	City of Palo Alto	East Bayshore 2	TBD	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	TBD	N	TBD	$ 2,500,000	Planning
2	4W190	City of San Jose	LTC Phase IX	DSBB or HDS	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	86	N	NA	$ 10,660,000	Planning
2	-	City of San Jose	LTC Phase VIII	HDS	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	91	N	564	$ 11,137,500	Planning

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	-	Alameda County	LTC Program: Orange and Vegas, Redwood and Lessley, Norbridge and Walker, Mattox and Birch	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	51	N	161	Included in LTC Program: Via Arriba	Planning
2	-	City of Pacifica	Pacifica Palmetto Ave Site	HDS	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	11	N	500	$ 1,440,000	Planning
2	-	City of Emeryville	Powell	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	9	N	131	$ 1,725,000	Planning
2	-	City of Richmond	S 51st St & Bayview Ave	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	20	Y	35	$ 3,000,000	Planning

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Applicable WLA Implementation Requirement	Caltrans ROW Area Treated (in acres)	Caltrans ROW Area Verified in GIS (Y/N)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
2	-	City of Richmond	San Pablo Yacht Club	Debris Separating Baffle Box (DSBB)	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	26	N	173	$ 5,000,000	Planning
2	-	Vallejo Wastewater	SR-37/SR-29 Interchange	TBD	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	14	N	301	$ 5,000,000	Planning
2	-	Vallejo Wastewater	Valle Vista @ Austin Creek	TBD	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	1	N	36	$ 2,000,000	Planning
2	-	Vallejo Wastewater	Yolano	TBD	San Francisco Bay	PCB and Mercury	-	Caltrans Mercury WLAs: • No WLAs specific to Caltrans. Instead, Caltrans' WLA shares an unspecified portion that is assigned to city or municipal NPDES permits in which Caltrans' roads or facilities reside. Caltrans will treat 2,970 acres of ROW that drains directly or indirectly to San Francisco Bay. Caltrans roadways are within the following entities with the following WLAs: − Santa Clara Valley Urban Runoff Pollution Prevention Program = 23 kg/year − Alameda Countywide Clean Water Program = 20 kg/year − Contra Costa Clean Water Program = 11 kg/year − San Mateo County Stormwater Pollution Prevention Program = 8.4 kg/year − Vallejo Sanitation District = 1.6 kg/year − Fairfield-Suisun Urban Runoff Management Program = 1.6 kg/year − American Canyon = 0.14 kg/year − Sonoma County Area = 1.6 kg/year − Napa County Area = 1.6 kg/year − Marin County Area = 3.3 kg/year − Solano County Area = 0.81 kg/year − San Francisco County Area = 8.8 kg/year Caltrans PCB WLAs: • All stormwater runoff sources = 2 kg/year • Caltrans proportional responsibility = 0.025 kg/year	5	N	35	$ 2,000,000	Planning

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA No./ Agreement Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Caltrans ROW Area Treated (in acres)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
4	D43CIAULA001	City of Los Angeles	MacArthur Lake	-	Ballona Creek	Heavy metals (zinc, copper, lead), trash	34.05902, -118.277928	-	-	Included in Broadway Manchester	Executed
4	D43CIACUL001	Culver City	Mesmer Low Flow Diversion	Dry Weather Flow Diversion	Ballona Creek Estuary	Cu, Pb, Zn, DDT, PAHs, and PCBs	33.986948, -118.401560	195	6,093	$230,000	Executed
4	D43CIACUL002	Culver City	Culver Blvd	Outside Caltrans ROW	Ballona Creek, Ballona Estuary, and Sepulveda Channel	Bacteria, Metals (zinc, copper, lead), and Toxic Pollutants	TBD	23	773	$522,916	Executed
4	D43CIABAL0003	City of Los Angeles Sanitation Department	Ballona Creek LFTF	Dry Weather Flow Diversion	Ballona Creek, Ballona Estuary, and Sepulveda	Bacteria (dry weather)	34.01142, -118.390806	1,163	68,198	$1,400,000	Executed
4	D43CIADPW002	Los Angeles County Department of Public Works	Alondra Park	Outside Caltrans ROW	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters	Toxic Pollutants: Metals (Copper, Lead, Zinc), DDT, PAHs, and PCBs	33.886639, -118.342652	185	4,944	$15,000,000	Executed
4	D43CIAULA001	City of Los Angeles	Wilmington Neighborhood Greening	-	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters	Toxic Pollutants: Metals (Copper, Lead, Zinc), DDT, PAHs, and PCBs	33.773133, -118.269284	-	237.7	Included in Broadway Manchester	Executed
4	D43CIAULA001	City of Los Angeles	Broadway Manchester Multi-Modal Green Street	-	LA River Dominguez Channel and Greater Los Angeles and Long Beach Harbor	Metals Bacterial Trash Nitrogen Compounds and Related Effects Toxic Pollutants	33.959997, -118.278324	8	196	$11,886,981	Executed
4	D43CIAULA003	City of South Pasadena	Facility 2 Lower Arroyo Seco Infiltration Gallery Project	-	Los Angeles River	Metals, Bacteria, Trash	34.125321, -118.166416	11.59	153.18	$3,114,685	Executed
4	D43CIAULA004	City of Downey	Furman Park	Regional stormwater runoff capture	Los Angeles River	Ammonia, Copper, Metals, Bacteria, and Trash	33.95337, -118.13746	-	475	$7,500,000	Executed
4	37290	LADPW, City of Los Angeles	Valley Plaza Park North	Infiltration Gallery	Los Angeles River	Ammonia, Copper, Metals, Bacteria, and Trash	34.198857, -118.404857	54.2	920.8	$22,747,000	Executed
4	37190	LADPW, City of Los Angeles	Valley Plaza Park South	Infiltration Gallery	Los Angeles River	Nitrogen, Phosphorus, Metals, Copper, Lead, Zinc, and Fecal Coliform	34.194813, -118.401911	13.4	212.40	$12,583,000	Executed
4	-	LADWP	Fernangeles Recreation Center Park Project	Infiltration Gallery	Los Angeles River	Metals Bacteria, Trash	34.229220, -118.401888	20	181	$17,070,000	Executed
4	D43CIAULA002	City of South Gate	Urban Orchid-City of South Gate	-	Los Angeles River and Dominguez Channel and Greater Los Angeles and Long Beach Harbor	Metals, Trash, Bacteria, Toxic Pollutants	37.8896384, -122.503168	225	4,279.20	$5,000,000	Executed
4	D43CIAELM001	City of El Monte	Garvey Ave Grade Separation with City of El Monte	-	Los Angeles River and San Gabriel River, Estuary, and Impaired Tributaries	Trash, Metals, Bacteria, Metals (Cu, Pb, Zn), Selenium, and Indicator Bacteria	34.06345, -118.014	7.65	54.74	$1,500,000	Executed
4	D43CIALB001	City of Long Beach	LB Municipal Urban Stormwater (LB-MUST) Project	Outside Caltrans ROW	Los Angeles River and Tributaries	Metals (Copper, Lead, and Zinc)	33.777342, -118.203812	192	11,000	$28,000,000	Executed
4	37160	LADWP	Strathern Park Project	Outside Caltrans ROW	Los Angeles River Watershed, Tujunga Wash-Los Angeles River	Ammonia, Copper, Metals, Bacteria, and Trash	34.216795, -118.406487	30.8	445	$13,141,000	Executed
4	D43CIALW0001	City of Lakewood	Bolivar Park	Outside Caltrans ROW	Los Cerritos Channel	Metals (Copper, Lead, and Zinc)	33.846619, -118.153470	64	3,209	$11,000,000	Executed
4	D43CIABF0001	City of Bellflower	Caruthers (Mayfair HS)	Outside Caltrans ROW	Los Cerritos Channel and San Gabriel River Estuary and Impaired Tributaries	Metals (Copper, Lead, and Zinc) and Selenium	33.879703, -118.110788	103.3	3,256	$13,000,000	Executed
4	D43CIALW0002	City of Lakewood	Mayfair Park	Outside Caltrans ROW	Los Cerritos Channel Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters	Metals, Toxic Pollutants, Trash	33.8594746, -118.1353483	62.3	2,274	$15,000,000	Executed
4	D43CIASH0001	City of Signal Hill	LB Airport Phase 1 & 2	Outside Caltrans ROW	Los Cerritos Channel, and Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters	Metals (Copper, Lead, and Zinc), Toxic Pollutants, and Trash	33.813591, -118.140404	40.6	1,925	$15,250,000	Executed
4	D43CIACA0001	City of Carson	Carriage Crest Park	Outside Caltrans ROW	Machado Lake	Trash, Eutrophic, Algae, Ammonia, and Odors (Nutrients)	33.809339, -118.284000	TBD	1,118	$13,000,000	Executed
4	D43CIADPW0001	Los Angeles County Department of Public Works	Adventure Park	Outside Caltrans ROW	San Gabriel River	Copper, Lead, Zinc, and Selenium	33.942249, -118.035907	TBD	6,985	$15,000,000	Executed

Cooperative Projects Executed or Programed between Caltrans and Local Municipalities

Regional Board	EA No./ Agreement Number	Participating Entities	Name of Agreement	Project Type	Impaired Waterbody	TMDL Pollutants	Location (Latitude, Longitude)	Caltrans ROW Area Treated (in acres)	Non-Caltrans ROW Area Treated (in acres) Total Project	Funding Commitment	Cooperative Agreement Status at FY End
4	39270	Culver City	Syd Kronenthal Park Stormwater Capture Project	Regional underground storage facility	Ballona Creek	Heavy metals (zinc, copper, lead), trash	34.027315, -118.377345	568	35,404	$11,300,000	Planned
4	1A380	Los Angeles County Department of Public Works	Ladera Heights - W Centinela Ave Green Improvement Project	Stormwater infiltration wells (drywells) + bioswales	Ballona Creek	Heavy metals (zinc, copper, lead), trash	33.977066, -118.378136	-	356.69	$18,225,000	Planned
4	39250	City of Inglewood	Edward Vincent Jr Park	Outside Caltrans ROW	Ballona Creek Estuary, Santa Monica Bay	Toxic Pollutants: Metals (Copper, Lead, Zinc), DDT, PAHs, and PCBs	33.973141, -118.343529	TBD	TBD	$10,000,000	Planned
4	1A400	City of Pasadena	Eaton Wash Park and Sierra Madre Median	Construct infiltration gallery to treat stormwater runoff	Rio Hondo/Los Angeles River	Bacteria	34.0731, -118.0556	Sierra Madre: 0 Eaton Wash: 1,029.38	Sierra Madre: 1,502.7 Eaton Wash: 9,264.42	$15,100,000	Planned
4	39630	LADPW	Allen J Martin Park - Los Angeles County	Construct infiltration gallery	San Gabriel River	Metals, Bacteria, Trash	34.039872, -117.962124	88	307	$10,000,000	Planned
4	39660	LADWP	Bassett High School - Los Angeles County	Stormwater conveyance lines, pretreatment systems, and an infiltration gallery	San Gabriel River	Metals, Bacteria, Trash	34.051461, -117.977658	155	1,146.5	$20,050,000	Planned
4	39240	City of Los Angeles	Hollenbeck Park Lake Rehabilitation Project	Capture and treatment	Upper Los Angeles River	Trash, Nutrients (Ammonia, Nitrate-N, Nitrite-N, Nitrate as N+ Nitrite as N), Metals, Bacteria	34.041513, -118.217055	13	460.1	$15,000,000	Planned
4	1A220	City of Pasadena	Brookside Park, between N San Rafael Ave and N Arroyo Blvd	Pretreatment and subsurface infiltration and storage	Upper Los Angeles River and Rio Hondo	Bacteria	34.154801, -118.166495	45.5	1,120.50	$16,875,000	Planned
4	1A230	City of Los Angeles	Lankershim Blvd, from Sherman Way to Interstate 5	Trash screens in catch basins, and dry wells	Upper Los Angeles River Watersheds	Metals, Bacteria, Trash	34.212103, -118.387787	176	-	$15,000,000	Planned
8	-	City of Santa Ana	Santa Ana Zoo	-	Newport Bay San Diego Creek San Diego Creek Watershed Upper and Lower Newport Bay	Copper, lead, zinc Dissolved copper Organochlorine Compounds	33.743898, -117.842515	-	-	$3,700,000	Planned
9	-	-	In San Diego County on Rte 125 from Elkelton Place to I-8 and on Rte 94 from 0.1 miles west of Lemon Grove Ave to Avocado Blvd.	-	Chollas Creek	Diazinon, Metals	32.734480, -117.015564	-	-	$10,000,000	Planned

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Project Title: Ah Pah Creek Habitat Improvement Project

Applicant: Yurok Tribe, Yurok Tribal Fisheries Department

Primary Contact: Sarah Beesley, Senior Fisheries Biologist – Yurok Tribal Fisheries Department
Email: sbeesley@yuroktribe.nsn.us Phone: (707) 296-8486

Project Watershed:
The project will be conducted in the Ah Pah watershed located within Humboldt County, California (Figures 1-2). Ah Pah Creek is a fourth order drainage that enters the Klamath River approximately 16 river miles upstream of the Pacific Ocean (Ah Pah Creek - Klamath River HUC ID: 180102091007). The watershed supports wild runs of late fall Chinook, Coho, steelhead, coastal cutthroat trout and numerous other native fish (natal populations), as well as supports critically valuable salmonid thermal refuge and rearing habitats to juvenile salmonids (particularly Coho Salmon) from throughout the entire Klamath Basin (non-natal populations). Most of the watershed is owned by Green Diamond Resource Company (GDRC) and is managed for industrial timber harvest. Although the watershed has been severely impacted by historic land use (logging, timber road & highway construction), Ah Pah Creek was designated as a priority for receiving restoration in the Yurok Tribal Fisheries Department's (YTFD) *Lower Klamath River Sub-Basin Watershed Restoration Plan* (Gale and Randolph 2000).

Target Pollutant:
The target pollutant for the Ah Pah Creek project is stream temperature. Various treatments will be employed to address legacy impacts that threaten stream temperature within this priority watershed.

Project Start and End:
The anticipated start date is July 11, 2026. The anticipated end date is December 31, 2028.

Project Description:
The Yurok Tribal Fisheries Department (YTFD) is proposing to conduct vital stream and riparian habitat improvements within Ah Pah Creek to enhance water quality and help support native fish recovery. Proposed actions include installing constructed wood jams (CWJs), removing legacy timber related infrastructure from riparian habitats, reconfiguring habitats to increase floodplain connectivity, creating and/or enhancing off-channel wetlands, mechanized removal of invasive plants, and native tree planting. This is part of a larger-scale effort to enhance and protect cold water resources in the Ah Pah Creek watershed. The project Ah Pah Creek Habitat Improvement Project design is presented as Figure 3. The first phase of work was conducted by YTFD and our restoration consultant Rocco Fiori of Fiori GeoSciences (FGS) during summer 2024. The team created a ~650 ft alcove (0.4 acres) (Figure 2: A-5) and relocation of a 900 ft section of timber road out of the floodplain which liberated ~1.0 acre of habitat.

There remains a significant amount of legacy road and landing fill within the project area that needs to be removed to achieve meaningful habitat improvements and ecological uplift. YTFD and FGS intend to enhance the alcove (A-5) constructed in 2024 and construct an additional alcove during summer 2025. The requested funds are anticipated to support restoration work targeted for 2026 – 2028 (July – October each year). YTFD has proposed a ~three-year project period to allow time to address any unforeseen complications and to observe restoration performance and apply lessons learned. However, YTFD anticipates completing the restoration work in summer 2027. Requested funds will support creation of three alcoves, installation of approximately 20 CWJs, and planting 500 native trees in riparian habitats.

Detailed Scope of Work:
Project administration will be led by Sarah Beesley (YTFD - Senior Fisheries Biologist). Ms. Beesley will work with CalTrans to finalize the project scope and execute the funding agreement if selected for

funding. YTFD anticipates project funding would be available by spring 2026; however, the Ah Pah Creek Project is shovel ready and work could be initiated sooner if desired by the funding agency. The funding agreement process will establish all the project requirements including invoicing and reporting protocols and associated timelines. Ms. Beesley, YTFD, and the Yurok Tribe have extensive experience successfully contracting and executing projects with a wide range of funding partners. Lead YTFD staff will be responsible for coordinating agency site visits and any related outreach activities with CalTrans.

YTFD coordinated with FGS to design the project (Figure 3) and YTFD anticipates continuing to partner with FGS to complete the work. The project entails installing various fish habitat structures, enhancing and/or creating off-channel wetlands, removing legacy road and/or landing fill from riparian habitats and rehabilitating those areas, mechanized and hand removal of invasive plants, and tree planting.

YTFD has secured all the required environmental and cultural resource authorizations to conduct the Ah Pah Creek Project. The current compliance authorizations are outlined in Table 1. All authorizations and permits will provide project coverage through the 2028 restoration season (July – October).

Table 1. Environmental Compliance Strategy for the Ah Pah Creek Project.

Authorization	**Lead Agency**	**Agency Contact**	**Status**
Section 7 ESA	U.S. Fish & Wildlife Service (USFWS)	Greg Gray (USFWS) *greg_gray@fws.us*	Complete March 2023
	National Oceanic & Atmospheric Administration (NOAA)	Marisa Parish (NOAA) *marisa.parish@noaa.gov*	Complete June 2024
Section 106	Yurok Tribe Cultural Resources Department	Rosie Clayborn - Yurok Tribal Heritage Preservation Officer *rclayburn@yuroktribe.nsn.us*	Complete Feb. 2024
	U.S. Fish & Wildlife Service (USFWS)	Greg Gray (USFWS) *greg_gray@fws.us*	Complete Spring 2024
401 Permit	North Coast Regional Water Quality Control Board	Forest Fortescue *forest.fortescue @waterboards.ca.gov*	Complete April 2024
404 Permit	U.S. Army Corps of Engineers (USACE)	Kasey Sirkin (USACE) *L.K.Sirkin@usace.army.mil*	Complete June 2024
NEPA	U.S. Fish & Wildlife Service (USFWS)	Greg Gray (USFWS) *greg_gray@fws.us*	Complete June 2025
CEQA	California Department of Fish & Wildlife (CDFW)	Nicholas Simpson (CDFW) *Nicholas.Simpson@wildlife.ca.gov*	Complete Feb. 2024

Heavy equipment and hand labor will be used to conduct the habitat enhancement actions described herein. Construction will occur in the typical dry season (July-October). This construction period was selected to take advantage of subsurface and/or low flow conditions within treatment areas to minimize and/or avoid impacts to aquatic resources and protect various sensitive species. Prior to heavy equipment operations, YTFD and FGS will review safety protocols related to working with heavy equipment and associated hazards, general safety protocols, fire and spill prevention and management procedures. Safety meetings will be conducted throughout restoration operations. Heavy equipment and on-site vehicles will

be equipped with fire suppression gear, first aid kit, hazmat spill kit, and emergency communications. Employees will receive and be required to use the proper safety gear during all field operations. Restoration implementation actions are following comprehensive best management practices and all requirements outlined in the project permits and authorizations listed in Table 1.

To help evaluate how well the project meets the intended goals, YTFD will conduct photo-monitoring and habitat assessments as funding allows. Success criteria will be defined by post-project increases in habitat complexity and floodplain connectivity. Assessment of habitat complexity will be accomplished via use of repeat photo-documentation and habitat assessments. Habitat mapping protocols to be used include California Department of Fish and Wildlife habitat inventory methods and similar. The baseline (pre-project) survey was conducted in May 2024. The post-project survey will be conducted following completion of the project (spring 2027 or 2028). Given the complex sediment dynamics occurring in the watershed, no success criteria will be set for any habitat metrics. However, YTFD will report on baseline and post-project metrics such as pool frequency, average residual pool depth, percent habitat cover for pools, and pool shelter rating. YTFD hypothesizes the project will help improve pool metrics in the reach.

For photo-monitoring, YTFD has established a network of geo-referenced sites in the project reach and has begun collecting baseline, construction, as-built, and post-restoration photographs. YTFD will continue expanding the network of photo-points and collecting photographs at various times throughout the project's duration. Objectives are to document habitat conditions at different flow levels and stages of implementation to help assess and characterize potential habitat changes resulting from restoration.

Outcomes:

For this project, YTFD is proposing to achieve the following:

- Increased anadromous fish habitat diversity, function, and resiliency within ~20 acres and 1.0 river mile of Ah Pah Creek via implementation of process-based, restorative measures.
- Increased health and resiliency of ~20 acres of riparian habitat.
- Increased watershed health and resiliency via removal of legacy infrastructure from riparian habitats.
- Improved economic opportunities for the community via support of green-based jobs for tribal citizens and local professionals and via procurement of supplies/services from local/regional vendors.
- Increased knowledge sharing via project partner engagement and outreach activities.

Implementation monitoring will collect the following information to help document project outcomes:

- Total river miles addressed via habitat enhancement actions (Target 1.0 Mile)
- Total acres addressed via habitat enhancement actions (Target 20 acres)
- Number of constructed wood jams and other habitat features installed (Target $\geq$20)
- Number of off-channel wetlands (alcoves) created/enhanced (Target 3)
- Number of native trees/shrubs planted (Target 500)

Photo-monitoring results and a summary of the pre- and post-project habitat assessments will be provided as part of this project. Reporting will be completed as outlined in the funding agreement.

Schedule:

2026	Tasks & Milestones	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26
	Project Administration	Yurok / Agency Coordination			**Execute Agreement**		Project Administration (Reporting/Documenting/Invoicing/Site Visits)						
	Habitat Enhancement							**Year 1 Implementation**					
	Photo-Monitoring	→											
2027	**Tasks & Milestones**	**Jan-26**	**Feb-26**	**Mar-26**	**Apr-26**	**May-26**	**Jun-26**	**Jul-26**	**Aug-26**	**Sep-26**	**Oct-26**	**Nov-26**	**Dec-26**
	Project Administration	Project Administration (Reporting/Documenting/Invoicing/Site Visits)											
	Water Quality Enhancement							**Year 2 Implementation**					
	Photo-Monitoring	→											
2028	**Tasks & Milestones**	**Jan-26**	**Feb-26**	**Mar-26**	**Apr-26**	**May-26**	**Jun-26**	**Jul-26**	**Aug-26**	**Sep-26**	**Oct-26**	**Nov-26**	**Dec-26**
	Project Administration	Project Administration (Reporting/Documenting/Invoicing/Site Visits)										**Final Report/Invoice**	
	Water Quality Enhancement							**Year 3 Implementation** (If Deemed Necessary)					
	Photo-Monitoring	→											
	Habitat Mapping				Post-Project Survey					**Final Monitoring Report**			

Project Budget:

Table 2. Ah Pah Creek Project Budget.

Budget Class	**Totals**
Personnel	$187,040.00
Fringe 31%	$57,983.00
Travel (GSA)	$2,000.00
Equipment	$0.00
Supplies	$12,222.00
Contractual	$220,600.00
Total Direct	$479,845.00
Indirect 36.99%	$95,155.00
Total Request	**$575,000.00**

References Cited:

Gale, D.B. and D.B. Randolph. 2000. Lower Klamath River Sub-basin Watershed Restoration Plan. Yurok Tribal Fisheries Department – Lower Klamath Program, Klamath, California.

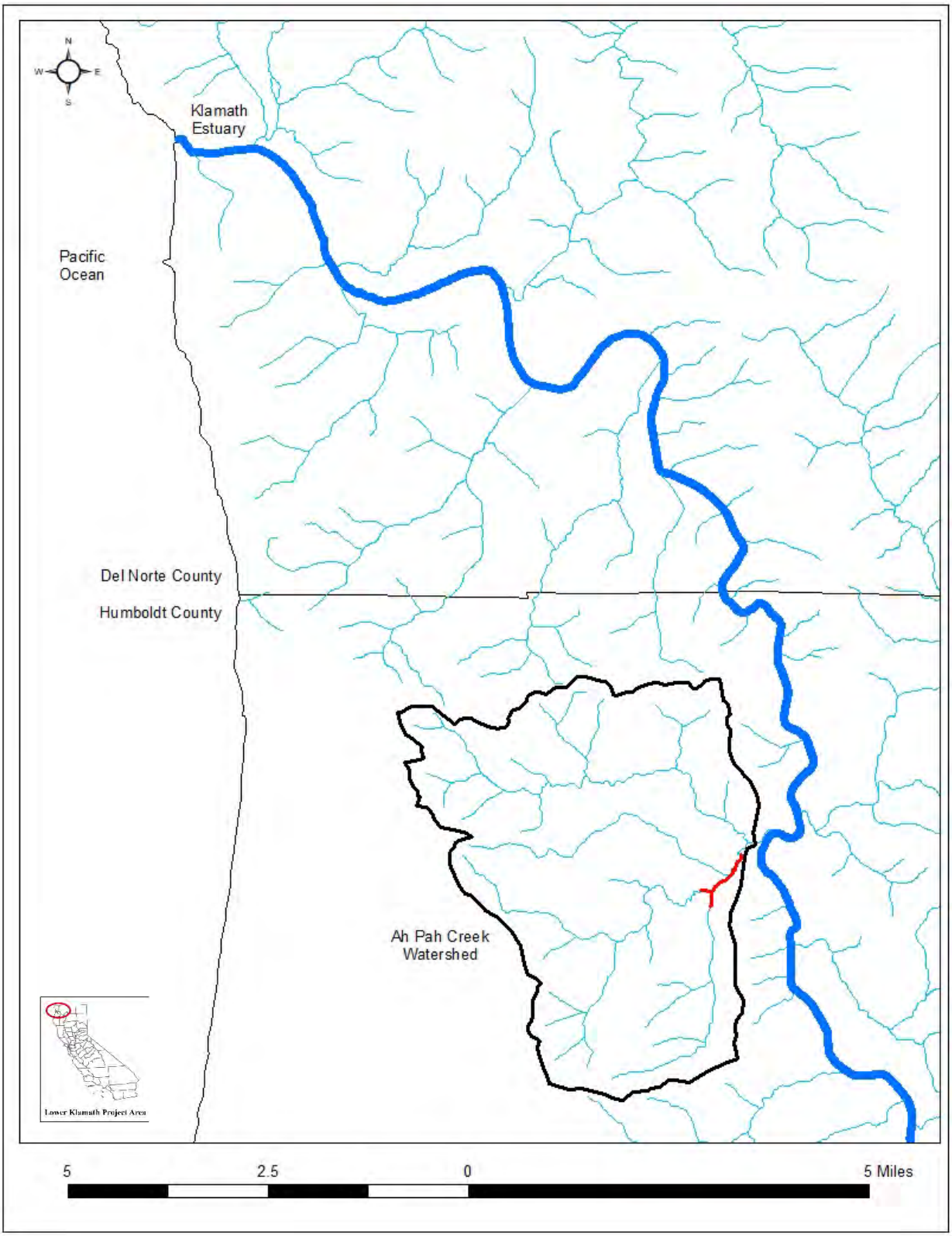


Figure 1. Location map depicting the Ah Pah Creek watershed, Lower Klamath River, California.

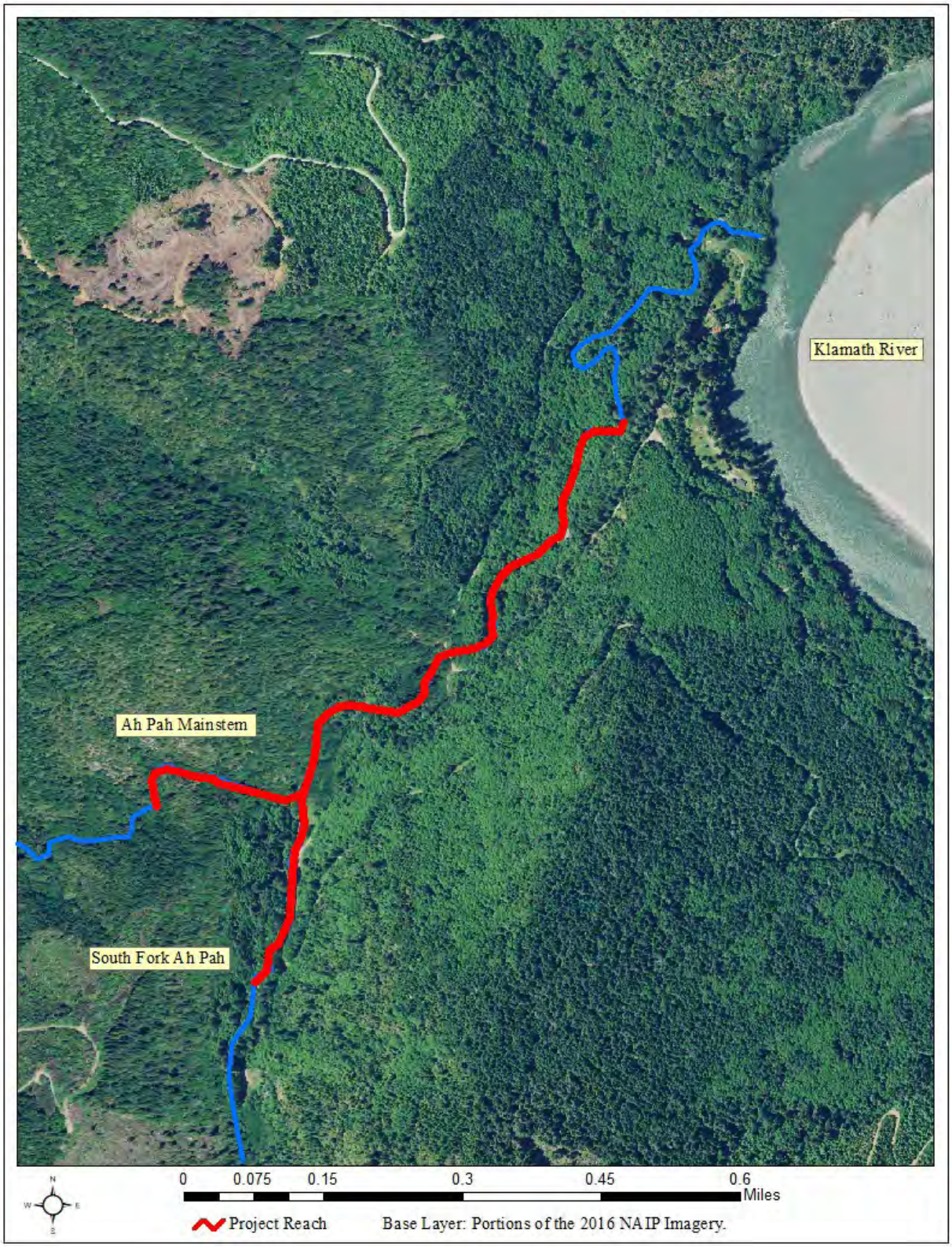


Figure 2. Map depicting the Ah Pah Creek project reach, Lower Klamath River, California.

EXPLANATION

Large Wood Features

- Constructed Wood Jam
- Groundwater Palasade

Floodplain Treatments

- Alcove (A-# = Feature Number)
- Floodplain Fill Removal
- Road Grade Raise
- On-Site Disposal

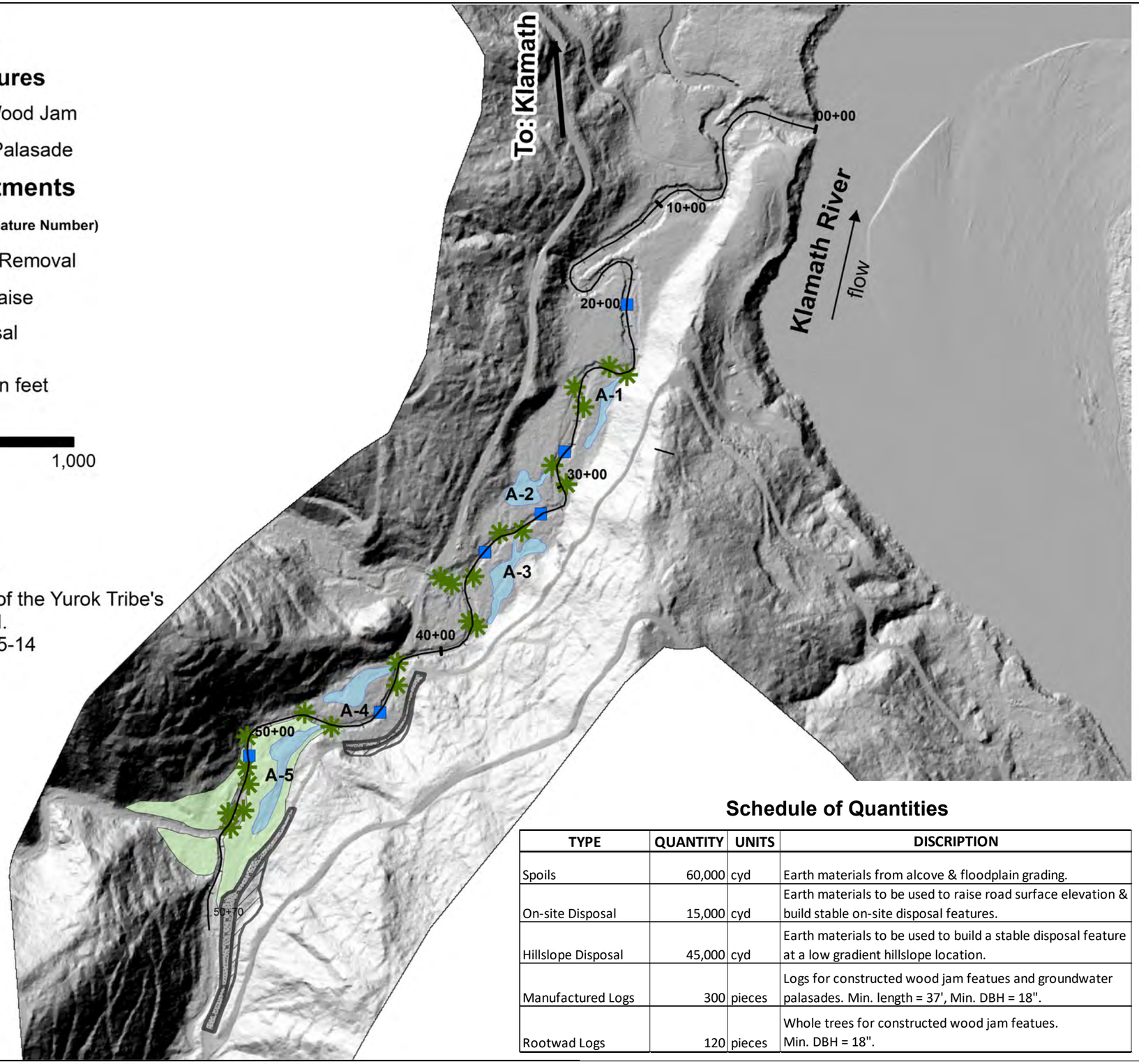
Stationing in feet

Feet

0 250 500 1,000

N

Base layer: Portions of the Yurok Tribe's 2016 1m LiDAR DEM.
Map by: FGS 2024-05-14



Schedule of Quantities

TYPE	QUANTITY	UNITS	DISCRIPTION
Spoils	60,000	cyd	Earth materials from alcove & floodplain grading.
On-site Disposal	15,000	cyd	Earth materials to be used to raise road surface elevation & build stable on-site disposal features.
Hillslope Disposal	45,000	cyd	Earth materials to be used to build a stable disposal feature at a low gradient hillslope location.
Manufactured Logs	300	pieces	Logs for constructed wood jam featues and groundwater palasades. Min. length = 37', Min. DBH = 18".
Rootwad Logs	120	pieces	Whole trees for constructed wood jam featues. Min. DBH = 18".

YUROK TRIBE FISHERIES DEPARTMENT
AH PAH CREEK RESTORATION PROJECT

Project Name

PROJECT DESIGN

Sheet Title

Prepared by/Date
FGS
JUNE 2024

Sheet Number
1 of 1

Figure 3. Design sheet for the Ah Pah Creek Restoration Project.

South Fork Trinity TMDL
Sediment Reduction Project

Project Watershed: **South Fork Trinity River, Butter Creek Compartment**

Target Pollutant: Sediment

INTRODUCTION: The Trinity County Resource Conservation District (TCRCD) has a cooperating agreement with Shasta-Trinity National Forest to conduct road maintenance activities to reduce road related sediment delivery. The TCRCD, located in Weaverville, CA proposes road storm-proofing work on public USFS roads along **113 miles** of USFS Maintenance Level 1 thru 3 roads in the Butter Creek Compartment of South Fork Trinity River (SFTR). The vast majority of the project area are federal lands managed by STNF, as usual, there are some limited private inholdings. This project lies immediately south of Hyampom flowing directly to the South Fork Trinity. The Butter Creek Watershed Analysis in 1994 led to decommissioning activities that both the STNF and TCRCD implemented in the late 90s. These decommissions that were completed are presented on an attached map and then not shown again to make the map appearance cleaner. This project will be limited to work on USFS roads in the Butter Creek compartment.

There are **65 roads** in the watershed and multiple blueline crossings, we will prioritize roads by # and type of water crossings, inlet basin condition/ culvert capacity for large storm events, disconnecting road surface/ditch delivery where needed and eliminating diversion potential at stream crossings. *Every road* will be looked at to assure that the culverts are open, there is limited diversion potential and adequate road drainage.

The TCRCD will notify NCWQCB if we need to address any CAT B permitting for road restoration work that exceeds the Forest Order CAT A activities.

CONTACT INFORMATION: Cynthia Tarwater, Roads Program Manager @ **Trinity County Resource Conservation District** by email at ctarwater@tcrcd.net

PROPOSED STATEMENT OF WORK: The TCRCD proposes to stormproof **113 miles** in the Butter Creek Compartment of the South Fork Trinity including approximately **200 spring, swale or stream crossings** excluding ditch relief culverts. The TCRCD has extensive experience in road-storm proofing and watershed restoration; standard State and Forest BMPs will be utilized and all disturbed areas near or draining to watercourses will be seeded and mulched after treatment.

This work will include only activities approved in Category A under the Federal Lands Permit and may include:

- Cleaning inlet basins at culverted water crossings or standard ditch relief culverts where needed.
- Constructing Critical dips at stream crossings with diversion potential utilizing rock armor where needed, forwarding information of crossings where our remedial work will not be sufficient long term and upsizing is needed.
- Installation of flared end sections, drop inlets or cutting of bevels on culvert inlets to increase culvert capacity and reduce plugging potential.

- Rock armoring of inlets and outlets where active scouring is occurring.
- Cleaning of inboard ditches if the action can reduce sedimentation or installation of ditch relief culvert or rocked rolling dips to disconnect the ditch from watercourse.
- Cleaning of outlets of existing rolling dips or the construction of new rolling dips to alleviate surface road erosion and disconnect from watercourses.
- Minor brushing, grading and spot rock surfacing of area with poor soils.
- Removal of and safe disposal of slide material blocking road access
- Stabilization of road fill failures
- Reporting of sites deemed outside of CAT A activities and pursue CAT B approval

COST ESTIMATE NARRATIVE/SOW: Minor expenditures would cover reviewing older inventories, prioritize road maintenance projects and most will be used to layout and implement road improvements on **113 miles on 65 roads**, TCRCD project management including recon, layout and design, permitting, procurement of local contractors for equipment work, culvert/hardware/erosion control supplies and staffing required for oversite of construction activities, labor, critical area treatments, reporting, and administrative expenses.

Project Start Date: Spring 2026 continuing until complete.

Total Estimated Project Budget: **$960,500**

PROJECT SCHEDULE: Start Spring/Summer 2025-26

PROJECT SCHEDULE:

TCRCD PROJECT SCHEDULE

TASK	DURATION	EST. START	EST. END	2025												2026												2027											
	Months			Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Cal Trans Agreement	2	1/1	3/1																																		
Review/Contracting	2	3/1	4/30																																		
Implementation	6	5/1	10/30																																		
Reporting	2	11/1	12/31																																		

Note: Implementation will take place during summers months when creeks are dry or at low flow.

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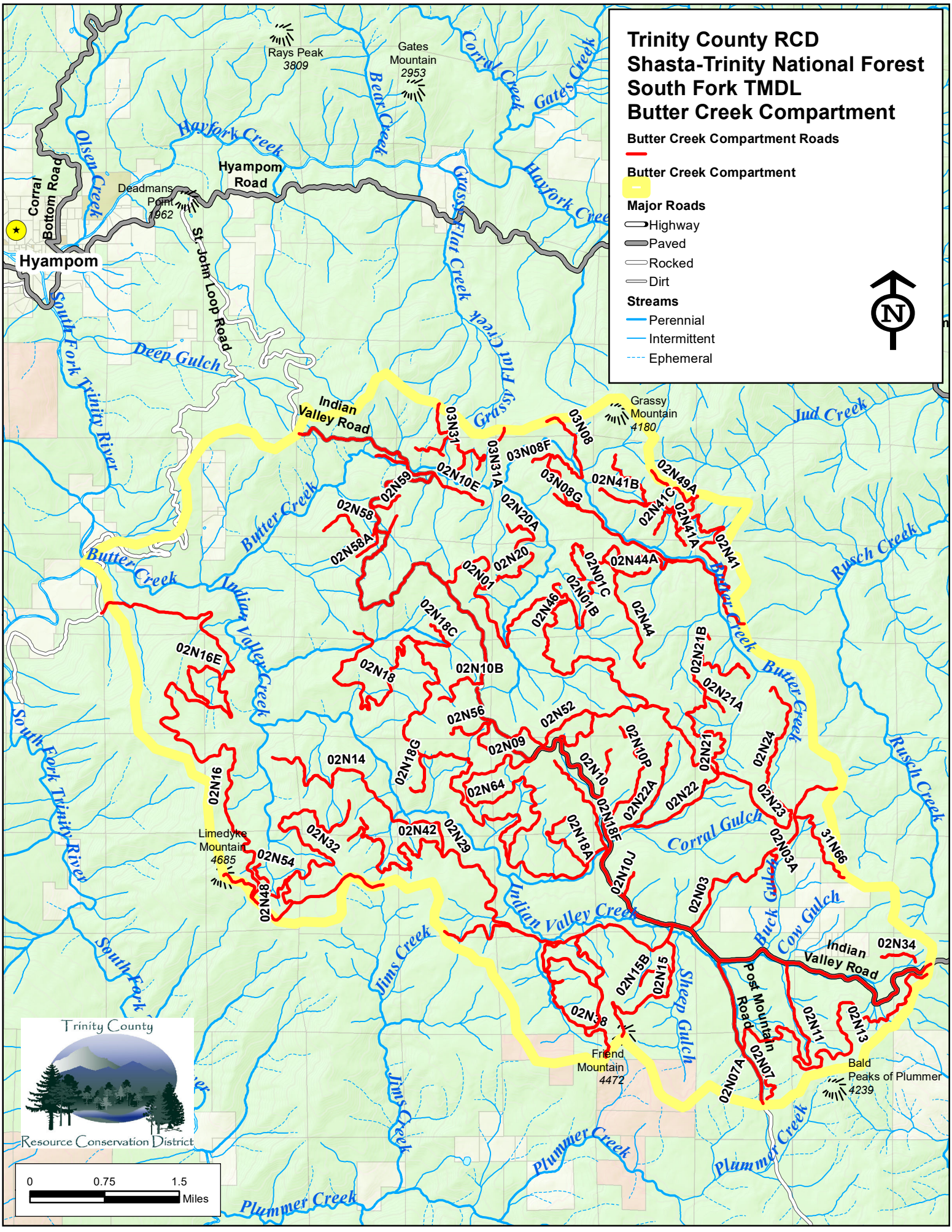
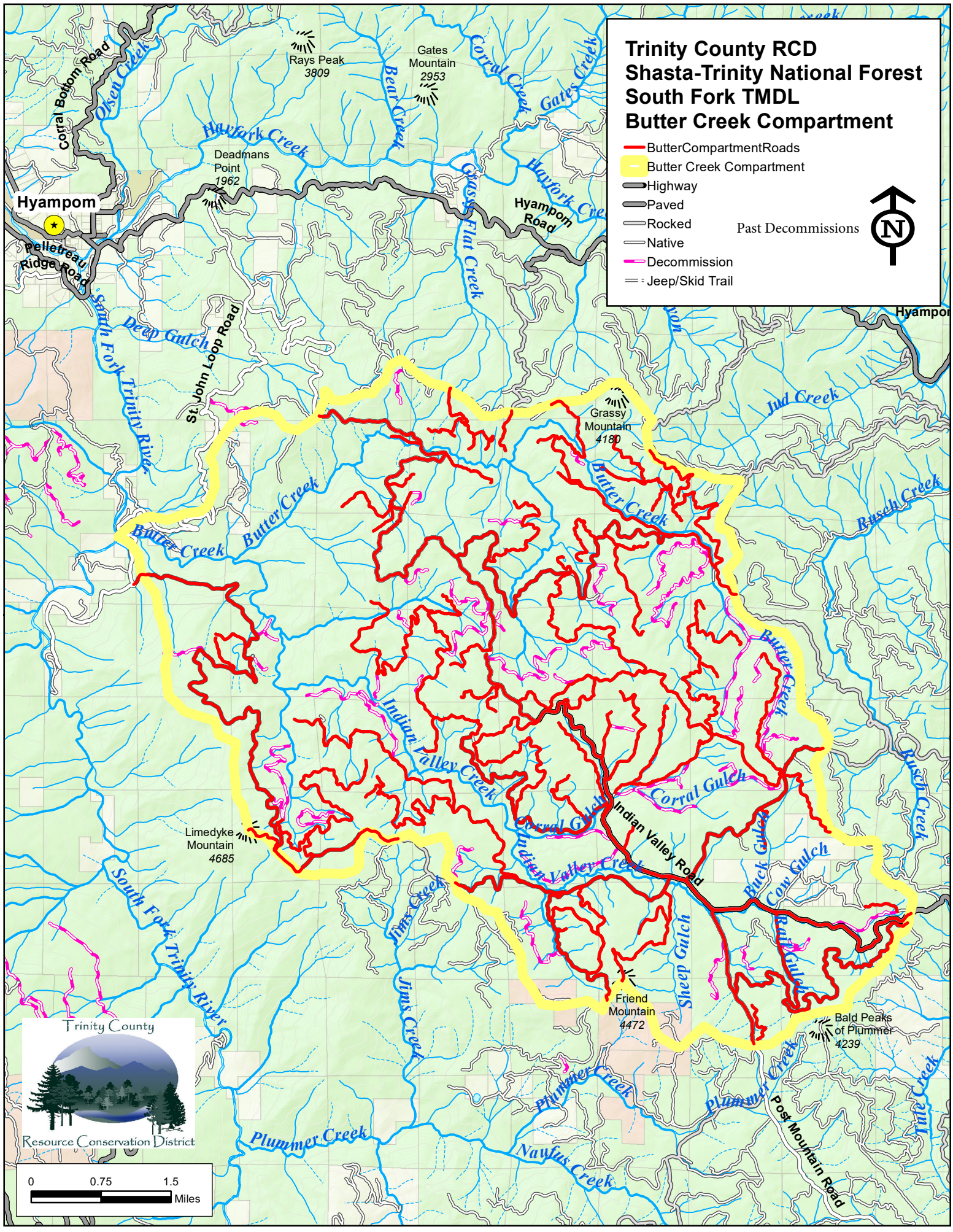

Trinity County RCD
Shasta-Trinity National Forest
South Fork TMDL
Butter Creek Compartment
Butter Creek Compartment Roads
Butter Creek Compartment
Major Roads
Highway
Paved
Rocked
Dirt
Streams
Perennial
Intermittent
Ephemeral
N
Rays Peak
3809
Gates Mountain
2953
Hayfork Creek
Bear Creek
Corral Creek
Gates Creek
Olsen Creek
Corral Bottom Road
Hyampom Road
Deadmans Point
1962
St. John Loop Road
Hyampom
South Fork Trinity River
Deep Gulch
Grass Flat Creek
Indian Valley Road
Grassy Mountain
4180
Jud Creek
Butter Creek
Rusch Creek
Indian Valley Creek
Limedyke Mountain
4685
Corral Gulch
Buck Gulch
Cow Gulch
Jims Creek
Sheep Gulch
Post Mountain Road
Friend Mountain
4472
Bald Peaks of Plummer
4239
Plummer Creek
03N37
03N31A
03N08F
03N08
02N10E
02N59
02N58
02N58A
02N20A
02N41B
02N49A
02N41C
02N47A
02N41
02N44A
02N01
02N20
02N01C
02N01B
02N46
02N44
02N18C
02N16E
02N18
02N10B
02N21B
02N21A
02N56
02N52
02N09
02N10P
02N21
02N24
02N14
02N18G
02N10
02N22A
02N22
02N23
02N16
02N64
02N18E
02N03A
31N66
02N32
02N42
02N29
02N18A
02N10J
02N54
02N48
02N03
02N34
02N15B
02N15
02N38
02N11
02N13
02N07A
02N07
Trinity County
Resource Conservation District
0
0.75
1.5
Miles


Trinity County RCD
Shasta-Trinity National Forest
South Fork TMDL
Butter Creek Compartment
ButterCompartmentRoads
Butter Creek Compartment
Highway
Paved
Rocked
Native
Decommission
Jeep/Skid Trail
Past Decommissions
N
Hyampom
Rays Peak
3809
Gates Mountain
2953
Deadmans Point
1962
Grassy Mountain
4180
Limedyke Mountain
4685
Friend Mountain
4472
Bald Peaks of Plummer
4239
Corral Bottom Road
Olsen Creek
Hayfork Creek
Bear Creek
Corral Creek
Gates Creek
Grass Flat Creek
Hyampom Road
Pelletreau Ridge Road
South Fork Trinity River
Deep Gulch
St. John Loop Road
Butter Creek
Jud Creek
Busch Creek
Indian Valley Creek
Corral Gulch
Indian Valley Road
Buck Gulch
Cow Gulch
Rail Gulch
Sheep Gulch
Jims Creek
Plummer Creek
Nanfus Creek
Post Mountain Road
Trinity County
Resource Conservation District
0
0.75
1.5
Miles

PROJECT SCOPE SUMMARY:

Hole-in-the-Ground Water Quality and Flow Enhancement Project

Applicant--California Trout, Inc., January 17th, 2023

Introduction:

The Hole-in-the-Ground Water Quality and Flow Enhancement (Project) is a water quality and flow enhancement project located in the Shasta River upstream of the confluence with Parks Creek. There are roughly 6 miles of the Shasta River from the base of Dwinnell Dam to Parks Creek. This is a critical stream reach as it possesses cold water contributions from several spring systems that produce cool, nutrient rich water that drives productive habitats used by the endangered Southern Oregon/Northern California Coast (SONCC) Coho Salmon (*Oncorhynchus kisutch)* and other cold water dependent species.

Hole-in-the-Ground (HIG) Ranch is situated along the upper Shasta River in an area with exceptional restoration potential for Coho as it contains some of the most valuable aquatic habitats in the region, including Clear Spring, a stable spring source that immediately discharges into the Shasta River. HIG Ranch is a participant in the multi-stakeholder Shasta Safe Harbor Agreement (SHA), which was signed in early February 2021, and affords ranchers regulatory protections against incidental "take" in exchange for ecological enhancements on their land - often in the form of dedicated cold water flow. This Project is one of the SHA's highest priorities - where improvements to irrigation conveyance and delivery systems for ranchers will result in improved instream temperatures and expanded habitat for Coho.

California Trout (CalTrout) will coordinate this work in partnership with Emmerson Investment Inc, Montague Water Conservation District (MWCD) and GS Black, Inc. Caltrans will receive compliance credits for TMDL reductions and provide project funding support - the Shasta River community will benefit from improved instream habitat within a critical salmonid bearing area.

The project for which we request funding is currently at 75% design stage (designs available on request). Funding for full design and acquiring construction permitting has been awarded through NFWF. Some funding may be needed to acquire other permits as some of those aspects were not fully funded in the NFWF proposal. We expect 100% design to be completed by July 2023 and permitting shortly after.

We are also actively pursuing matching funding for this project and will apply to NFWF for a recently awarded Regional Conservation Partnership Program Grant from NRCS called "Shasta Valley Farm and Fish Drought Resilience". This funding will be awarded specifically to flow enhancement projects in the SHA area.

Background:

The Hole in the Ground Ranch (HIG) is located on the Shasta River just upstream from the Parks Creek confluence. Spring source inputs and sub-surface contribution to the gaining stream provide for year-round habitat and critical over-summering rearing habitat for Coho salmon. HIG has made voluntary commitments for securing habitat conditions optimal for the enhancement of survival of the SONCC coho salmon, as well as Chinook salmon (*O. tschawitscha*) and Steelhead (*O. mykiss*) through a secured Safe Harbor Agreement (SHA) with NOAA. HIG is coordinating with its neighbors, Hidden Valley Ranch

and Montague Water Conservation District, through a reach-wide conservation strategy, to enhance instream habitat in the upper Shasta River (a stream reach from Dwinnell Reservoir to Parks Creek Confluence). A more comprehensive presentation of the voluntary agreements made can be found at https://www.fisheries.noaa.gov/resource/document/shasta-river-template-safe-harbor-agreement-and-site-plans.

Montague Water Conservation District (MWCD) owns and operates Dwinnell Reservoir and provides water to HIG and Hidden Valley Ranch through a contract agreement (referred to as prior rights agreements) developed when Dwinnell Reservoir was constructed. MWCD supports this application which complements the conservation objectives of MWCD with its neighbors on the Upper Shasta stream reach. MWCD, Hidden Valley Ranch and HIG hold Safe Harbor Agreements with NOAA. The conservation strategy for the upper Shasta River is constructed considering a stream reach strategy where all life stage needs for Coho Salmon are met and enhanced through implementation of the proposed conservation measures. The upper Shasta River stream reach strategies identified in the Shasta River Safe Harbor Agreement Flow Management Strategy (June 2020) and attached as a supplementary document to this application (Attachment 1). The implementation of this project will accomplish several priority objectives identified in the upper Shasta stream reach conservation strategy, further defined below.

The primary irrigation source for HIG is the Shasta River and related springs. These sources of water are defined in the 1932 Shasta River Decree and contract agreements ("prior right agreement") to deliver water to the HIG from Dwinnell Reservoir. As a result of the prior rights agreements, HIG receives a set amount of water from MWCD. HIG notifies MWCD when and how much water to release for re-diversion at its points of diversion, roughly 2.5 -3.0 river miles below Dwinnell Reservoir. The water released to HIG from MWCD is then diverted either at HIG via their Gravity Diversion (uppermost diversion) or the Pump Diversion (0.8 miles downstream from the Gravity Diversion) or a combination of the two. It is important to note that cold water from Clear Springs discharges water to the Shasta River between the two diversions. Threatened coho salmon utilize the upper Shasta River reach throughout the year.

The temperature of water received at HIG's diversions varies depending on time of year, flow volume and storage conditions in Dwinnell Reservoir. MWCD releases water to the Shasta River for multiple purposes including municipal, environmental and deliveries of prior rights. During summer months the water released from Dwinnell Reservoir can be warm and unsuitable for Coho Salmon. MWCD is implementing improved infrastructure and has committed to management strategies to monitor and manage the water quality parameters released to the Shasta River. Since 2018, MWCD has been providing pumped cold groundwater to the Shasta river below Dwinnell Reservoir to improve the temperature of water released to the Shasta River and maintain an off channel cold water habitat that has been constructed below the dam. These measures provide a cold water refugia near the base of Dwinnell Dam and have improved water quality parameters including water temperature released to the Shasta river for varied purposes. Even though the stream reach is a gaining stream, the summer months result in reduced spring production (and increased diversion from spring sources), and increased ambient temperatures warm streamflow as it continues downstream resulting in reduced and less

dependable over-summering habitat. Over-summering habitat is identified as likely the most limiting factor for Coho in the Shasta River. Protecting and expanding over-summering habitat and water quality is an important component of this project and the strategy of the stream reach objectives.

Project Description Summary:

An objective of this project and other coordinated projects within the upper Shasta stream reach is to provide infrastructure and develop operations plans to better manage and protect spring sources and cold water inputs to improve and expand dependable over-summering habitat. These projects are coordinated through each SHA participant's commitments in coordination with CDFW, NOAA and more recently, the *NCRWQCB.*

This project site is located on HIG, a working beef cattle ranch owned by Emmerson Investments, Inc (see map Attachment 2). They have 3 sources of water for irrigation and stock water, so called 'Prior Rights' from MWCD, and 2 spring sources, one is roughly 2.5 cfs from Clear Springs and the other is an unnamed spring diverted under a riparian claim. There are two Points of Diversion (POD) on the ranch (see Attachment 2), the most upstream POD is the Gravity Diversion. Roughly ½ mile below the Gravity Diversion is Clear Springs, which flows into the Shasta River channel, and less than ½ mile below that is the most downstream POD, a pump station and sump located approximately 250 ft off-channel. Prior rights can be diverted from either the Gravity Diversion or at the pump station and the water rights from the springs flow downstream and are diverted at the pump station. As a result of the project, both points of diversion will remain operable dependent on management conditions and triggers.

This project will replace about 5,500 feet of the earthen Gravity Diversion ditch with a 27" diameter PVC pipe to increase delivery efficiency. The proposed pipeline would be capable of diverting all of the prior rights at the Gravity Diversion to allow all prior rights water to be diverted prior to mixing with the discharge of Clear Springs. This will provide additional operational flexibility to protect, expand and make the over-summering refugia created by Clear Springs more dependable. Full diversion from the Gravity Diversion is triggered when the Shasta River water temperatures reach 18°C at HIG's upper fence line, preventing dilution of the cold water provided to the Shasta River by Clear Springs. In order to achieve this objective, a new diversion intake structure and fish screen must be constructed at the Gravity Diversion as a component of this proposal. The reconstructed POD will allow for year round fish passage, meet current fish screening criteria and possess a flow measuring device and headgate to control the volume of water diverted. The proposed infrastructure and pipeline will be capable of diverting up to 8.0 cfs. When piping is completed, the seepage loss saving (between 0.5 to 1 cfs) will be left instream provided by the cold spring water of Clear Springs.

Additionally, a diversion upgrade at the Gravity Diversion will allow HIG to participate in a substitution program where warmer water from MWCD Dwinell Reservoir is provided in exchange for cold spring water from Clear Springs. MWCD's exchange water will leave up to 1.5 cfs of additional cold water from Clear Springs instream. Depending on what Clear Springs is producing at the time, roughly 0.5 to 2.5 cfs of cold spring water from Clear Springs could be left instream with the efficiency improvement and the exchange project. During this time, the pump diversion will be diverting a reduced volume or not operating at all depending on conditions and operational objectives, leaving Clear Springs flow instream.

In order to conduct the exchange and monitor the effectiveness of the project, multiple gauging sites will need to be installed so that the timing and amount of flow diverted and the amount of spring water left instream are all verified. This includes some telemetered data where real-time management is needed to meet resource objectives and track effectiveness. These are described below in Task 2b: Project Monitoring and in the attached Monitoring Plan : Diversion Combine (Attachment 3).

A unique component of this project includes conducting an investigation to evaluate the construction feasibility of piping delivery of prior rights to the Hole in the Ground Ranch as well as the Hidden Valley Ranch (Attachment 4). The pipeline would be used in lieu of releasing water to the Shasta River intended for prior rights. In concept, the pipeline would be used when water quality released by MWCD is considered unsuitable for instream benefit.

MWCD is supportive of investigating the concept and will work with CalTrout to conduct and manage the investigation. MWCD will work with prior rights users and potential landowners that would be affected by the potential project. The objective of the investigation would include assessing the cost and construction feasibility of installing a pipeline from Dwinnell Reservoir or MWCD's main canal to the prior rights users. This would include assessing potential alternatives for routing the pipeline while evaluating cost, benefits for the resource and for irrigation. The investigation would need to assess how the proposed pipeline would become incorporated into the proposed HIG Gravity Ditch pipeline.

The applicant and MWCD would work with Shasta Water Conservation Group (SHA landowner group), CDFW, NOAA and NCRWQCB to develop standards for water quality metrics when the proposed pipeline would be used in lieu of releasing prior rights to the Shasta River.

The investigation will also explore and potentially model the value of delivering pumped groundwater to various locations within the reach. Under this scenario, the project would be exploring delivering cold water and warm water in independent pipelines to assess potential to expand cold water habitat within the reach of the Shasta River.

Project Objectives and Resulting Resource Benefits:

- Increase irrigation efficiency, increase operational management to enhance water quality, particularly temperature and flow conditions,
- Protect and expand oversummering habitat by diverting all prior rights flow and exchange water at the upper Gravity Diversion, which allows Clear Springs flows to dominate the flows in the Shasta River. This will provide dependable and expanded cold over-summering habitat for Coho.
- Proposed infrastructure will allow the cold water exchange program with MWCD to be implemented and expand the contribution of flow from Clear Springs downstream through the SHA reaches of the Shasta River and accomplish several objectives of the Shasta River SHA Flow Management Strategy (Attachment 1).

- Monitoring will allow operators to manage the project to achieve the best operational conditions through adaptive management to acquire optimum conditions for irrigation and instream resources.

Project Details:

Task 1: Project Management and Outreach

Manage and coordinate all aspects of the project including grant administration, invoicing, reporting, project design, partner outreach and engagement, work plan preparation and partnership management, and management of all subcontractors, tasks and deliverables per schedule.

Deliverables:

- Reporting and invoicing completed on schedule
- Final subcontracts submitted
- Final Project Report

Task 2: Permitting, Project Monitoring, Engineering and Construction Oversight

2a Permitting

Prepare and submit necessary permitting, this may include biological, botanical and wetland survey (archeological surveys were completed by NOAA) and depending on the project size either SHRP and HREA or the General Order for Large Restoration Projects. The streamline permitting approach will fulfill CEQA requirements.

2b Project Monitoring

Develop and implement a Monitoring Plan in coordination with CDFW, RWQCB and NOAA that installs stations to fulfill all aspects of the project see Attachment 3.

2c Engineering- MWCD-Feasibility Investigation

Produce a feasibility investigation that assesses cost and feasibility of piping HIG prior rights water and exchange water from MWCD main canal to HIG Gravity Diversion (Attachment 4).

2d Construction Oversight

This includes day-to-day management of construction activities 1) to ensure the contractual and design-related requirements are being met, 2) construction related costs and schedule monitoring, 3) construction related activities are tracked and documented and relayed to project partners and 4) the transitional stages of project are completed efficiently and effectively.

Deliverables:

a. Final Permits acquired

b. Finalized Monitoring Plan, installation of required project monitoring elements and prepare a final report summarizing temperature benefits due to project implementation and water management based on soil moisture conditions.
c. Feasibility Report with preliminary designs and engineering cost estimates.
d. Inspection reports and certificates of final completion

Task 3: Construction

Deliverables:

a. Reconstructed compliant point of diversion at the HIG Gravity Diversion that meets fish passage and screening criteria, measures flow and controls flow with an adjustable headgate.

b. Install approximately 6,000' of pvc pipe to improve delivery efficiency while delivering irrigation water to property served by the gravity diversion and the pumped diversion, which isolates Clear Springs from prior right deliveries, protecting and extending over summering habitat

c. Provide infrastructure to facilitate cold water exchange with MWCD, allowing protection of Clear Springs deliveries in exchange for water provided by MWCD for irrigation.

d. As-built design will be provided at the end of construction

Budget:

Hole-in-the-Ground Water Exchange and Flow Enhancement Project	
Task 1. Project Management and Outreach	Budget
Project Managers (30% time, 2 yr)	$ 38,160
Grant Administrator (12% time)	$ 18,970
Project Coordinator (12% time)	$ 17,472
Communication (5%)	$ 8,320
Finance and Compliance Manager (8 hrs/quarter)	$ 2,944
Regional Director	$ 12,200
Subtotal Personnel Services	***$ 98,066***
Staff Benefits (40%)	$ 39,226
Personnel Services	***$ 137,292***
Mileage- CalTrout	$ 4,000
Equipment-Hobo Loggers	$ 5,000
Pusher Inc. for Communication and Marketing	$ 6,500
Task 1 Total	**$ 152,792**

Task 2. Permitting, Project Monitoring, Engineering and Construction Oversight	
Subcontracting - Permitting	$ 25,000
Subcontractor - Project monitoring	$ 100,000
Eyasco - Real Time Monitoring Stations	$ 60,000
Montague Water Conservation District - Pipeline Feasibility Study	$ 150,000
AquaTerra Consulting LLC - Construction Management	$ 30,000
David's Engineering - Engineering & Construction Support	$ 75,000
Subcontractor - Soil Moisture Monitoring	$ 15,000
Task 2 Total	**$ 455,000**
Task 3. Construction	
GS Black, Inc. - Conveyance Pipeline and Diversion Combine + constructed Riffle	$ 1,087,000
Task 3 Total	**$ 1,087,000**
Subtotal	**$ 1,694,792**
NICRA (20.13%)	$ 71,017
Contingency 10%	$ 169,479
GRAND TOTAL	**$ 1,935,28**

ATTACHMENTS

Attachment 1: Shasta River Safe Harbor Agreement Flow Management Strategy

Attachment 2: Project Location Map

Attachment 3: Monitoring Plan : Diversion Combine

Attachment 4: Prior Rights Pipeline Feasibility Study

Attachment 1:

Draft Shasta River Safe Harbor Agreement

Flow Management Strategy

June, 2020

By:

National Marine Fisheries Service
Coastal California Office
Protected Resources Division

Klamath River Branch
1655 Heindon Rd, Arcata, CA 95521

AquaTerra CONSULTING

2312 Columbine Road, Weed, CA 96094
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Shasta River Safe Harbor Agreement
Flow Management Strategy

Introduction

A Template Safe Harbor Agreement (Agreement) is in progress by the National Marine Fisheries Service (NMFS), the California Department of Fish and Wildlife (CDFW), the Shasta Watershed Conservation Group (SWCG), eleven landowners, two irrigation districts (Montague Water Conservation District and Grenada Irrigation District), and the Edson-Foulke Yreka Ditch Company (the Permittees). The purpose of the Agreement is to establish general requirements for NMFS, under authority of the Endangered Species Act (ESA) section 10(a)(1)(A) and implementing rule and policy, to issue Enhancement of Survival Permits to non-federal landowners in the Shasta River Basin for the purpose of promoting the conservation, enhancement of survival, and recovery of the Southern Oregon/Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) of coho salmon.

The Agreement Covered Area (Figure 1) includes about 20 miles of the Shasta River, the lower 1.6 miles of Big Springs Creek, and the lower 14 miles of Parks Creek. The Agreement will facilitate implementation of improved streamflow management, implementation of various land and stream restoration actions and is expected to improve water temperature, fish passage, and habitat diversity, across the Agreement Covered Area within the upper Shasta River watershed including Parks Creek and Big Springs Creek, tributary to the Klamath River in Siskiyou County, California. A desired outcome of this Flow Management Strategy is to provide a pathway for coordination between participating landowners and create an executable implementation strategy for improved management of the Shasta River within the Agreement Covered Area to maximize the benefits for the covered species.

NMFS and the CDFW in collaboration with the Technical Advisory Committee (TAC), consisting of landowner, agency, and non-governmental organization representatives, identified existing conditions (e.g., hydrology, water quality, substrate, riparian function) in the Covered Area that are known or assumed to be limiting factors for coho salmon. For planning purposes, the TAC identified the following six reaches within the Covered Area and described existing biological requirements and habitat conditions for Covered Species in each reach (Agreement Appendix 2).

Reaches are defined here using the concept of River Mile (RM), the linear distance in miles along a river or stream upstream from its mouth. The RM reach locations listed below were provided by AquaTerra Consulting using hydrography information.

- Upper Shasta River from Dwinnell Dam downstream to the confluence of Parks Creek (RM 40.6 to 35)
- Parks Creek
    - Upper Parks Creek (RM 14.5 to 8)
    - Mid-Parks Creek (RM 8 to 2)
    - Lower Parks Creek (RM 2 to 0)
- Mid-Shasta River from the confluence of Parks Creek downstream to the northern boundary of the Covered Area (RM 35 to 20)

- Big Springs Creek from the confluence with the Shasta River upstream to the water wheel crossing (RM 1.6 to 0)

The Agreement includes an Adaptive Management Program (Agreement Appendix 4) that describes various effectiveness monitoring requirements for hydrology and water temperature, including the installation and operation of fixed monitoring stations located throughout the reaches within the Covered Area (Figure 1). The monitoring stations will assist in determining whether any detectable spatial and temporal changes in water quantity and temperature have occurred at the reach scale following implementation of this Flow Management Strategy and Beneficial Management Activities (BMAs) under the Agreement and associated ranch site plans. The monitoring stations will also provide data to assist Permittees in implementing this Flow Management Strategy.

Flow Management Strategy: Goals, Objectives and Uncertainties

The following goals are intended to promote a successful Flow Management Strategy and help achieve the desired outcome of improved instream conditions for coho salmon:

- Build upon existing information to develop a strategy that encourages collaboration among the Agreement participants for the benefit of coho salmon.
- Preserve and enhance aquatic and riparian habitat, specifically habitat conditions supporting each life stage of coho salmon.
- Address regulatory responsibilities.
- Establish integrated and flexible flow management that aligns with other planning efforts.
- Foster a culture of shared stewardship of the Shasta River among landowners.

The Flow Management Strategy objectives are based on the biological requirements of coho salmon at each freshwater life stage. Coho salmon tolerances and habitat requirements change with season and life stage. Although most developmental changes and movements to different habitats are gradual, it is useful to delineate the freshwater life cycle into four distinct life stages and to specify factors assumed to affect habitat quality for each life stage. These life stages are defined herein as follows:

1. **Adult migration and spawning (October 1 to December 31)**
2. **Egg incubation and winter rearing juveniles (January 1 to February 28)**
3. **Spring rearing, redistribution and smolt emigration (March 1 to June 15)**
4. **Summer rearing (June 16 to September 30)**

Under the Agreement, instream flows will be measured via implementation and effectiveness monitoring procedures in the Adaptive Management Program. Permittees are developing a forbearance agreement in support of the Agreement and some permittees have submitted petitions pursuant to section 1707 of the California Water Code. NMFS understands the challenges of measuring and tracking flow commitments in the Shasta River, and thus recommends that forbearance and Section 1707 dedicated flows are measured and verified at or near the points of diversion or places where flows are released to the river using real-time flow measuring devices as stipulated in the Agreement.

It is anticipated that flow commitments via forbearance or 1707 dedication will be realized and measurable instream at the northern boundary of the covered area (RM 20) for all life stages as defined above. It is anticipated that a flow gage will be installed somewhere between the new point of diversion and riffle anticipated to be constructed on the Novy Ranch and the northern boundary of the Covered Area, wherever an accurate rating curve can be established. Until the Novy riffle is established, the SHA group will use the Grenada Irrigation District's riffle as the downstream most compliance point for the SHA.

There is a lack of long term hydrologic data describing flow characteristics for the stream reaches within and upstream of the Covered Area of the Agreement. Information describing historic management of diversions, including water use records maintained by Shasta Scott Water Master District (SSWMD), are generally lacking detail on diversion volumes and magnitude. Natural spring flow contributions to surface water also tend to fluctuate during the irrigation season and between water years and the mechanisms responsible for these fluctuations are poorly understood. Water conservation projects proposed under the Agreement are intended to reduce diversion volumes and improve irrigation management resulting in improved flow conditions in the Shasta River and Parks Creek. However, in some cases historic irrigation practices resulted in tailwater returns to the stream channel as surface flow or hyporheic (subsurface) flow. A more detailed analysis would be required to determine the actual volume of consumed water removed from the stream channel for each diversion. Although this analysis would help to better understand the effects of this Flow Management Strategy to net instream flows, it is beyond the scope of this document.

The Adaptive Management Program (Appendix 4 of the Agreement) includes an effectiveness monitoring element that provides for several water quality monitoring stations to document stream flow and water temperatures at critical locations within the Covered Area. The Agreement also required detailed monitoring and reporting of diversion volumes. Combined, these two sets of data will result in better understanding of the water budget, spring flow contributions, and irrigation demands that will inform future water management to benefit SONCC coho salmon. The first evaluation of these data will occur five years after the signing of the Agreement. In the meantime, contributions of spring flow and hyporheic flow to the stream channel are assumed to be fairly stable for the purposes of developing this Flow Management Strategy. Therefore, the flow schematics that are described in this Flow Management Strategy do not take into account the uncertainties associated with spring flows, hyporheic flows and tailwater contributions.

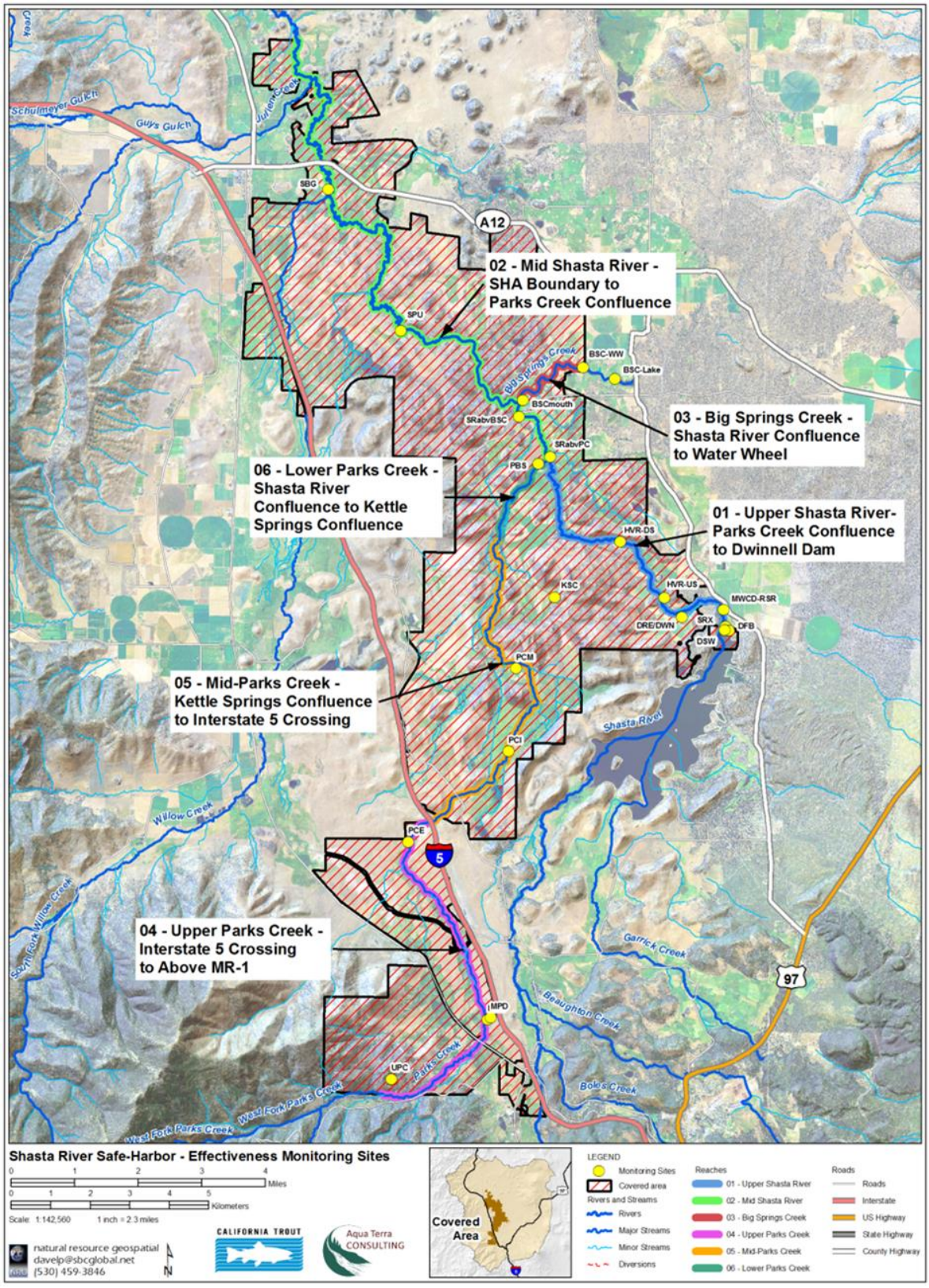


Figure 1. The location of 6 Stream reaches and water quality monitoring sites identified within the Covered Area for the Shasta River Template Safe Harbor Agreement.

The Flow Management Strategy considered recommendations from studies conducted by McBain & Trush, Inc. (2013) and McBain et al. (2014). These researchers conducted a Tier No. 1[1] interim instream flow needs (IFNs) study in the Shasta River and provided flow recommendations for the upper Shasta River and Parks Creek (Table 1). Table 2 depicts IFNs for the lower 6 miles of the Shasta River in the Shasta River Canyon (Table 2). The reaches in Table 1 correspond to the stream reaches identified within the Covered Area of the Agreement as follows:

McBain & Trush, Inc.	Agreement Covered Area Reaches
• Reach 3, TNC Study Site	Mid Shasta River Reach
• Reach 2A, UPC Study Site	Mid Parks Creek Reach (top of reach)
• Reach 2C, LPC Study Site	Lower Parks Creek Reach
• Reach 1C, HIG Study Site	Upper Shasta River Reach (bottom of reach)

Table 1. Interim minimum Tier No. 1 IFNs for priority reaches in the Big Springs Complex as recommended by McBain & Trush, Inc. (2013).

Salmonid Life Sage	REACH 3 TNC Study Site IFN Q_{MIN} (cfs)	REACH 2A UPC Study Site IFN Q_{MIN} (cfs)	REACH 2C LPC Study Site IFN Q_{MIN} (cfs)	REACH 1C HIG Study Site IFN Q_{MIN} (cfs)
September 7 to September 30: Early Adult Chinook Salmon Migration	20	11 to 15	11 to 15	10
October 1 to December 31: Chinook and coho Salmon Spawning Habitat and Adult Chinook Migration	20 to 22	11 to 15	11 to 15	10 to 13
January 1 to March 31: Winter Juvenile Salmonid Rearing Habitat	20	10	12	7 to 10
April 1 to June 15: Spring Pulse and Smolt Outmigration	40	20 to 25	20 to 25	20 to 25
June 16 to September 6*: Summer Juvenile Salmonid Rearing Habitat	13	2	7	6

[1] Moyle et al. (1998) developed metrics for fish condition by distinguishing three tiers of fish health: individual (Tier No. 1), population (Tier No. 2), and community (Tier No. 3). Under Tier No. 1, individual fish should (1) have a healthy body conformation; (2) be relatively free of diseases, parasites, and lesions; (3) have reasonable growth rates for the region; and (4) respond in an appropriate manner to stimuli (e.g., predator avoidance).

Table 2. Summary of IFN recommendations at USGS gage #11-5117500 by salmonid life stage in the lower Shasta River Canyon as developed by McBain and Trush, Inc. and Humboldt State University Department of Environmental Resource Engineering (2014).

Salmonid Life Sage	Streamflow Period	IFNs (cfs)	Dry Year IFNs (cfs)	Section Reference
Early Adult Chinook Salmon Migration	September 15: September 30:	≥ 70 ≥ 125	≥ 50 ≥ 125	8.1
Adult Salmon Spawning	October 1: October 15: October 31 to December 31:	≥ 125 ≥ 170 ≥ 195	≥ 125 ≥ 125 ≥ 150	8.2
Fry and Juvenile Salmonid Winter Rearing	January 1 to March 31:	≥ 170	≥ 135	8.3
Juvenile Salmonid Growth and Smolt Outmigration, Snowmelt Streamflows	April 1 to May 15: May 16 to June 15: June 16 to June 30:	≥ 200 ≥ 165 ≥ 125	≥ 170 ≥ 150 ≥ 70	8.4
Juvenile Salmonid Rearing Summer Baseflows	July 1 to September 14:	≥ 70	≥ 50	8.5

Utilizing relevant scientific information including McBain & Trush, Inc. (2013) and McBain et al. (2014), the Technical Advisory Committee developed reach-specific qualitative habitat improvement goals as well as quantitative flow objectives (Table 3).

Upper Shasta River

- Adult Migration and Spawning (October – December): increase the amount and extent of spawning gravel in this reach; provide adult passage flows during migration period; develop and implement a beaver dam management plan to reduce migration barriers, and implement channel maintenance flows to encourage sediment transport and aid recruitment of riparian vegetation. The flow objectives for this life stage ranges from 10 to 13 cfs (Table 1).

- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing (March – June 15): increase the extent, reliability, and connectivity of existing cool water refugia areas in this reach; install and maintain riparian fencing and manage riparian zones to encourage development of mature riparian communities; increase channel roughness and large wood through riparian planting and placement of in-channel LWD to improve rearing habitat where habitat diversity is currently lacking; and, improve the quality and abundance of preferred habitats for rearing coho salmon through creation of alcoves, side-channels, oxbows and off channel ponds in areas where cold water is present. The flow objectives for this life stage recommend peak flows between 20 to 25 cfs followed by declining flows to mimic the snow melt hydrograph until summer base flows

begin after June 15 (Table 1).

- Juvenile Over-Wintering (January – February): increase channel roughness and habitat complexity through riparian planting and placement of in-channel LWD; encourage development of beaver dam habitat and modify beaver dams to improve fish passage conditions and reduce impacts to ranch management when necessary; create off channel habitats to provide rearing coho salmon areas to seek refuge during high flow events. The types of off-channel habitats that may be considered include side channels, alcoves, oxbows, or secondary high flow channels within restored flood plains. The flow objectives identified by McBain & Trush, Inc. (2013) for winter rearing of juvenile salmonids is 7 to 10 cfs (Table 1).

Mid-Shasta River

- Adult Migration and Spawning: where appropriate (based on geomorphology), increase the extent and quality of spawning gravels; ensure that suitable migration and spawning flows are provided when adults are present; remove the existing flashboard dam to improve adult migration. Exclusionary riparian fencing has been constructed throughout nearly this entire reach and maintenance of fencing should continue.
- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: reduce spring/summer water temperature through flow/diversion management; encourage development of a healthy riparian vegetation corridor through fencing and development of riparian grazing strategies; implement strategic placement of large wood to improve instream cover and habitat diversity; ensure unimpeded fish passage for all life stages throughout this reach.
- Juvenile Over-Wintering: conduct monitoring to determine juvenile over-wintering use of this reach; re-establish areas of connectivity between the main channel and historic over-wintering habitat; encourage development of woody riparian vegetation communities where possible to provide a source of instream cover (large wood) and to create velocity refuge during high flow events; implement strategic placement of large wood in the channel.
- Flow objectives for the Mid Shasta Reach for each life stage should contribute towards meeting the flow objectives described for the Lower Shasta River Canyon (Table 2) downstream of nearly all of the agricultural diversions in the Shasta River.
- **Big Springs Creek**

- Adult Migration and Spawning: maintain the existing riparian fencing, which is protecting streambanks, increasing emergent vegetation and narrowing the channel morphology.
- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: Maintain the existing riparian fencing, which protects streambanks and the channel, allowing increased abundance of emergent vegetation and narrowing of the channel morphology; increase channel roughness and habitat complexity through targeted plantings of woody riparian species; implement placement of in-channel LWD to improve habitat diversity and cover for coho salmon during the late fall, winter and spring (Jeffres et al. 2010); remove passage obstacles and barriers on Little Springs

Creek.

- Juvenile Over-Wintering: maintain the existing riparian fencing, which protects streambanks and allows for increasing emergent vegetation and narrowing of the channel morphology; increase channel roughness and habitat complexity through targeted woody riparian planting and placement of in-channel LWD.
- Big Springs Creek is currently managed to optimize water temperature for coho salmon as priority over any diversions for agricultural beneficial use. Water can only be diverted if both water temperature objectives at the confluence with the Shasta River are met (< 18°C) and habitat flow criteria in the Shasta River Canyon (Table 2) are achieved. Therefore, management of the creek under the ownership of CDFW will optimize habitats for coho salmon when instream habitat restoration actions are implemented.

Upper Parks Creek

- Adult Migration and Spawning: conduct further flow studies to support a diversion management plan; develop and implement a coordinated diversion management plan to enhance fall and winter flows; evaluate potential geomorphic impediments to fish passage and develop a channel rehabilitation plan and implement projects to remediate fish passage obstacles and barriers to allow adult coho salmon access to upper Parks Creek reach; evaluate spawning habitat improvement opportunities and design and implement projects that are identified through the evaluation. The flow objective for adult migration of coho salmon in this reach is 10 cfs, 11 cfs for Chinook salmon (McBain &Trush, Inc. and Humboldt State University 2013; AquaTerra Consulting 2017).

- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: implement projects to remediate fish passage obstacles and barriers to juvenile coho salmon movement; develop and implement a coordinated diversion management plan to augment flow and water quality conditions; implement investigation of the hydrograph and hydrologic conditions (flow, temperature, groundwater/surface water interaction, surface/subsurface return flows, etc.) to evaluate the potential of sub-reaches to support rearing juvenile coho salmon; install riparian fencing and develop a riparian management plan to encourage development of a mature riparian vegetation community, to stabilize channel banks, and to improve floodplain connectivity and function. The flow objectives for this life stage seek to mimic the natural snow melt hydrology with a minimum peak flow of 20 cfs (Table 1, Reach 2A). Spring flows that mimic snowmelt hydrology are recommended to help restore natural ecological processes that favor riparian recruitment and provide natural ques for fish response as flows decrease to a summer base flow in Mid-June. Summer base flow objectives should attempt to maintain flow connectivity, optimize water temperatures, maintain suitable fish passage conditions, and provide conditions that inundate of food producing riffles.

- Juvenile Over-Wintering: similar to summer rearing habitat conditions described above, over-wintering habitat in Upper Parks Creek also varies by sub-reach, with the channel upstream of Old Highway 99 likely experiencing excessive velocities during high discharge events, the channel

between Old Highway 99 and the railroad bridge offering valuable instream habitat complexity and refuge, and the reach below the railroad lacking velocity refuge. Evaluate the feasibility and cost-benefit of channel rehabilitation below the railroad crossing; improve access and quality of off channel habitats present within the flood plain in the middle reach between old Highway 99 Bridge and the railroad crossing. McBain & Trush, Inc. (2013) recommended a flow of 10 cfs to provide favorable conditions for egg incubation and over wintering habitat. AquaTerra Consulting (2017) conducted a critical riffle study to determine flow levels needed to provide fish passage for all coho salmon life stages through Parks Creek. Results of the study showed that a flow of 5.6 cfs would provide adequate fish passage for smolt emigration at all riffles (0.4 ft. of depth) with one exception. Based on these results the Permitted proposed to provide a minimum flow 6.0 cfs which assumes that flows at this level will provide adequate coverage and water velocity to fully protect any redds and incubating eggs that may be present in this reach. The Permittees have agreed to conduct additional studies during the first five years of the Agreement to verify that 6.0 cfs does provide suitable conditions for egg incubation. Therefore, the Permittees have proposed a flow objective of 6.0 cfs for this life stage.

Mid-Parks Creek

- Adult Spawning and Migration: develop and implement a coordinated diversion management plan to provide access to and maintenance of spawning habitat; install and maintain riparian fencing and manage riparian zones to encourage development of mature riparian vegetation communities; increase channel roughness and large wood through woody riparian planting and placement of in-channel LWD to improve substrate sorting and reduce fines; conduct spawning gravel augmentation in select locations. The flow objective for adult migration of coho salmon in this reach is 10 cfs, 11 cfs for Chinook salmon (McBain &Trush, Inc. and Humboldt State University 2013).

- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: increase the extent, reliability, and connectivity of existing cool water refugia areas in this reach, guided by existing or yet-to-be developed temperature models; develop and implement a restoration strategy for Bridge Field and Black Meadow springs, creeks, and sloughs; install and maintain riparian fencing, encourage development of mature riparian communities, stabilize channel banks, improve floodplain connectivity and function; introduce large roughness elements to improve substrate sorting, reduce fines, and increase cover. The flow objectives for this life stage seek to mimic the natural snow melt hydrology with a minimum peak flow of 20 cfs (Table 1, Reach 2A). Spring flows that mimic snowmelt hydrology are recommended to help restore natural ecological processes that favor riparian recruitment and provide natural ques for fish response as flows decrease to a summer base flow in Mid-June. Summer base flow objectives should attempt to maintain flow connectivity, optimize water temperatures, maintain suitable fish passage conditions, and provide conditions that inundate of food producing riffles.

- Juvenile Over-Wintering: The alluvial channel immediately downstream of Interstate 5 contains alternate bar characteristics that may provide limited refuge from high velocities at intermediate flood flow events. Further downstream, near the confluence of the North Slough, the meander frequencies decrease and secondary off-channel features disappear. During large flood events,

sheet flows spread across adjacent pasture lands and juvenile salmonids may be vulnerable to standing as flows recede. However, the North Slough and the small spring-fed channels that feed into the slough may provide important over wintering habitats and areas of refuge during large flood events, though there is no data to support this hypothesis. In addition, these spring-fed channels and sloughs help moderate water temperatures downstream of the confluence with Parks Creek, and provide favorable rearing conditions. The flow objective for this life stage is 10 cfs (Table 1, Reach 2A)

Lower Parks Creek

- Adult Migration and Spawning: develop and implement a coordinated diversion management plan; install riparian fencing and encourage development of mature riparian vegetation communities; stabilize channel banks, improve floodplain connectivity and function; introduce large roughness elements to improve substrate sorting and reduce fines; remediate potential adult migration barrier at existing flashboard dam. The flow objective for adult migration and spawning is a minimum flow of 11 cfs (Table 1, Reach 2C).
- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: develop and implement a coordinated diversion management plan; install riparian fencing and encourage development of mature riparian vegetation communities; stabilize channel banks, improve floodplain connectivity and function; introduce large roughness elements to improve substrate sorting and reduce fines; remediate potential adult migration barrier at existing flashboard dam. The flow objectives for this life stage seek to mimic the natural snow melt hydrology with a minimum peak flow of 20 cfs (Table 1, Reach 2C). Spring flows that mimic snowmelt hydrology are recommended to help restore natural ecological processes that favor riparian recruitment and provide natural ques for fish response as flows decrease to a summer base flow in Mid-June. Summer base flow objectives should attempt to maintain flow connectivity, optimize water temperatures, maintain suitable fish passage conditions, and provide conditions that inundate of food producing riffles.
- Juvenile Over-Wintering: install riparian fencing to encourage development of mature riparian vegetation communities, stabilize channel banks, investigate floodplain restoration incorporating off channel habitat features (i.e., side-channels, alcoves, backwaters), introduce large roughness elements to increase cover during high flow. The flow objective should provide a minimum flow of 12 cfs to support conditions for over wintering coho salmon (Table 1, Reach 2C).

As described above, the TAC developed reach descriptions and identified habitat improvements needed based on existing studies and reports, qualitative information and the need to balance beneficial actions for coho salmon with maintaining viable agricultural operations for enrolled properties. Table 3 lists the Flow Management Strategy objectives that resulted from the TAC's consideration of this information.

Table 3. Flow Management Strategy objectives and current instream flow conditions for each coho salmon life stage in the Agreement Covered Area.			
Reach	**Life Stage**	**Flow Objectives**	**Current conditions**
Upper Shasta River	Adult Migration and Spawning	10 - 13 cfs	5 - 11 cfs
	Incubation and Winter Rearing	7 - 10 cfs	3.5 - 10 cfs
	Spring Rearing, Redistribution, Emigration	20 - 25 cfs peak with declining flows to mimic snow melt hydrograph	25 - 3 cfs
	Summer Rearing	6 cfs	3 cfs
Upper Parks Creek	Adult Migration and Spawning	10 - 11 cfs	0.05 - 7.5 cfs
	Incubation and Winter Rearing	6 - 10 cfs	7.5
	Spring Rearing, Redistribution, Emigration	March-April 20 cfs; 5/16 - 5/23 = 12 cfs; 5/24 - 5/31 = 8 cfs; 6/1 - 6/10 = 4 cfs	March = 7.4 cfs April = 12.2 cfs May = 12.2 cfs June = 7.2 cfs
	Summer Rearing	1 cfs	1.45 - 0 cfs
Mid Parks Creek	Adult Migration and Spawning	10 - 11 cfs	0 - 5.4 cfs
	Incubation and Winter Rearing	10 cfs	11 - 12 cfs
	Spring Rearing, Redistribution, Emigration	3/1 - 5/15 = 20 cfs; 5/16 - 5/23 = 12 cfs; 5/24 - 5/31 = 8 cfs; 6/1 - 6/10 = 4 cfs,	Mar-4.1 cfs Apr- 8.9 cfs May - 8.4 cfs June - 2.1 cfs
	Summer Rearing	1 cfs	June = 2.1 cfs July= 0 cfs August= 0 cfs Sept = 0 cfs
Lower Parks Creek	Adult Migration and Spawning	Oct 1 - 14 = 6.85 cfs; Oct 15 - 31 = 9.85 cfs; Nov = 17 cfs; Dec = 17 cfs	Oct - 1 cfs Nov - 11.4 cfs Dec - 18.1
	Incubation and Winter Rearing	13 cfs	Jan = 17.9 cfs Feb = 18.2 cfs
	Spring Rearing, Redistribution, Emigration	March =25.85 cfs; April = 25.85 cfs; May 1-15 = 25.85 cfs; May 16-23 = 17.85 cfs; May 24-31 cfs = 13.85 cfs; June 1 - 10 = 9.85 cfs; June 11 - 15 = 6.85 cfs	March = 5.1 cfs April = 9.9 cfs May = 9.4 cfs June = 3.1 cfs
	Summer Rearing	6.85 cfs	1 cfs

Table 3. Continued.

Mid Shasta River	Adult Migration and Spawning	70 cfs	140 -170 cfs[1]
	Incubation and Winter Rearing	76 cfs to 95 cfs	257 cfs[2]
	Spring Rearing, Redistribution, Emigration	112 cfs decreasing to 39 cfs by summer	12 to 89 cfs
	Summer Rearing	28 cfs to 39 cfs	25 to 36 cfs less GID Diversion Rates

1: Average monthly flow at USGS Yreka gage for water years 2000 to 2016 for October and November.

2: Average flow at the USGS Yreka gage for water years 2000 to 2016 for December and January, combined.

Shasta River Flow Management Strategy Implementation

The following section describes each enrolled property and landowner contribution to the flow management strategy

Upper Shasta Reach

There are four enrolled properties within the Upper Shasta Reach:

- Montague Water Conservation District (MWCD)
- Seldom Seen Ranch
- Hidden Valley Ranch
- Hole in the Ground Ranch.

Montague Water Conservation District

MWCD is a public irrigation district that owns and operates Dwinnell Reservoir located in the southern portion of Shasta Valley and provides irrigation water to users within the district boundary, located in the northern portion of Shasta Valley. MWCD owns Dwinnell Reservoir, the property under the high water mark of Dwinnell Reservoir and the property along the Shasta River immediately below Dwinnell Reservoir where much of the water operations for the irrigation district occurs.

MWCD constructed Dwinnell Dam on the Upper Shasta River in 1928 with the purpose of storing water for irrigation use during the growing season. Irrigation water is released from Dwinnell Dam to the main canal where it is delivered to irrigation customers along the east side of Shasta Valley north of Dwinnell Dam between April 1st and September 30th. Lake Shastina, the reservoir pool behind Dwinnell Dam, has a storage capacity of approximately 50,000 acre-feet. MWCD holds appropriative water right permits (Permit Numbers 2452 and 2453) which give MWCD the right to divert and store a total of 49,000 acre-feet of water from the upper Shasta River (35,000 acre-feet) and Parks Creek (14,000 acre-feet) annually. The season of diversion under both of these permits begins on October 1 and ends on June 15.

The current and anticipated instream flow releases that MWCD will be releasing to the Shasta River to benefit instream habitat conditions for coho salmon are described here for background purposes.

In MWCD's application for a Corps 404 permit, MWCD proposed to implement and Conservation and Habitat Enhancement and Restoration Program (CHERP) which included a change to its operations for the delivery of water described as "CHERP flows" upon completion of main canal lining. Additionally, MWCD proposed interim increases to instream flows upon receiving section 404 permit. A key element of MWCD's proposed environmental water strategy (both interim and CHERP flows) includes the use of the Flying L groundwater pumps to provide a source of cold water (12.2°C) for fish immediately downstream of Dwinnell Dam. MWCD did not propose changes to its base operations which include diversion of water from Parks Creek, delivery of water to its customers via the main canal, or delivery of water to prior rights water users downstream in the Shasta River.

Due to the variability in storage at the onset of irrigation season, and variability in water releases for irrigation and prior rights holders, MWCD developed a water year type determination criteria and CHERP instream release volume and schedule for five water year types, very dry, dry, normal, wet and very wet. MWCD proposes to make the year type determination on, or around, March 1st and then updated on April 1st and again on May 1st. The criteria for year type determination are based on reservoir storage and snowpack, but vary between months. A process of examining changing year type within a year (from March 1 to May 1) is included to accommodate the potential changes in spring time conditions that may lead to more or less water available for the upcoming period. The method proposed to determine the water year types were developed by Watercourse Engineering, Inc. (2016) and a copy of the Technical Memorandum is included as Attachment B in the Addendum to the Biological Assessment and Essential Fish Habitat Assessment (ESA 2016). In summary, the first water year type designation decision occurs on March 1st and is based entirely on the storage volume present behind Dwinnell Dam in the reservoir as shown in Table 4. Updates to the water year type designation will occur on April 1st and then again on May 1st and both of these determinations will be based primarily on storage volume in Dwinnell Reservoir, with a secondary criteria based on the accumulated snow pack (snow water content) at Peterson Flat snow field.

Table 4. Proposed water year type designation criteria for determination of environmental flow volumes proposed under the CHERP.

Water Year Type	March 1st Storage Estimate for Dwinnell Reservoir
Very Dry	Less than 17,000 Acre Feet
Dry	Equal to 17,000 to less than 24,000 Acre Feet
Normal	Equal to 24,000 to less than 36,000 Acre Feet
Wet	Equal to 36,000 to less than 43,000 Acre Feet
Very Wet	Greater than or equal to 43,000 Acre Feet

MWCD Flow Management Strategy Contributions

The following section provides a description of the MWCD proposed flow environmental water releases to the Shasta River under the five different water year type designations. It's important to remember that summer releases under all five water year types include the use of cold water from the Flying L wells to reduce water temperatures downstream for coho salmon as the maximum water temperatures of the reservoir releases reach 18°C.

CHERP Flow Release Schedules by Water Year

Very Dry Water Year – 2662 Acre Feet:

Under a very dry water year MWCD proposes to release 2,662 Acre-Feet of environmental water between March 1st and February 28th. The schedule for environmental water releases proposed under a very dry water year is presented in Figure 2.

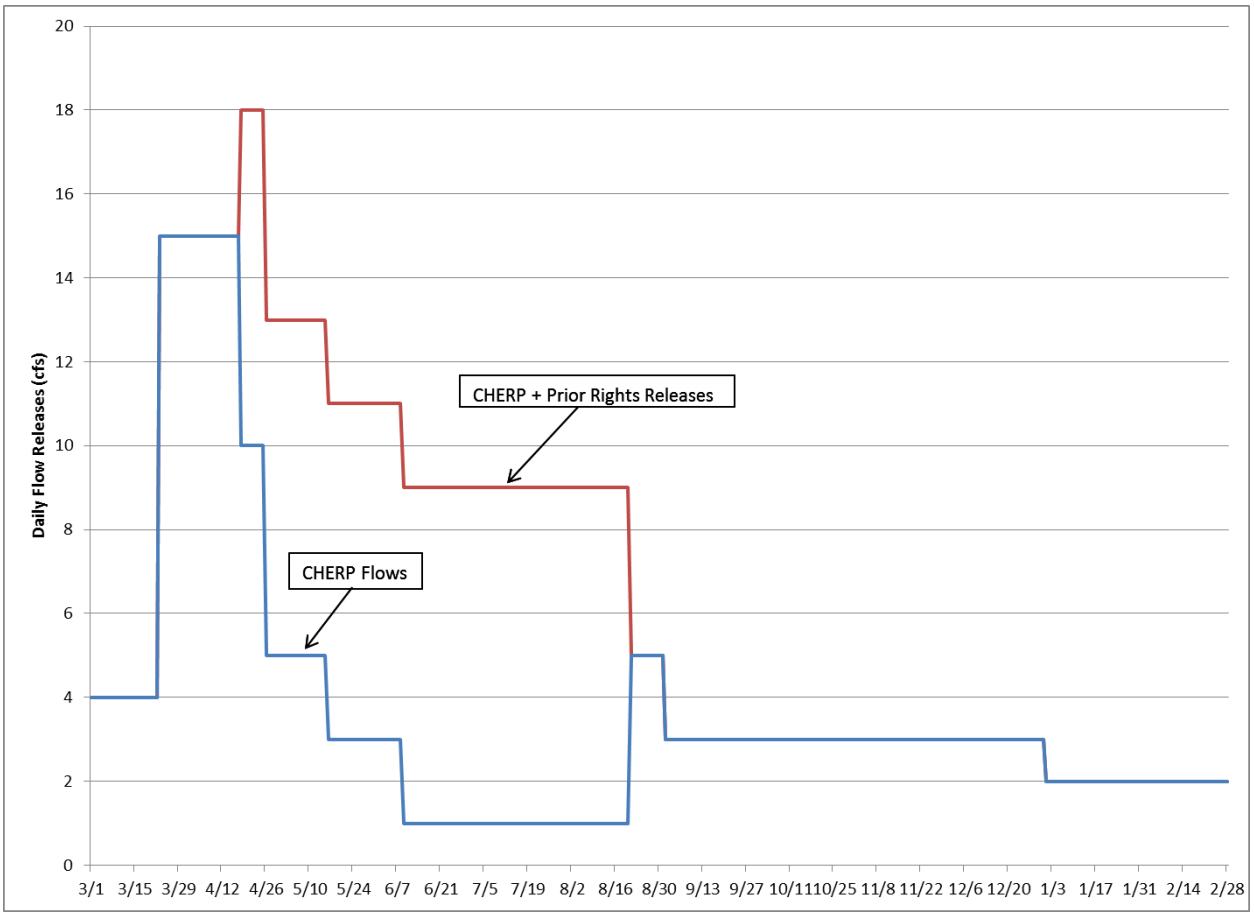


Figure 2. Total water releases below Dwinnell Dam under a very dry water year. The total releases includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season.

For the development of the Very Dry release schedule, the following information was considered:

- Spring pulse flow releases of 15 cfs will be released in late March and April to improve conditions for emigrating coho salmon smolts, and to improve conditions for movement (redistribution) of fry and juvenile coho salmon as they seek out preferred cold water habitats to rear in during the late spring and summer.
- Summer releases under the proposed CHERP will be maintained at a minimum of one cfs to help support coho summer rearing. These flows are based on the results of the temperature model and experimental flow study (AquaTerra Consulting, 2015). This one cfs release will be added to the eight cfs released for prior rights deliveries.
- When surface water releases from Dwinnell to the cross canal during the summer begin to approach 18°C the Flying L Pumps will be used to cool water temperatures by blending approximately 5.5 cfs of cold water (12.2°C) with the 0.5 cfs of cold water (12-13°C) from the Dwinnell seeps with three cfs of stored Dwinnell water. These releases are intended to maintain suitable water temperatures for coho salmon for an approximate distance of 1.2 kilometers downstream of Dwinnell Dam (AquaTerra Consulting 2015).

- In the rare event that both prior rights users on the Shasta River request temporary cessation of water deliveries during the summer of a Very Dry water year, MWCD will provide an additional 2.0 cfs (in addition to the proposed CHERP flow release of 1.0 cfs) from Flying L wells until prior rights deliveries are resumed. The purpose is to maintain cold water for coho rearing from the cold water wetland habitat near the base of Dwinnell Dam to the vicinity of the Hidden Valley springs inflows, about 2.4 river kilometers downstream (Figure 10).
- Fall releases under the proposed CHERP will be maintained at a minimum of 3 cfs during the months of November and December of Very Dry water years and would result in an estimated flow of approximately 9 cfs to 11 cfs at the Parks Creek confluence due to natural accretions (and absence of winter diversions) below Dwinnell Dam during the peak adult coho salmon migration period.
- Winter releases under the proposed CHERP will be maintained at a minimum of 2 cfs to support coho juvenile over-winter survival.

Dry Water Year – 3541 Acre Feet:
Under a dry water year MWCD proposes to release 3,541 Acre-Feet of environmental water between March 1st and February 28th. The schedule for environmental water releases proposed under a dry water year is presented in Figure 3.

The proposed Dry water year type schedule builds on the conditions provided under the Very Dry water year schedule as follows:

- The duration of spring pulse flows (15 cfs) will be extended under the Dry Water Year scenario for an additional 2 weeks to improve conditions for both emigrating smolts and for redistribution of fry and juvenile coho salmon to over- summering refugial habitats. The extended duration of the spring pulse flow seeks to mimic the natural snowmelt hydrograph under Dry Water Year conditions.
- Under Dry Water Years, summer base flows will be increased by 3 cfs for coho salmon juvenile summer rearing. The 3 cfs is based on the results of a temperature modelling and experimental flow study indicating that a maximum of 5 cfs of stored (warm) Dwinnell water can be added to the approximately 6 cfs of cold Flying L/Dwinnell seeps water (total 11 cfs for 8 cfs of prior rights and 3 cfs of instream flow) to achieve suitable downstream water temperatures.
- An additional 1 cfs will be released in November to further improve conditions for adult coho salmon migration upstream of the Parks Creek confluence with the Shasta River.

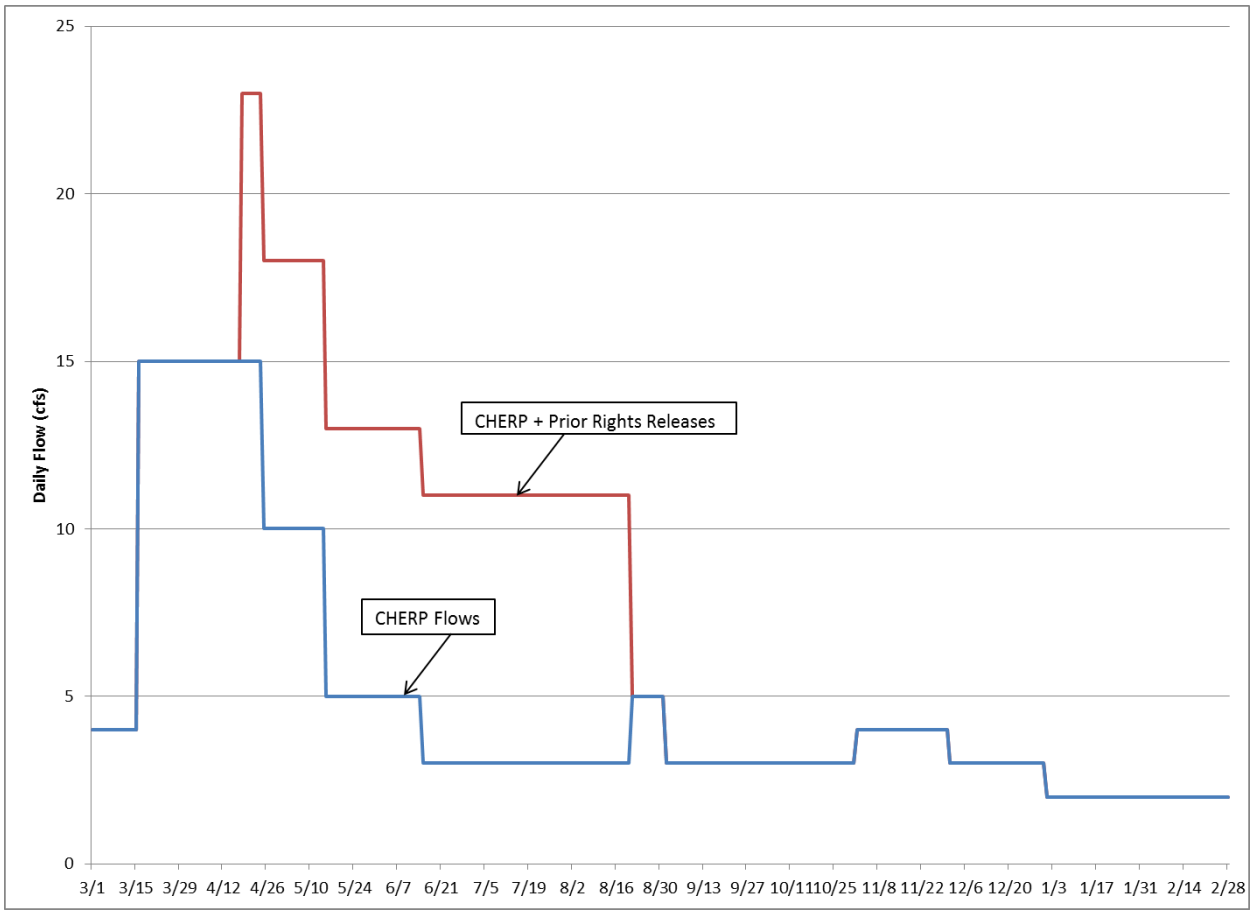


Figure 3. Total water releases below Dwinnell Dam under a dry water year. The total release includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season.

The above dry water year type schedule emphasizes spring smolt outmigration, but adds summer rearing flows consistent with the current understanding of temperature management optimization. The slight increase in November flows, combined with natural accretion in the Upper Shasta River, is intended to support adult coho salmon migration and spawning within the Hole in the Ground reach upstream of the Parks Creek confluence.

Normal Water Year – 4437 Acre Feet:

Under a normal water year MWCD proposes to release 4,437 Acre-Feet of environmental water between March 1st and February 28th. The schedule for environmental water releases proposed under a normal water year is presented in Figure 4.

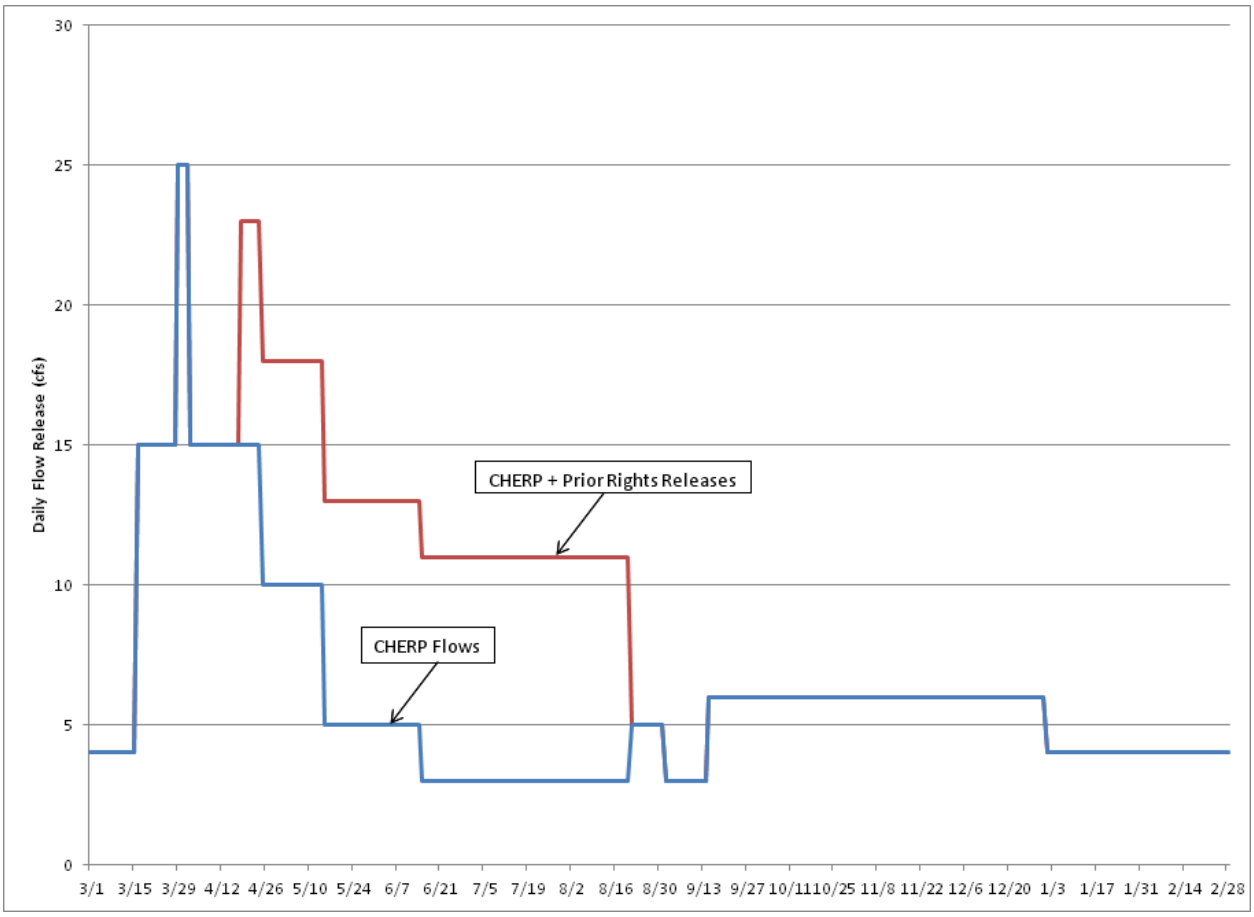


Figure 4. Total water releases below Dwinnell Dam under a normal water year. The total release includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season.

The Normal Water Year type schedule builds on the conditions provided in a Dry Water Year schedule as follows:

- Adds a 25 cfs (4 days) spring pulse at the end of March to provide smolt outmigration cue and encourage partial beaver dam breaching;

This increases flow releases to 6 cfs during adult migration and spawning seasons from mid-September through December. These releases will provide between 10 and 14 cfs of flow in the Shasta River upstream of Parks Creek where coho salmon are currently known to spawn. These improved flow releases are also intended to improve conditions for adult Chinook salmon migration and spawning in the same areas and downstream. In addition, winter base flows will be increased to 4 cfs in January through February to further enhance winter juvenile rearing conditions. These flow releases are also intended to provide stable base flow conditions for protection of incubating coho salmon embryos. In addition to providing smolt outmigration and summer rearing conditions similar to? consistent with the Dry Water Year schedule, the Normal Water Year schedule is intended to support adult migration and spawning for both coho and Chinook salmon, as well as coho salmon

juvenile winter rearing, at flow levels that, combined with natural accretion, will be within the range of flows recommended by McBain & Trush, Inc. and Humboldt State University (2013).

Wet Water Year – 6236 Acre Feet:
Under a Wet Water Year MWCD plans to release 6,236 Acre-Feet of environmental water between March 1st and February 28th. Included in the 6,236 Acre-Feet of environmental water is a block of 684 Acre-Feet of water which can be used adaptively during the year. Potential uses may include but are not limited to flushing flows for habitat maintenance or pulse flows to aid in migration, etc. The schedule for environmental water releases proposed under a wet water year is presented in Figure 5.

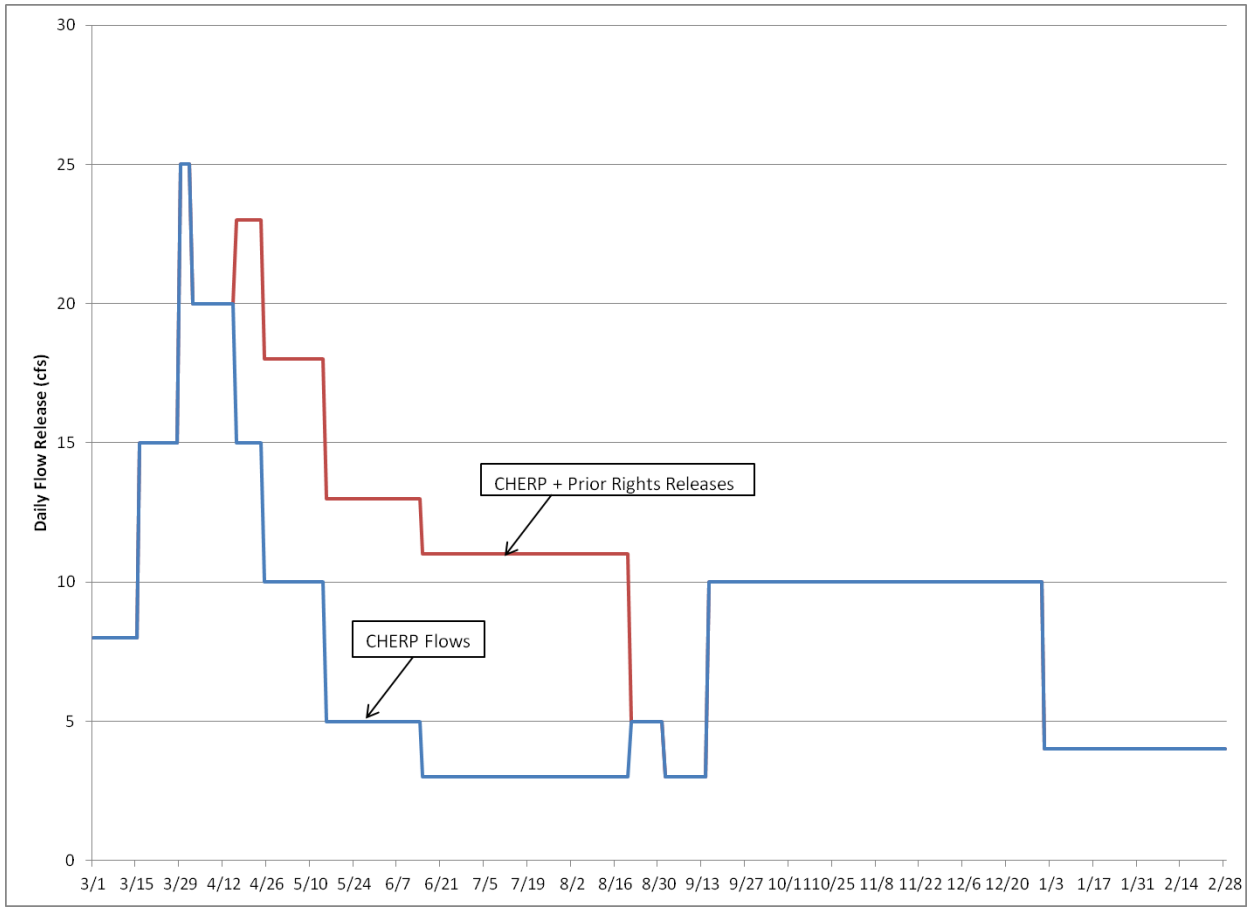


Figure 5. Total water releases below Dwinnell Dam under a Wet Water Year. The total release displayed includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season. The block water volume of 684 Acre-Feet is not included here as this water is anticipated to be used in an adaptive manner based on the hydrologic and biological needs present that year.

The proposed Wet water year type schedule builds on the conditions provided in a Normal Water Year schedule as follows:

- Flow releases are increased from 4 cfs to 8 cfs during the first two weeks of March to improve habitat and movement conditions for newly emerging coho salmon fry and for early emigration of coho salmon smolts downstream.

- The 25 cfs pulse flow at the end of March through April 1st is consistent with the Normal Water Year schedule, but the magnitude of spring pulse is increased to 20 cfs through April 15 to further improve conditions for smolt emigration and fry and juvenile redistribution. Flows at this level are also intended to improve rearing habitat through bench inundation of floodplain and alluvial habitat features downstream. Flows at this level are also intended to encourage flushing of fine sediments and organic material from the stream channel and numerous beaver dams present between Dwinnell Dam and the confluence of Parks Creek. The magnitude and duration of spring flows is increased over the normal year schedule to better simulate natural snowmelt runoff conditions under a wet water year type.
- Fall and winter flows from mid-September through December are increased to 10 cfs to further improve conditions for adult coho and Chinook salmon migration and spawning. Flow releases of 10 cfs from Dwinnell Dam are anticipated by MWCD to provide about 14 to18 cfs upstream of the Parks Creek confluence.
- The Wet Water Year schedule includes an addition block of 684 AF of water which is intended to be used adaptively based on current environmental conditions and expanding knowledge of coho salmon habitat use as conditions improve over time. Potential uses for this block of water are anticipated to include implementation of channel maintenance and/or sediment flushing flows to improve habitat quality and diversity, improve spring rearing and migration conditions, or to further improve adult migration and spawning habitat conditions in the fall/winter.

In summary the wet year schedule further increases flows throughout much of the year (except summer base and winter base) while also providing for a block of water to be managed adaptively to improve habitat quality and diversity under wet water year types. The schedule also attempts to mimic natural snowmelt runoff conditions under wet water types.

Very Wet WY – 8152 Acre Feet:
Under a very wet water year MWCD proposes to release 8,152 Acre-Feet of environmental water between March 1st and February 28th. Included in the 8,152 AF of environmental water is a block of 1,154 Acre-Feet of water to be used adaptively during the year. Potential uses may include but are not limited to flushing flows for habitat maintenance or pulse flows to aid in migration, etc. The schedule for environmental water releases proposed under a wet water year is presented in Figure 6.

The proposed Very Wet Water Year type schedule builds on the conditions provided under a Wet Water Year schedule as follows:

- Flow releases are increased to 10 cfs at the beginning of March to further improve habitat and movement conditions for newly emerging coho salmon fry and early emigration of coho salmon smolts downstream, which better mimics Spring hydrologic flow conditions under a Very Wet Water Year.
- The duration of increased flows through May are intended to mimic snowmelt flow conditions and further improve conditions for emigration of smolt coho salmon and for rearing and redistribution of fry of juvenile coho salmon. Specifically, under a Very Wet Water Year type the duration of the 25 cfs peak flow is extended through April 15 and the duration of the 20 cfs flow is extended through

April 30. The magnitude of flow releases also is increased from 10 cfs to 15 cfs between May 1 and May 15. The magnitude of flow releases from May 15 through May 31 is increased from 5 cfs to 10 cfs, and a release of 5 cfs is extended through June 14, provided that suitable water temperatures can be maintained downstream in this reach.

- Flow releases are increased from 10 cfs to 13 cfs between October 1 and November 30 to improve conditions further during the peak coho and Chinook salmon migration and spawning season. Flow releases of 13 cfs are anticipated to provide flows between 17 and 21 cfs upstream of the Parks Creek confluence.
- The very wet water year release includes an additional block of 1,154 AF of water to be used adaptively based on needs (environmental conditions and expanding coho salmon habitat use) as conditions improve in the future. Potential uses for this block of water are anticipated to include implementation of channel maintenance and/or sediment flushing flows to improve habitat quality and diversity, improve spring rearing and migration conditions, or to further improve coho and Chinook salmon adult migration and spawning habitat conditions in the fall and winter.

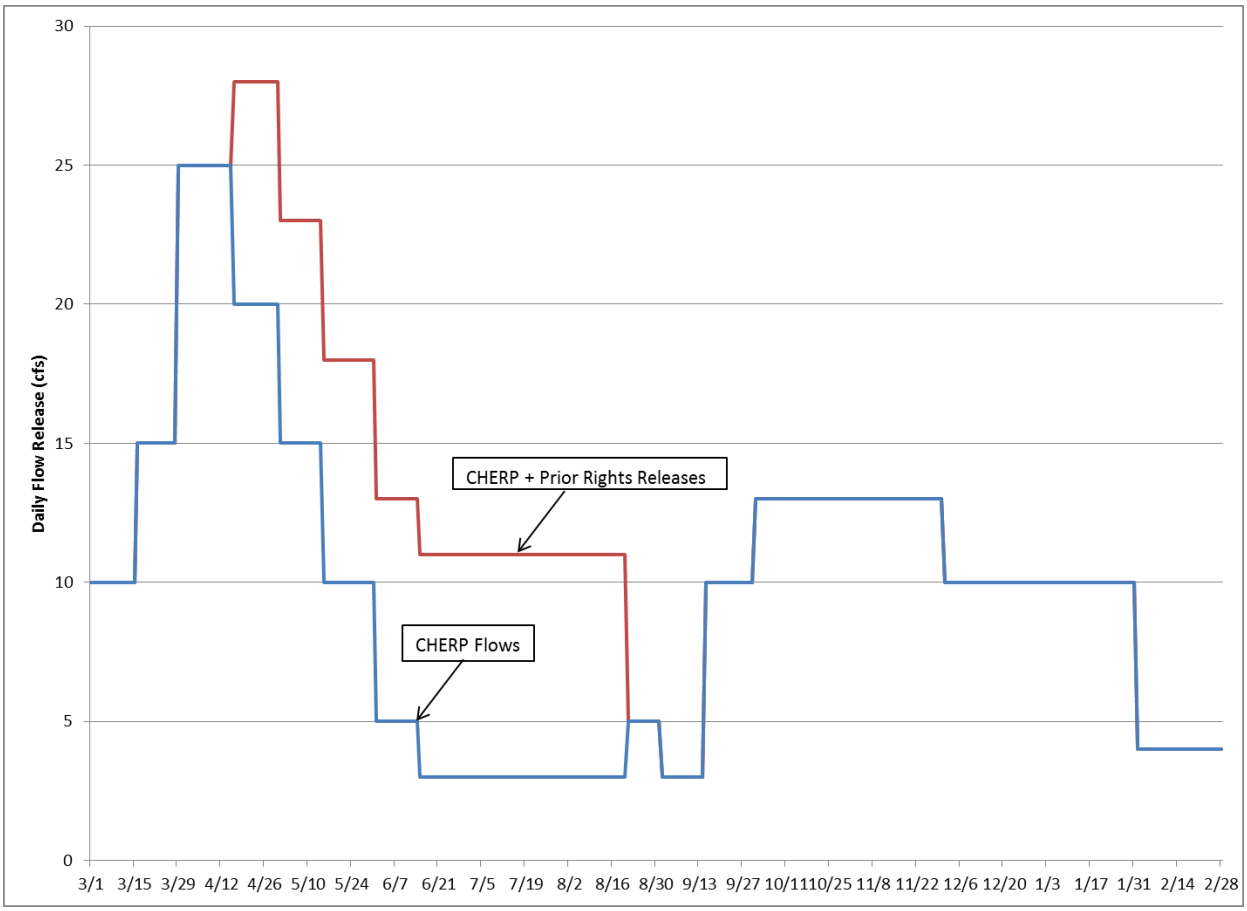


Figure 6. Total water releases below Dwinnell Dam under a Very Wet Water Year. The total release displayed includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season. The block water volume of 1,154 Acre-Feet is not included here as this water is anticipated to be used in an adaptive manner based on the hydrologic and biological needs present that year.

MWCDs' Interim Flow Schedule

Because the infrastructure modifications to the main canal may take several years to complete, water savings from this action would not be available to provide the full CHERP flow schedule immediately upon the issuance of the Section 404 permit and Section 7 permit under the ESA. Instead, MWCD has agreed to implement an interim flow schedule with conservation measures aimed at meeting the minimum needs of coho salmon. As facilities are upgraded, additional volumes of water can be delivered with the proposed CHERP flows fully implemented at the end of the five-year Corps permit. The interim flow plan includes ongoing flow releases that are consistent with a December, 2013, Settlement Agreement between MWCD, Klamath River Keeper, and the Karuk Tribe, along with two additional conservation measures that are intended to benefit coho salmon. First, MWCD proposes to release a total volume of 2,662 acre-feet in years when storage is less than 18,000 acre-feet on April 1 (consistent with a Very Dry Water Year type). This is a net increase of 412 acre-feet above the current baseline of Settlement Flow releases. Second, under Settlement Agreement flows, MWCD's summer environmental flow releases are constrained by the temperature of water stored in Dwinnell Reservoir. Under the interim flow plan, MWCD proposed to utilize discharges from its Flying L pumps in consultation with NMFS to improve the water quality (i.e., temperature) of flow releases consistent with proposed CHERP operations for all water year types. Utilization of the Flying L pumps will allow for greater summer release rates and/or cooler water releases than are currently possible under Settlement Agreement operations.

Prior Rights

Water rights that were established prior to the construction of the Dwinnell Dam are currently held by several owners downstream and are typically referred to as "prior rights." The total volume for these prior rights is 3,382 acre-feet. This volume of water is held in storage by MWCD behind Dwinnell Dam on behalf of the prior rights holders each year. MWCD is obligated to release these prior rights to users downstream during the irrigation season between March 1st and October 31st. When requested, prior rights water is delivered to water right holders either through releases to the main canal or to the Shasta River via the cross canal. Of the 3,382 acre-feet that comprise the total prior rights volume, 1,398 acre-feet are delivered through the main canal and the remaining 1,984 acre-feet are delivered through releases to the Shasta River. Prior rights releases to the Shasta River generally occur between April and September and release volumes are generally about 8 cfs; however, they may range between 2 to 10 cfs. When prior right releases of 8 cfs are provided by MWCD, prior right holders typically divert 2 cfs at Point of Diversion (POD) 158, 4 cfs at POD 165 and 2 cfs at POD 166. A more detailed description of these prior rights releases is provided for each POD in the following section for each Participant.

Seldom Seen Ranch

The Seldom Seen Ranch is approximately 1,421 acres and is located north of Lake Shastina and west of Big Springs Road. The Ranch shares an eastern and northeastern boundary with the Shadow Hills subdivision. To the north lie the Mallet Hidden Valley and Hole in the Ground ranches and to the west, the Shasta Springs Ranch. The ranch is used primarily for beef cattle production and is currently managed as an integrated unit with three other ranches owned and managed by the Permittee. The ranch is irrigated with groundwater or precipitation.

The Seldom Seen Ranch has a Prior Rights Agreement with the Montague Water Conservation District (MWCD) and is supplied from stored water, on demand and under the supervision of the Shasta Valley Water Master, released from Lake Shastina via the cross canal at the base of Dwinnell Dam in lieu of the natural flow of the river. This right is for up to 924 acre-feet.

There are four points of diversion on the Seldom Seen Ranch. One of these is currently the irrigation diversion for the neighboring Hidden Valley Ranch. The other three diversions historically diverted irrigation, stock, and domestic water for the Seldom Seen Ranch, but are currently non-active. The soils of the Seldom Seen are good but porous and the long, unlined ditches were inefficient, so the ranch converted to groundwater use for irrigation. The Seldom Seen Ranch has a production well with approximately a 1330 gpm flow rate, supplying about five-thousand feet of pressurized pipe for wheel-lines. The Seldom Seen Ranch uses their Summer Priority irrigation right at their other place of use with a similar "Prior Rights" agreement, i.e. downriver on the Hole in the Ground Ranch. The Seldom Seen Ranch is irrigated with groundwater. The stock watering right is used by the cattle at protected watering access lanes on the Shasta River.

Hidden Valley Ranch

Hidden Valley Ranch (HVR) is located along Big Springs Road and includes a total of 431± acres, with 150 ± acres under irrigation. The HVR is generally a cow/calf operation with a small segment of the operation producing sheep. Approximately 1.5 miles of the Shasta River is adjacent to the HVR.

The ranch's diversion 158 is a prior right with a storage right of 464 acre-feet, which is stored in Dwinnell Reservoir and released between March 1 and November 1. The delivery rate is generally 2 cfs during this period, however deliveries can be delayed or curtailed during part of the irrigation season. It is delivered by MWCD via the cross canal to the Shasta River, it is then diverted approximately 1,219 meters downstream from MWCD main canal, which is located on a neighboring property and conveyed to HVR by a combination of open ditch and pipeline. There are two springs sourced just adjacent to the Shasta River, near the south property boundary. These two springs are included in the Shasta River Decree, listed as diversion numbers 160 and 161 with a combined right of 0.25 cfs. These springs often produce water in excess of the adjudicated right and the ranch has historically used that excess under a riparian right. Hidden Valley Ranch also has a spring/seep located up gradient from the previously described adjudicated springs, which have also been used for irrigation under the ranch's riparian rights.

Hole in the Ground Ranch

The Hole in the Ground Ranch is approximately 3,120 acres and is located north of Lake Shastina, and west of Big Springs Road. Streams flowing through the Ranch include the Shasta River, Parks Creek, and Hole in the Ground Creek. The confluences of the creeks with the Shasta River are downstream of the property on what will soon be the Shasta Big Springs Wildlife Area. The Ranch is used primarily for beef cattle production and is currently managed with the Permittee's other ranches, also covered under the Agreement.

The Hole in the Ground Ranch has a Prior Rights Agreement with the MWCD for up to 1520 acre-feet, which include the Seldom Seen Prior Right. This water can be delivered at either one or both of two surface diversions on the ranch. The "Gravity Ditch/Diversion" (Shasta Decree Diversion #165) consists of a headgate on the river-right bank of the Shasta River just downstream of the south property line. Head is created by a

constructed roughened channel. The "Gravity Diversion" supplies about 4 cfs of water to irrigate pastures on the east side of the river.

The second POD (Shasta Decree Diversion #166), commonly referred to as the "Cone Screen" diversion, supplies a pumping station and sump located approximately 250 feet off-channel, approximately 0.8 mile downstream of the Gravity Diversion. There are two pumps, one with a capacity to divert about 2,000 gallons per minute (gpm) or 4.4 cfs, and the other has a capacity to divert about 2,200 gpm or 4.9 cfs. Depending on demand, one or the other pump is operated to deliver water to the head of a distribution ditch that is higher than the river. This and lateral ditches supply irrigation water to pastures on the west side of the river and the east side of Parks Creek.

The Hole in the Ground also receives irrigation from two springs. One of these, "Clear Spring", is diverted under License 4151 from the State Water Resources Control Board, Division of Water Rights. Clear Spring flows a few feet from its source into the Shasta River downstream of the Gravity Diversion and the river is used to convey the water right for re-diversion at the Cone Screen diversion 0.5 mile downstream. Clear Spring flow ranges from about 1.0 to 3.5 cfs. The license is for the purposes of irrigation and stockwater and is limited to the amount actually beneficially used for those purposes and shall not exceed 2.5 cfs to be diverted in the period from about March 1 to about November 1 of each year, for irrigation and throughout the year as needed for stockwater. The POD is under the supervision of the Watermaster and as a practice, diverts less than the permitted amount to accommodate spring fluctuation and water quality for fisheries.

The second unnamed spring originates on the Seldom Seen Ranch and is diverted at either POD on the Hole in the Ground under a riparian claim. The spring does not flow in every year, and is not necessarily used in every year it flows. In years when the spring flows, it appears as a small seep in Feb-April, but relatively quickly can increase to more than 2 cfs, sometimes to as much as 9 cfs. Anecdotal evidence suggests that spring flow does not emerge until Lake Shastina storage exceeds some undetermined amount (>30,000 AF). When available and use is anticipated, the flow is measured at its source on the Seldom Seen Ranch and the amount is offset by a corresponding amount of stored water *not* released from Lake Shastina, thereby making the stored water allotment available for use later in the irrigation season. Review of historic Watermaster records suggest this practice started soon after the reservoir came on-line, in the mid-1930s. Measurement records do not exist prior to 2003 and since diversion does not occur every year, the record since then is also sparse. The most recent recorded amount was for a maximum 1040 acre-feet annual use, as reported to the State Waterboard's Electronic Water Rights Information Management System (eWRIMS) under ID S023972.

Upper Shasta Reach Estimated Reach Accretions/Depletions

This reach includes MWCD and three downstream ranches. However, only Hidden Valley Ranch and Hole in the Ground Ranch have active surface diversions that affect surface flow management. There are three active points of diversion on the Upper Shasta reach, primarily delivered from MWCD as prior rights. Diversion amounts can vary depending upon how prior rights are being utilized by the ranches and at times during the irrigation season the ranches may call on MWCD to reduce prior rights deliveries from Dwinnell Dam. Thus, diversions (depletions) can vary from 0 to 10 cfs along this reach, some of which returns to the river (accretions) as fish screen bypass water and tailwater returns. It should be noted that many of the tailwater returns in this reach have been greatly reduced within the last several years due to improved management and

infrastructure. During the summer 2015, stream measurements indicated that the reach from MWCD cross canal through Hidden Valley Ranch is a losing reach with an unaccounted depletion of between 0.9 and 1.3 cfs. Stream measurements taken at the same time indicated that the reach from Hidden Valley's north property line to Hole in the Ground's north property line is a gaining reach, with accretions calculated to range between 5 cfs and 10 cfs. This accretion calculation includes the discharge from Clear Springs on the Hole in the Ground Ranch, which was measured to be around 2.2 cfs at the time of the assessment.

Development of more efficient water conservation practices will influence the accretion rates returning to the river that have been observed under current irrigation conditions. Therefore, it is uncertain how much these accretion rates will be affected as more efficient water conservation practices and facilities are implemented over time. In addition, spring flows that emerge at several locations downstream of Dwinnell Dam and along Parks Creek may also be influenced by storage elevations in the reservoir, while other spring sources appear to be influenced by other factors that including snow pack, groundwater pumping, and other factors which are not yet identified.

Existing Upper Shasta Flows

Since the CHERP flows will not be available until after the water conservation efforts are completed to the main canal, the following schematic (Figure 7) illustrates the diversions and accretions in the Upper Shasta reach without the CHERP flow commitments. This schematic also does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices and provides a simple illustration of the historic flow patterns primarily driven by irrigation management practices. MWCD's interim flow schedule is currently in place and in the future MWCD intends for the CHERP flow schedule to be included under the safe harbor agreement permit process once the existing Section 7 Permit expires in September of 2022 or sooner. MWCD also proposes additional water management actions as part of the SHA that are described in the Upper Shasta Flow Management Strategy section below. In addition, MWCD is seeking a State Water Code 1707 dedication for their CHERP flow to insure this environmental water remains instream and is protected from diversion by water right and riparian diverters downstream.

Upper Shasta River - Existing Flow Conditions
Irrigation Season: March 1 - November 1

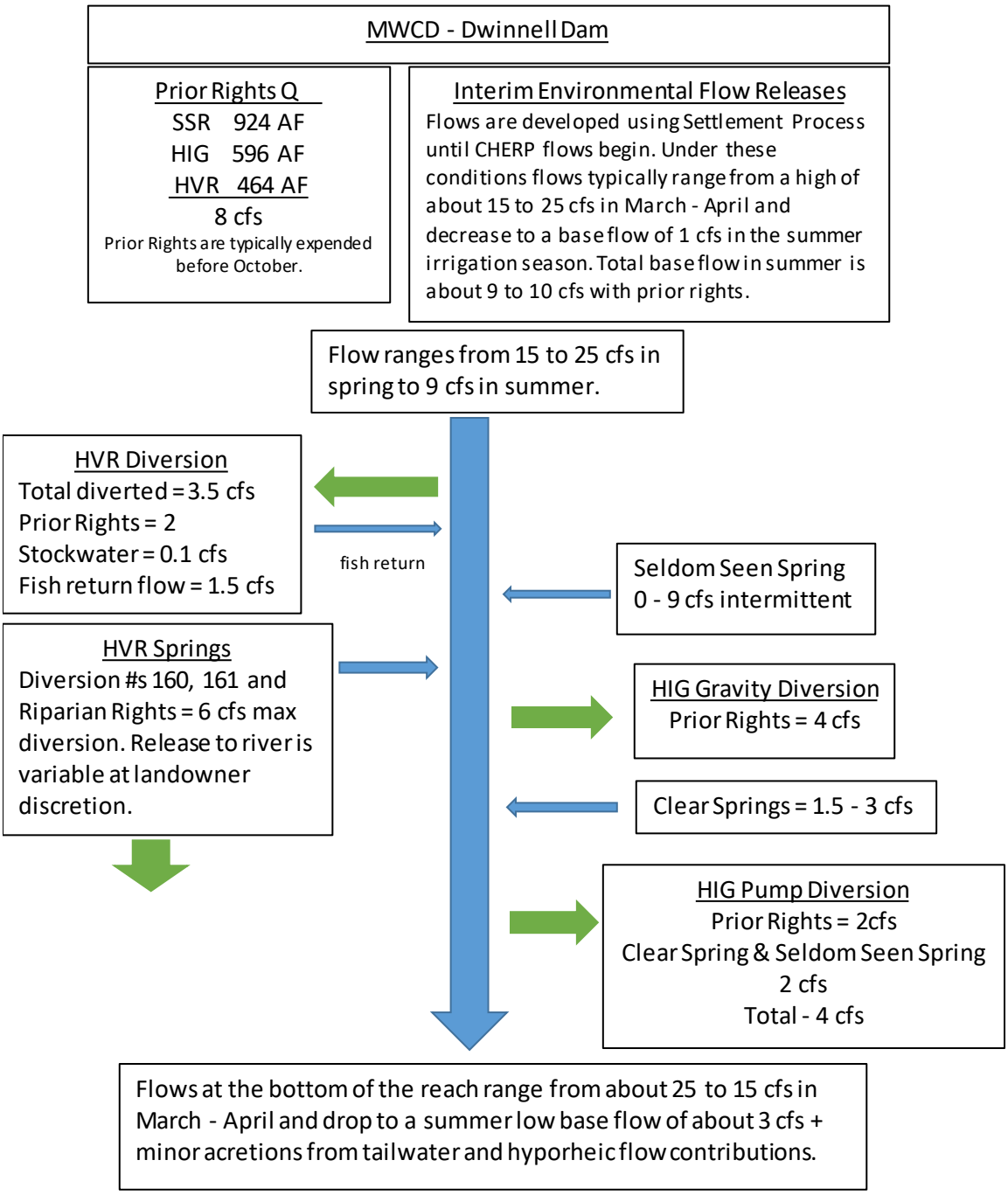


Figure 7. Flow schematic of the existing conditions in the upper Shasta River between Dwinnell Dam and the confluence with Parks Creek during the summer season (March 1 to October 31).

Upper Shasta Flow Management Strategy

The following section describes the TAC's life stage objective and each Permittee's flow commitment needed in order to collectively meet the outlined flow objectives for the reach. Since the flow available in the reach is highly dependent upon proposed MWCD CHERP releases, which in turn are dependent upon five water year types proposed by MWCD to guide its flow management, the following MWCD commitment is presented in terms of water years types.

Adult migration and spawning (October 1 to December 31) Flow Objectives:

A. Base Flows - Develop a flow strategy that ensures a minimum 10 cfs, October 1st - December 31st (Table 1, Reach 1C).

B. Pulse Flows - Short term pulse flows may be beneficial to assist movement of adult coho salmon through beaver dams and allow access to newly restored spawning habitats proposed to be created under the Agreement through gravel placement downstream of Dwinnell Dam. The magnitude of these pulse flows is uncertain and would need to be monitored during various flow release levels to determine the optimum range of flows that will provide adult passage over time.

Adult migration and spawning (October 1 to December 31) Permittee Commitments:

MWCD: Under the CHERP flow schedule winter releases will range between 3 and 13 cfs of streamflow in the Upper Shasta River beginning in October dependent upon water year classification as follows:

"Very Dry Year" = 3 cfs will be released October through December.

"Dry Year" = 3 cfs will be released in October, 4 cfs in November, 3 cfs in December.

"Normal Year" = 6 cfs will be released October through December.

"Wet Year" = 10 cfs will be released October through December. In addition, MWCD will provide a 684 acre-foot block of water to be used adaptively in fall/winter of Wet Years for flushing, habitat maintenance, or migration.

"Very Wet Year" = 13 cfs will be released October through November, 10 cfs in December. In addition, MWCD will provide a 1,154 acre-foot block of water to be used adaptively in fall/winter of Very Wet Years for flushing, habitat maintenance, or migration.

Hidden Valley Ranch: The spring production on the ranch is variable in the winter, but when producing, it will be continuously released to the river, could be between 0.5 and 3+ cfs. During very dry years, it is anticipated that the spring might dry completely and not be available for instream use. The spring flow will be measured in real-time to assist in management, releases to the river, and irrigation use will be reported annually.

Hole in the Ground Ranch: The ranch has up to a 2.5 cfs winter rights from Clear Spring, which is kept instream and used for stockwater accessed directly from water lanes on the river. Clear Spring's production is continuously released to the river, producing between 1.0 and 3.5 cfs.

Upper Shasta Reach Total Flow Contributions: Adult Migration and Spawning

Winter instream flows are expected to be between 5.0 and 20.5 cfs at the bottom of this reach depending on water year type. The following schematic (Figure 8) illustrates the diversions and accretions in the Upper

Shasta reach. Water temperatures are cooling during this time of the year and we anticipate that water exchanges (warm water for cold spring water) between MWCD, Hidden Valley Ranch and Hole in the Ground Ranch will cease to occur. This does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

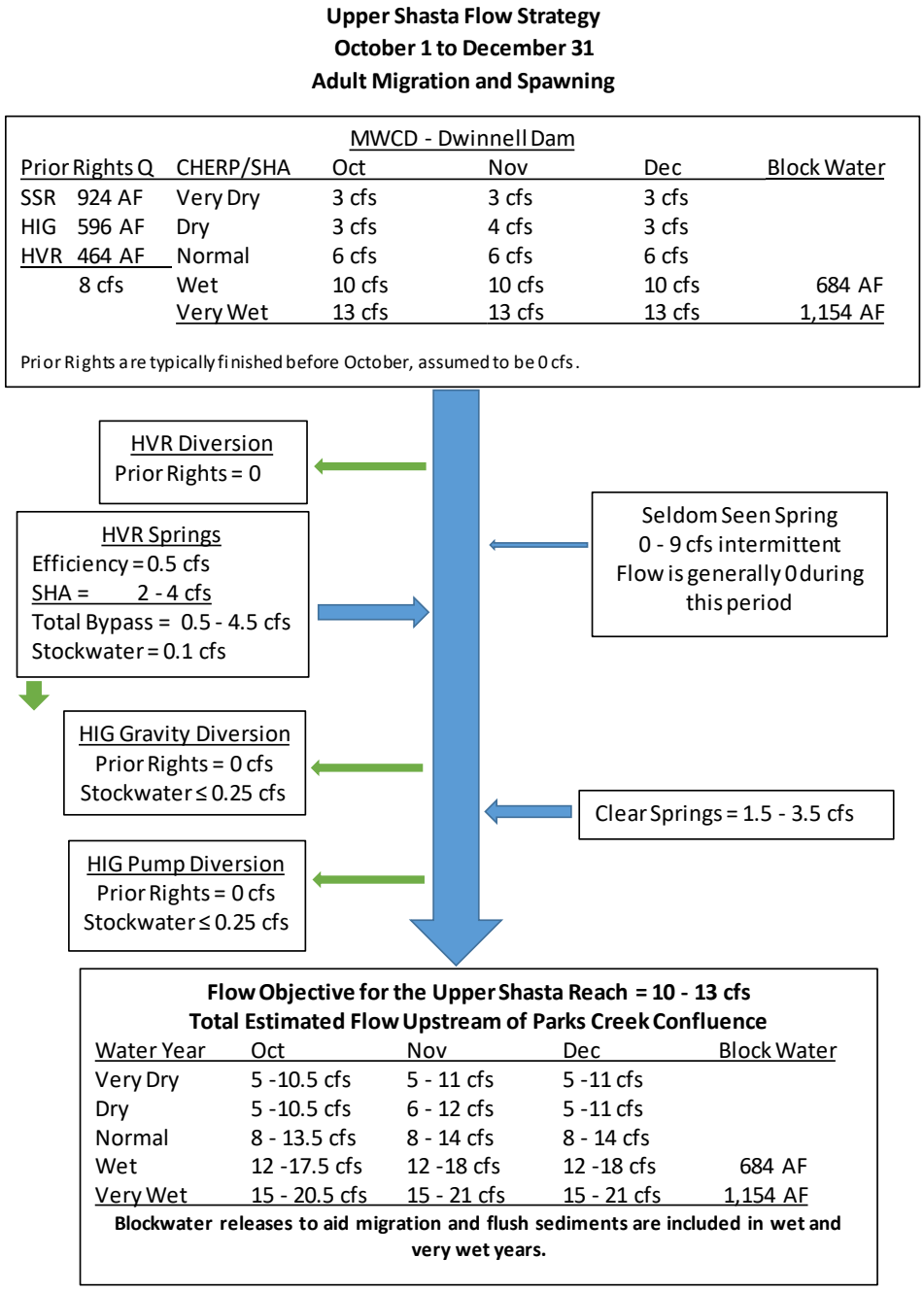


Figure 8. Estimated flow schematic for the Upper Shasta River under future conditions with CHERP and SHA proposed flow management during the adult migration and spawning season after all conservation measures have been implemented.

Egg incubation and winter rearing juveniles (January 1 to February 28) Flow Objectives:

This reach is protected from intermediate flood flows by the presence of Dwinnell Dam. However, large flood events can cause Dwinnell to spill high flows on rare occasions. Development of alcoves along with placement of large wood is intended to increase hydraulic and habitat diversity, improve cover, and provide juvenile coho salmon with areas to seek refuge during rare spill events. In MWCD's Site Plan they have also proposed to investigate installing a retrofit of trash racks and gate adjustment infrastructure to the mid-level spill gates on the spill tower. If feasible this will allow MWCD the flexibility to provide flushing flows to enhance habitat and trigger sediment transport below Dwinnell Reservoir during wet and very wet years. These modifications would also allow some relief during large floods by increasing the duration of intermediate flows and reducing the magnitude of peak flows.

A. Base Flows - The minimum flow objectives for over wintering coho salmon at the lower end of this reach as defined by McBain and Trush, Inc. and Humboldt State University (2013) range from 7 cfs to 10 cfs (Table 1, Reach 1C).

Egg incubation and winter rearing juveniles (January 1 to February 28) Permittee Commitments:

MWCD: Winter releases of between 2 and 10 cfs of streamflow in the Upper Shasta River beginning in January will be dependent upon water year classification as follows:

"Very Dry Year" = 2 cfs will be released January and February.

"Dry Year" = 2 cfs will be released January and February,.

"Normal Year" = 4 cfs will be released until the end of February.

"Wet Year" = 4 cfs will be released through January and February.

"Very Wet Year" = 10 cfs and 4 cfs will be released in January and February, respectively.

Hidden Valley Ranch: The spring production on the ranch is variable in the winter, but when producing, it will be continuously released to the river, could be between 0.5 and 4.5 cfs. During very dry years, it is anticipated that the spring might dry completely and not be available for instream use.

Hole in the Ground Ranch: The ranch has up to a 2.5 cfs winter rights from Clear Spring, which is kept instream and used for stockwater. Clear Spring discharge is continuously released to the river, producing between 1.0 and 3.5 cfs.

Upper Shasta Reach Total Flow Contributions: Egg Incubation and Winter Rearing

Winter instream flows are expected to be between 3.5 and 18 cfs at the bottom of this reach depending on water year type. The following schematic (Figure 9) illustrates the diversions and accretions in the Upper Shasta reach without the SHA flow commitments. This does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

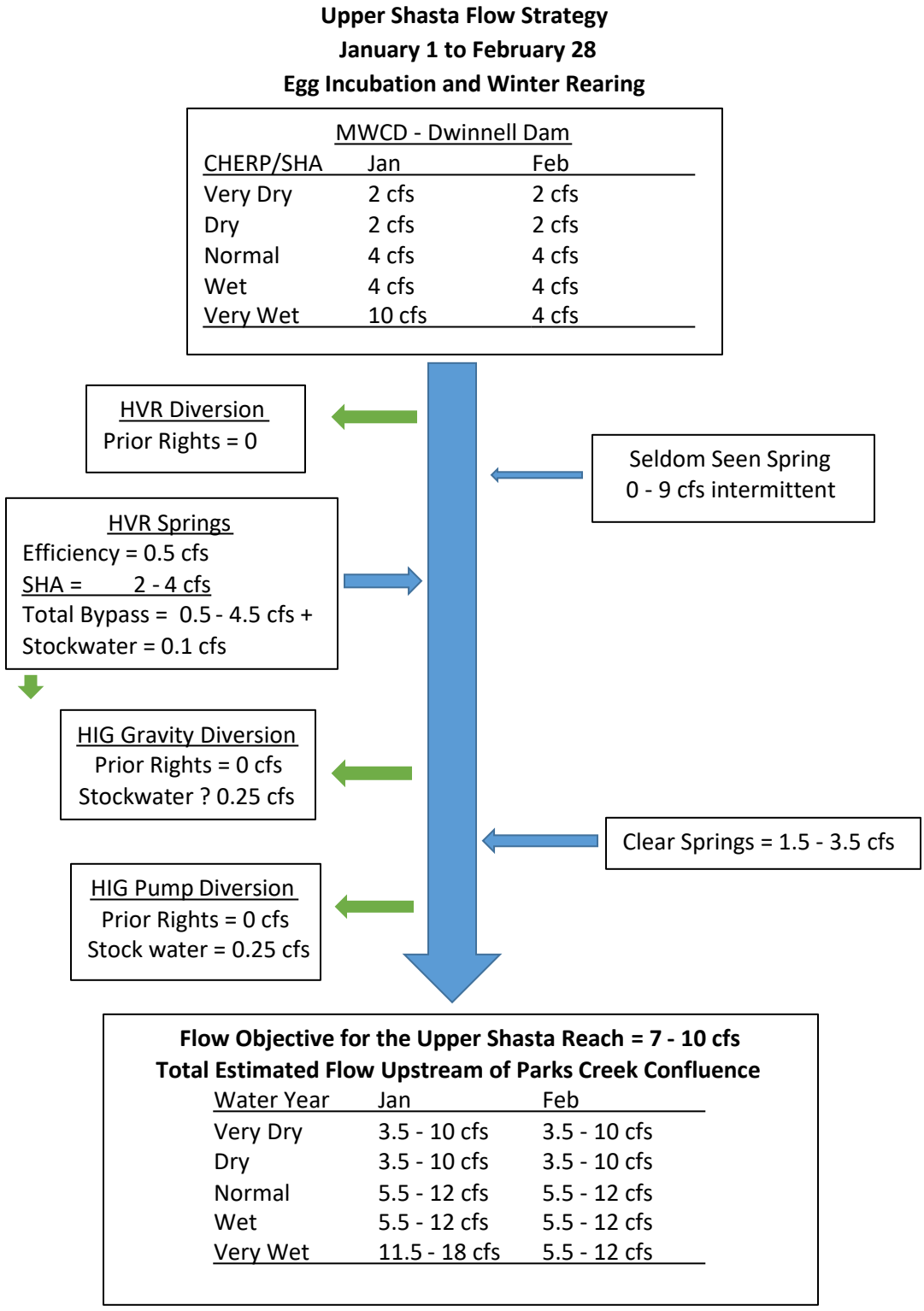


Figure 9. Estimated flow schematic for the Upper Shasta River under future conditions with CHERP and SHA proposed flow management during the winter incubation and rearing season after all conservation measures have been implemented.

Upper Shasta Reach Flow Objectives: Spring rearing, redistribution and smolt emigration (March 1 to June 15):

A. Base Flows – To the extent practicable, develop a flow strategy that ensures a minimum flow of 20 cfs (Table 1, Reach 1C). In the event that these flows cannot be achieved, ensure minimum depth of riffle crests to allow unimpeded fish passage. Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment throughout this reach. To accomplish this objective a gradual drawdown of spring flows to summer base flow levels would be desired. However, water temperature maintenance during the late spring may override this objective.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage through the numerous beaver dams that exist in this reach. A flow management strategy that includes pulse flows will help support a net conservation finding.

C. Temperature Considerations - As ambient air temperatures rise in the late spring, flow management should optimize cold water releases from spring sources and the Flying L pumps to prevent water temperatures from exceeding 18°C for as long as is possible. The primary goal is to maintain cold water (<18°C) connectivity for as long as possible. This will help to delay triggering temperature avoidance behavior by juvenile coho salmon and will help to maximize the distribution and connectivity of suitable rearing habitat within this reach.

Upper Shasta Reach Permittee Commitments: Spring rearing, redistribution and smolt emigration (March 1 to June 15):

MWCD: Spring releases of between 3.0 and 25 cfs of streamflow in the Upper Shasta River beginning in April will be dependent upon water year type as follows. For simplicity, the following release schedules do not include the 8 cfs (on average) of prior rights releases from Dwinnell Dam that will be occurring concurrently when requested by water right holders downstream. In addition to the flows below MWCD will deliver an additional 3 cfs of exchange water downstream to HVR and HIG Ranch when temperature triggers are met.

" Very Dry Year" = 4 cfs at the beginning of March, 15 cfs released in late March until mid-April, 10 cfs at the end of April and tapering down to 5 cfs until mid-May and then down to 3 cfs for the remaining period.

" Dry Year" = 4 cfs until mid-March, then 15 cfs will be released through the end of until end of April, 10 cfs until mid-May, and 5 cfs until mid-June.

" Normal Year" = 4 cfs will be released until Mid- March, then 15 cfs will be released, with a 4 day period of 25 cfs for pulse flows at the end of March 15 cfs will be released until end of April, 10 cfs until mid-May, 5 cfs until mid-June.

" Wet Year" = 8 cfs is released until mid- March, then 15 cfs will be released, with 25 cfs for pulse flows at the end of March 20 cfs will be released until mid-April, 15 cfs until end of April, 10 cfs until mid-May and 5 cfs until mid-June.

" Very Wet Year" = 10 cfs is released until mid- March, then 15 cfs will be released, with 25 cfs for pulse flows at the end of March until mid-April, 20 cfs until end of April, 15 cfs mid-May, 10 cfs until end of May and 5 cfs until mid-June.

Hidden Valley Ranch: The ranch's prior rights can be diverted at a rate up to 2 cfs at its point of diversion. The spring production on the ranch is variable in the spring, but generally starts in March and will be used primarily for irrigation during this life stage. However, efficiency improvements on the prior rights ditch will allow the ranch to provide 0.5 cfs of spring flow for instream use during this life stage.

Hole in the Ground Ranch: The ranch's prior rights will be diverted at the gravity diversion (upstream) and/or the cone screen diversion (downstream) during this life stage and will be diverted at a maximum rate of 6 cfs. Clear spring production is continuously released to the river, producing between 1.0 and 3.5 cfs, 2 of which is diverted at the cone screen diversion. It is currently estimated that efficiency improvements on the gravity diversion will allow the ranch to provide 0.7 cfs of Clear Spring for instream use during this life stage.

Upper Shasta Reach Total Flow Contributions: Spring Rearing, Redistribution and Smolt Emigration

Spring flow management seeks to mimic the natural snowmelt hydrology by providing peak flows in March and April followed by the declining limb until base summer flow management begins in June depending on water temperatures. Instream flows vary by month and water year type. Peak flow contributions from the Upper Shasta River reach will range between 17 and 33.5 cfs in March and April, 7 and 23.5 cfs in May. Base flows in June will range between 5 and 11.5 cfs in June. When water temperatures reach 18°C flow management will shift to optimize cold water habitats. The following schematic (Figure 10) illustrates the diversions and accretions in the Upper Shasta reach with proposed Permittee flow commitments after water conservation infrastructure projects are implemented under the Agreement. This does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

Upper Shasta Flow Strategy
March 1 and June 15
Juvenile Rearing, Redistribution and Smolt Emmigration

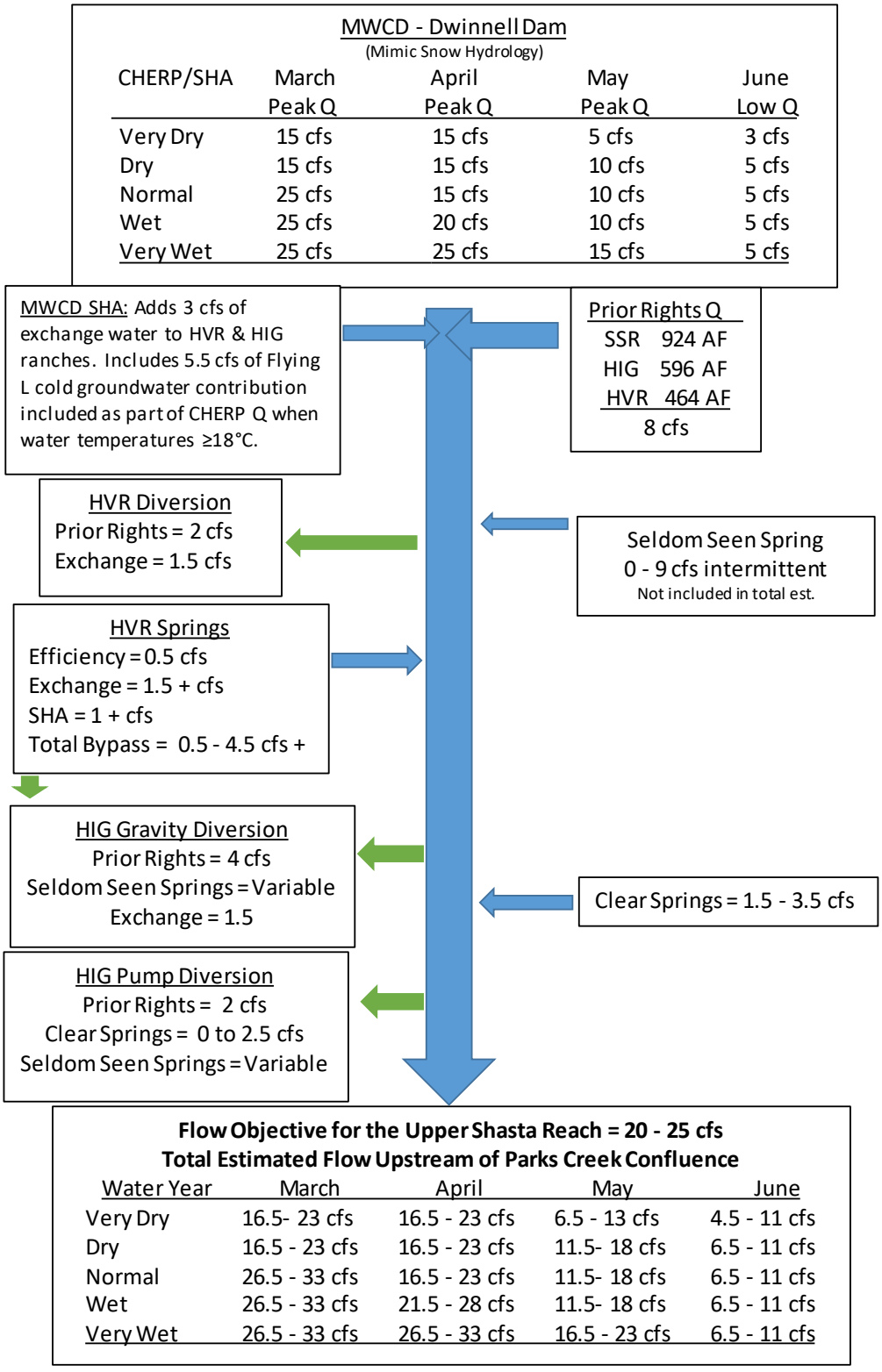


Figure 10. Estimated flow schematic for the Upper Shasta River under future conditions with proposed flow management during the spring rearing season after all conservation measures have been implemented.

Upper Shasta Reach Flow Objectives: Coho Salmon Juvenile Summer Rearing (June 15 to September 30):

The primary objective is to optimize cold water resources and flow connectivity throughout this reach. This may be possible by maximizing cold water releases, entering into water exchange agreements, relocating/combining points of diversion, and changes in irrigation management and/or use of groundwater pumps (Flying L Pumps). Flow connectivity objectives should seek to provide fish passage for juvenile salmon over critical riffles and beaver dams.

A. Base Flows – To the extent practicable, develop a flow strategy that ensures a minimum flow of 6 cfs (Table 1, Reach 1C).

Upper Shasta Reach Permittee Commitments: Juvenile Summer Rearing (June 16 to September 30):

MWCD: Summer flow releases (including prior rights releases) from Dwinnell Dam will be optimized by releasing up to 5.5. cfs of Flying L water into the channel to provide temperature benefits. Three (3) cfs of water will be designated as exchange water or environmental water. This water can be diverted by both downstream diverters (HVR and HIG) in equal exchange for spring water staying/released instream for water quality purposes throughout the reach. Water exchanges will occur when water temperatures reach 18°C at monitoring stations downstream. Whatever portion is not exchanged due to inadequate spring production will bypass downstream PODs. MWCD will release 3 cfs in addition to the 2-10 cfs of prior rights releases during this period under all water year types. MWCD will also provide an additional 2 cfs to instream flows when prior rights deliveries end for the season to gradually ramp down to a 3 cfs base flow.

Hidden Valley Ranch: The ranch's prior rights can be diverted at a rate up to 2 cfs at its point of diversion. The landowner commits to keeping the prior right delivery on during very dry and dry years and intends to fluctuate operations on normal to wet years. The spring production on the ranch is variable in the summer, but the ranch will optimize cold water releases by exchanging up to 1.5 cfs of cold spring water with 1.5 cfs of additional water provided by MWCD through releases from Dwinnell Dam when water temperatures reach 18°C at the Hidden Valley Ranch water quality monitoring station (HVR-US see Figure 1) upstream. Hidden Valley Ranch will also provide 0.5 cfs of spring water resulting from efficiency improvements and 1.0 cfs of spring water for the ranch's contribution to conservation. It should be noted that the spring flow is highly variable year to year and throughout the season and can drop down to 0.5 cfs. Hidden Valley Ranch will release between 0.5 and 3 cfs of cold spring water during this life stage. However, in normal to very wet years when spring production is in excess, the ranch could release up to 8 cfs at times. All exchanges will be in direct proportion to spring production, up to 1.5 cfs, and will be verified with real-time gaging.

Hole in the Ground Ranch: The ranch's entire prior rights delivery (6 cfs) will be diverted at the gravity diversion (upstream) during this life stage. The landowner commits to only turning down prior right deliver to 50-percent of normal delivery (3 cfs) during conditional events (rain events, maintenance) and will coordinate this with MWCD and HVR. The ranch will also divert an additional 1.5 cfs at the gravity diversion of the MWCD exchange water, with an equal portion of Clear Spring being kept instream when river temperatures at HVR-DS monitoring station (See Figure 1) reach 18°C. An additional 0.7 cfs from Clear Spring will remain instream due to conservation from efficiency improvements. Hole in the Ground will provide between 1 and

3.5 cfs of Clear Spring water during this life stage. All exchanges will be in direct proportion to spring production and will be verified with real-time gaging.

Upper Shasta Reach Total Flow Contributions: Juvenile Summer Rearing (June 16 to September 30):

Summer base flow management seeks to optimize cool water habitats throughout the reach through the use of cold groundwater and spring water contributions. These contributions would be possible through the use of groundwater pumping and exchanges of warm river water to irrigate fields for cold spring water contributions to the river. Summer instream flows are expected to be between 5 -17 cfs at the bottom of this reach. The objective is also to maintain flow connectivity throughout the reach. Landowners will commit to coordinating management of prior right releases to eliminate unexpected drop in flows downstream of Dwinnell Dam. This flow strategy will be temperature driven using 18 °C as the management trigger. Water exchanges will go into effect on both Hidden Valley Ranch and Hole in the Ground Ranch once 18°C is measured at real-time monitoring stations downstream. MWCD will also begin to operate the Flying L groundwater pumps, which release groundwater to the Upper Shasta River below Dwinnell Dam, water temperatures in the main canal reach 18°C. These shifts in flow management is anticipated to occur in June and will likely continue into September or October depending on environmental conditions. Accretions within the Hole in the Ground reach have been measured to be between 3 to 4.9 cfs in the summer depending on irrigation practices. The following schematic (Figure 11) illustrates the diversions and accretions that are anticipated to occur in the Upper Shasta reach under CHERP and SHA flow commitments. This does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

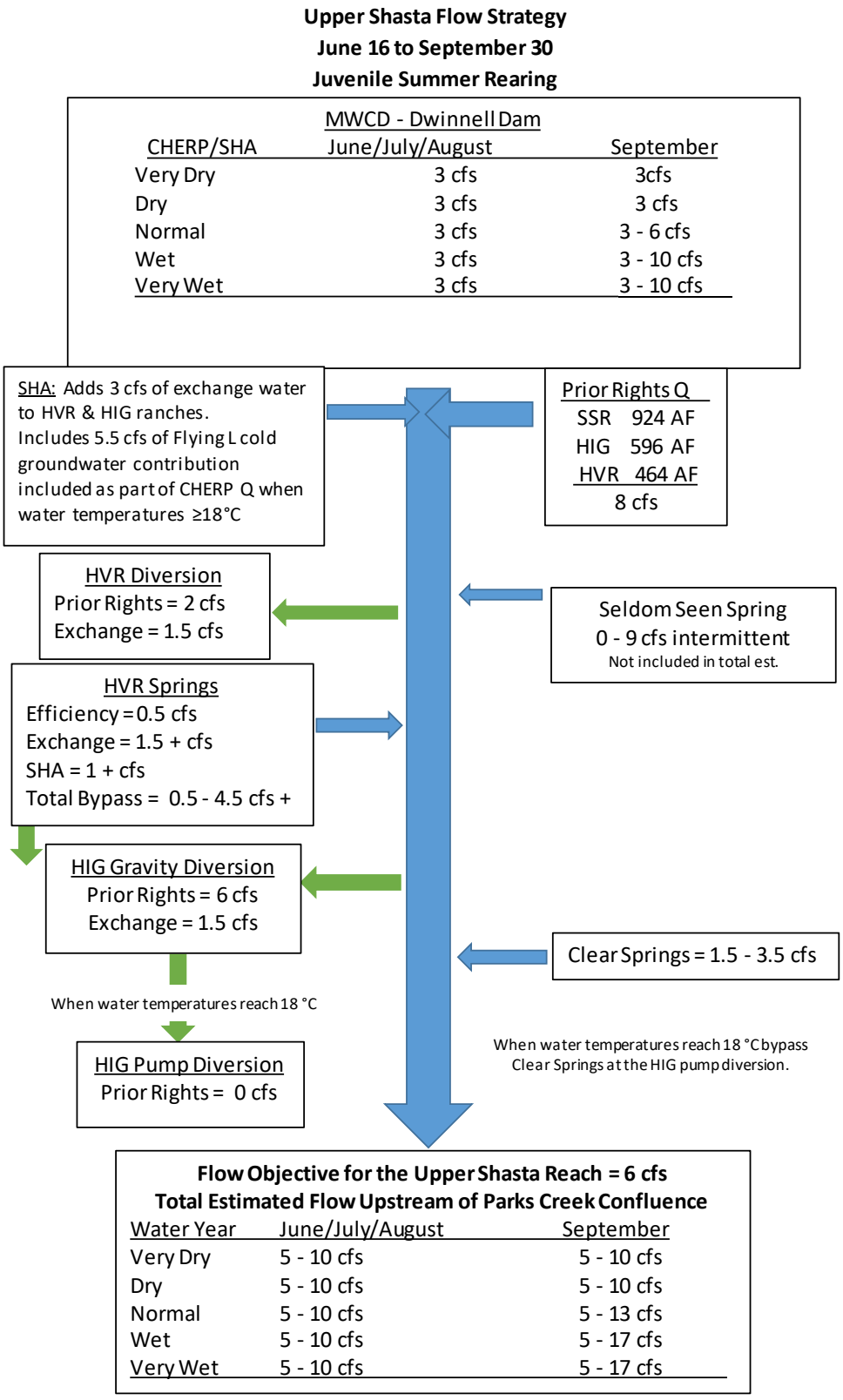


Figure 11. Estimated flow schematic for the Upper Shasta River under future conditions with CHERP and SHA proposed flow management during the spring rearing season after all conservation measures have been implemented.

Upper Shasta River Flow Management Strategy Summary

Table 5 summarizes the above described landowner commitments by water type, with estimated flows at the bottom of the Upper Shasta reach and the flow objectives for each life stage.

Table 5. Summary of the flow management strategy for the Upper Shasta Reach by life stage and water year.

Life Stage	Time Period	Water Year Type	Instream Flow Conservation Benefit in cfs				Flow Objective*
			MWCD	HVR (Springs)	HIG (Clear Spg)	Total Reach	
Adult Migration and Spawning	October 1- December 31	Very Dry	3 (Oct-Dec)	0.5 to 4.5	1 to 3.5	5-11 cfs	Base Flow= 10 cfs (Oct 1- Dec 31)
		Dry	3 (Oct), 4 (Nov), 3 (Dec)			5-12 cfs	
		Normal	6 (Oct- Dec)			8-14 cfs	
		Wet	10 (Oct-Dec) + 684 AF			12-18 cfs+ 684AF	Pulse Flows= 15-25 cfs on wet and very wet years
		Very wet	13 (Oct-Dec)+1,154 AF			15-21 cfs+1514AF	
Inclubation and Winter rearing juveniles	January 1- February 28	Very Dry	2 (Jan-Feb)	0.5 to 4.5	1 to 3.5	3.5-10 cfs	Base Flow= 7- 10 cfs
		Dry	2 (Jan-Feb)			3.5-10 cfs	
		Normal	4 (Jan-Feb)			5.5-12 cfs	
		Wet	4 (Jan-Feb)			5.5-12 cfs	
		Very wet	10 (Jan), 4(Feb)			11.5-18.5 cfs (Jan) 5.5-12 cfs (Feb)	
Juvenile redistribution and Smolt emigration	March 1 - June 15	Very Dry	15(March/April), 5 (May), 3 (June)	0.5 to 4.5	1 to 3.5	17-23 (March/April), 7-13.5 (May), 5-11.5 (June)	Base Flow= 20 cfs or min depth of CRA
		Dry	15 (March/April), 10 (May), 5 (June)			17-23 (March/April), 12-18.5 (May), 7-11.5 (June)	
		Normal	25 (March),15 (April), 10 (May), 5 (June)			27-33.5 (March), 17-23.5 (April), 12-18.5 (May), 7-11.5 (June)	Pulse Flow= 15-25 Cfs
		Wet	25 (March), 20 (April), 10 (May), 5 (June)			27-33.5 (March), 22-28.5 (April), 12-18.5 (May), 7-11.5 (June)	Temp Consideration < 18° C
		Very wet	25(March/April), 15 (May), 5 (June)			27-33.5 (March), 27-33.5 (April), 12-18.5 (May), 7-11.5 (June)	
Juvenile rearing	June 15- September 30	Very Dry	3 to 11 (8= prior rt, 3=June -August exchange/enviro) 3 to 18 (8=prior rt + 3-10=Sept Enviro)	0.5 to 4.5	1 to 3.5	5-17 cfs	Base Flow= 6 cfs
		Dry					
		Normal					
		Wet					
		Very wet					

*Note: * This target was established at the bottom of the reach on HIG Ranch.*

Parks Creek Overview

Parks Creek has been split into three sub-reaches, Upper Parks, Mid Parks and Lower Parks and described as follows:

- Upper Parks Creek – Interstate 5 Crossing to Upstream Boundary of Agreement Area (RM 8 to RM 14.5)
- Mid Parks Creek – Upstream of Kettle Springs Confluence to Interstate 5 Crossing (RM 2 to RM 8)
- Lower Parks Creek – Shasta River Confluence to Kettle Springs Confluence (RM 0 to RM 2)

There are six participants with five enrolled properties along Parks Creek:
Upper Parks Creek

- MWCD
- Edson-Foulke Ditch Company
- Parks Creek Ranch

Mid-Parks Creek

- Shasta Springs Ranch

Lower Parks Creek

- Hole in the Ground Ranch
- Cardoza

The Parks Creek irrigation season begins on March 1 and continues through October 31. Parks Creek is a snowmelt driven stream with peak sustained flows occurring during the snowmelt period of April and May, with periodic higher winter flows. Natural flow levels in Parks Creek typically begin to decline as snow fields at higher elevations melt in later May through June. As snowmelt driven flows tail off, natural flow levels in Parks Creek during this period are typically less than the total volumes of water currently adjudicated for beneficial agricultural uses along upper Parks Creek.

The annual water year varies significantly depending upon winter precipitation volume, snow pack conditions and snow-melt variability. Snow melt duration is variable dependent upon ambient temperatures and precipitation events during April and May. Regardless, a long period of base flows typically occurs in the upper reaches of Parks Creek from late-July until October. Late August-early September base flow conditions in Parks Creek reduce to approximately 3-4 cfs (normal water year) entering the upper boundary Parks Creek. Parks Creek often disconnects through an alluvial fan reach located above Old Hwy 99. Continuous and varied small accretions occur throughout all three Parks Creek reaches, which occur from either spring accretion, subsurface returns from flood irrigation or surface tailwater returns.

Upper Parks Creek Reach

Montague Water Conservation District:

MWCD has a storage right to divert 14,000 acre-feet of water from Parks Creek from October 1 to June 15th annually. MWCD diverts water from Parks Creek at a POD just downstream from the Old Highway 99 Bridge,

which is the beginning of the "Parks Creek Cross Canal". This water travels about 4,300 feet from the Parks Creek POD to the Shasta River, which then flows directly into Dwinnell Reservoir. MWCD storage right on Parks is a low priority right and their 1600 permit to divert water has established bypass requirements. Currently MWCD is required to bypass 6 cfs from November 1 through February 28 and must bypass 15.85 cfs from March 1st through June 15th when their diversion season ends. Under CHERP, MWCD proposes to increase its bypass flows from 6 cfs to 15 cfs from October 1 through December 15 to facilitate adult coho salmon migration. MWCD has a gaging station (PME) that is currently included in the California Data Exchange Center (CDEC) web site for public access. The gaging station measures bypass flows in Parks Creek immediately below MWCD's diversion point and is used to monitor minimum bypass flow requirements.

Edson-Foulke Yreka Ditch Company:

The Edson-Foulke Yreka Ditch (aka the China Ditch or Yreka Ditch) consists of 15.45 miles of open ditch delivering water to six users. Water rights held by Edson-Foulke Yreka Ditch Company (Edson-Foulke) are described in the Shasta River Decree under paragraphs 33, 116, 117, 118, 119, 120, 121, 122, 123, 124, and 324. These water rights include diversions from the Shasta River, upstream of Dwinnell Dam, Parks Creek, Willow Creek, Garden Springs, Kiernan Slough, McCloud Slough, and Whites Slough. The total amount of water adjudicated from these sources to the Edson-Foulke Ditch during the summer irrigation season is 59 cfs and during the winter the total is 27.15 cfs. Some of these water rights allow for in lieu use or combined use from multiple points of diversion. For example, Edson-Foulke has winter stockwater rights that can be diverted from either their Shasta River or their Parks Creek Diversion or can be diverted in part from both locations. These winter stockwater rights are described in paragraphs 33 (1.25 cfs), 116 (7.45 cfs), 117 (0.60 cfs), and 324 (0.60 cfs) for a total of 9.9 cfs. Edson-Foulke diverts their Parks Creek/Shasta River winter stockwater right of 9.9 cfs from their Parks Creek Diversion. Edson-Foulke has summer irrigation water rights totaling 59 cfs from all sources, which includes an adjudicated volume of 9.9 cfs for their Parks Creek Diversion. The Parks Creek summer irrigation water rights are described in paragraphs 33 (1.25 cfs), 116 (7.45 cfs), 117 (0.6 cfs), and 324 (0.6 cfs). Edson-Foulke also has a storage water right to divert 228 acre-feet to Edson and Foulke Reservoir between November 1 and March 1 annually. The locations from which this water may be diverted are described in the Shasta River Decree. The locations include Parks Creek and the Shasta River as described in paragraph 116, and Willow Creek as described in paragraph 119. Edson-Foulke intends to limit daily diversion volumes for this storage right to 5 cfs per day. Under this strategy, the storage diversion would be satisfied in about 23 days if the diversion rate is maintained at 5 cfs per day.

In summary, Edson-Foulke has adjudicated water rights for summer irrigation use from Parks Creek of 9.9 cfs and they have adjudicated water rights for stockwater use that total 9.9 cfs which Edson-Foulke plans to divert from Parks Creek and they have a storage right to 228 acre-feet which is also anticipated to be diverted from Parks Creek at maximum rate of 5 cfs per day between November 1 and March 1.

Parks Creek Ranch also has an agreement that enables them to use the Edson-Foulke Ditch infrastructure to convey 5.3 cfs of water from the Parks Creek POD from March 1 to July 10. This 5.3 cfs is a separate right from the 9.9 cfs adjudicated right of Edson-Foulke's Parks Creek diversion.

Parks Creek Ranch:

The Parks Creek Ranch uses a combination of water sources for irrigation. The ranch has a total of 28 distinct water rights identified in the Shasta River Decree that either divert from Parks Creek or a tributary to Parks Creek. Over time, points of diversion were combined into seven points of diversion on Parks Creek and six diversions on small tributary streams (Wells Creek, Spring Creek and Unnamed Fork of Parks Creek). The livestock watering rights for the ranch total 5.65 cfs. Specific to Parks Creek there are currently 18.65 cfs of irrigation rights from seven active points of diversion including 16 identified water rights. 2.0 cfs of additional rights are identified for Spring Creek. Parks Creek Ranch also has an agreement that enables them to use the Edson-Foulke Ditch infrastructure to convey 5.3 cfs of water from the Parks Creek POD from March 1 to July 10. This 5.3 cfs is a separate right from the 9.9 cfs adjudicated right of Edson-Foulke's Parks Creek diversion.

Due to available flows, as summarized above, Parks Creek Ranch operates under deficit irrigation conditions for several months including reducing the volume of acreage irrigated. As flows decline and adjudicated diversion volumes are no longer available, the Scott and Shasta Watermaster District implements a water rights priority system identified in the Shasta River Decree under authority of the Superior Court of Siskiyou County. Lower priority water rights are curtailed to assure delivery to higher priority rights. As the season progresses, the Parks Creek Ranch reduces the number of operating diversions to just 2-3 active diversions during base flows (typically diversions #1, #3 and #6), with diversion #1 being the highest priority right in Parks Creek and most important point of diversion related to irrigation value.

Parks Creek flow volumes of less than 10 cfs enter the Ranch's upstream boundary for prolonged periods during the summer and early fall. Regardless of water year type, flow volumes of less than 6.0 cfs may exist for approximately 80-100 days. Flow conditions typically increase slowly during the month of October. The Ranch currently uses the increased flows to expand irrigation at diversions #1 and #3 for a final irrigation set until the irrigation season ends on October 31, or earlier if cold weather ends the growing season..

Parks Creek Ranch has a winter right to divert 5.65 cfs to water livestock between November 1 and February 28.

Mid-Parks Creek Reach

Shasta Springs Ranch:

Shasta Springs Ranch has adjudicated rights on Parks Creek totaling 16.35 cfs, which can be taken between the five Parks Creek diversions. They also have an adjudicated right on Kettle Springs totaling 1.15 cfs and two other adjudicated rights on spring sources totaling 0.5 cfs. Bridge Field and Black Meadow springs are utilized under a Riparian Claim and water use statements are filed through the eWRIMS. All the diversions use gravity fed ditches and flood irrigation on pastures along the river. Flows coming from Bridge Field Slough were measured during the 2016 assessment and were found to have varying discharge. Bridge Field Slough receives water from several different sources that include tailwater from the Bridge Field pastures, several seeps, Duke Spring and most significantly Bridge Field and Black Meadow springs.

The spring production was monitored during the 2016 assessment; approximately 10.5 cfs was measured coming from Bridge Field Slough during May, with July contributions dropping to 4.26 cfs and November

contributions dropping to 2.3 cfs. With further review, it appears that flow from Black Meadow Springs is fairly consistent, staying around 1.5 to 2cfs and Bridge Field springs gradually curtailing production throughout the season. Kettle Springs had flows around 5 cfs in May, increasing in July to 7.5 cfs and then dropping slightly to 6.73 cfs in November.

Lower Parks Creek Reach

Cardoza Ranch:

The Cardoza Ranch has a 2.98 cubic feet per second (cfs) water right, which is included in the Shasta River Decree. The diversion is water mastered by the Scott Valley and Shasta Valley Water Master District. The water master does allow for periodic "combine and rotate" management of the diversion, where the diversion amount is increased for a shorter period of time, as long as no other user is harmed (personal communication, Tim Beck, Siskiyou County Water Master, deceased). This diversion has been measured to be between 6-9 cfs for shorter periods of time. The water master schedule does not indicate a winter stock water right for this ranch.

The current point of diversion is located on Lower Parks Creek, 1.5-miles upstream from the confluence with the Shasta River. The existing diversion structure consists of an earthen dam with two corrugated metal pipes, which are blocked with flashboards during the irrigation season. The water is backed up behind the levee to gain the elevation needed to convey diverted water down approximately 7,000 feet of open, unlined diversion ditch. This ditch goes to a concrete lined ditch, to the place of use. The water is then distributed throughout the ranch via a series of open, unlined ditches and conveyed by flood irrigation to the pastures. There is also a small pump that lifts the water from the main ditch to the upper pasture, where water is once again distributed via a series of open ditches. The ranch has identified an elevated baseline of moving the point of diversion from Parks Creek to the Shasta River near the Louie Road Bridge (Mid-Shasta reach), which will change the management reach they will be located within. However, since relocating the diversion may not occur until 3-5 years from the signing of the SHA, they are included in the Parks Creek Flow Management strategy to establish interim management commitments.

Estimated Reach Accretions/Depletions

There are fourteen points of diversion on Parks Creek split between the five participants, there are several other small tributaries where water is diverted and used for irrigation purposes. Diversion amounts can vary depending on time of year and the amount of available water available in the channel. The total of the adjudicated irrigation water rights is approximately 56.98 cfs and the season of use is from March 1 to October 31. This excludes the storage rights available to MWCD and any riparian rights that might be claimed during the year. Diversions (depletions) can vary greatly depending on season and more water tends to be diverted during the spring months, when instream flows are higher, and then taper off through the summer as instream flow declines with the declining snow pack. The lowest instream flows occur during the late summer and early fall from August through October. Fall base flows generally increase in November with some periodic large events occurring throughout the winter months. Diversions after November 1 through March 1 satisfy storage rights and livestock watering rights. Table 6 provides a summary of annual flows measurements observed in Parks Creek upstream of the Edson-Foulke diversion taken from 1959 to 1996.

Table 6. Monthly flows observed on Parks Creek upstream of the Agreement's Covered Area, above the Edson-Foulke Yreka Ditch (1959 to 1996).

Month	Percent of Annual Flow (%)	Mean Monthly Flow (cfs)	Mean Monthly Flow (Acre-Feet)
January	9.0	26.5	1,600
February	10.5	34.2	1,900
March	11.0	32.4	2,000
April	17.0	51.7	3,100
May	21.0	61.8	3,800
June	10.0	30.4	1,800
July	3.0	8.8	540
August	1.8	5.3	330
September	1.7	5.2	310
October	2.0	5.9	360
November	5.0	15.2	910
December	8.0	23.5	1,400

The following depletions and accretions were measured in 2016:

Spring (May 2016):

A total of 49 cfs was being diverted, which did not include diversions from Spring Creek or Wells Creek on Parks Creek Ranch. Between 20 and 40 cfs of accretions were measured and calculated throughout Parks Creek. The accretions were from all sources including tailwater and springs, with approximately 10 cfs contributed from Bridge Field Slough and 5 cfs from Kettle Springs Creek.

Summer (July 2016):

A total of 17.33 cfs was being diverted, which included water diverted from Bridge Field and Kettle, but did not include diversions from Spring Creek or Wells Creek on Parks Creek Ranch. Approximately 16 cfs of accretions were measured and calculated throughout Parks Creek. The accretions were from all sources including tailwater and springs, with approximately 4.25 cfs contributed from Bridge Field Slough and 7.5 cfs from Kettle Springs Creek.

Fall (November 2016):

A total of 15.9 cfs was being diverted by MWCD, no other points of diversion were in operation during this assessment period. Approximately 22 cfs of accretions were measured and calculated throughout Parks Creek. The accretions were from all sources, with approximately 3.24 cfs contributed from Bridge Field Slough and 6.73 cfs from Kettle Springs Creek.

Parks Creek Existing Flows

The following schematic (Figure 12) illustrates the diversions in the Parks Creek reach without the SHA flow commitments. This does not account for yearly or seasonal variation due to snow pack, spring flow or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

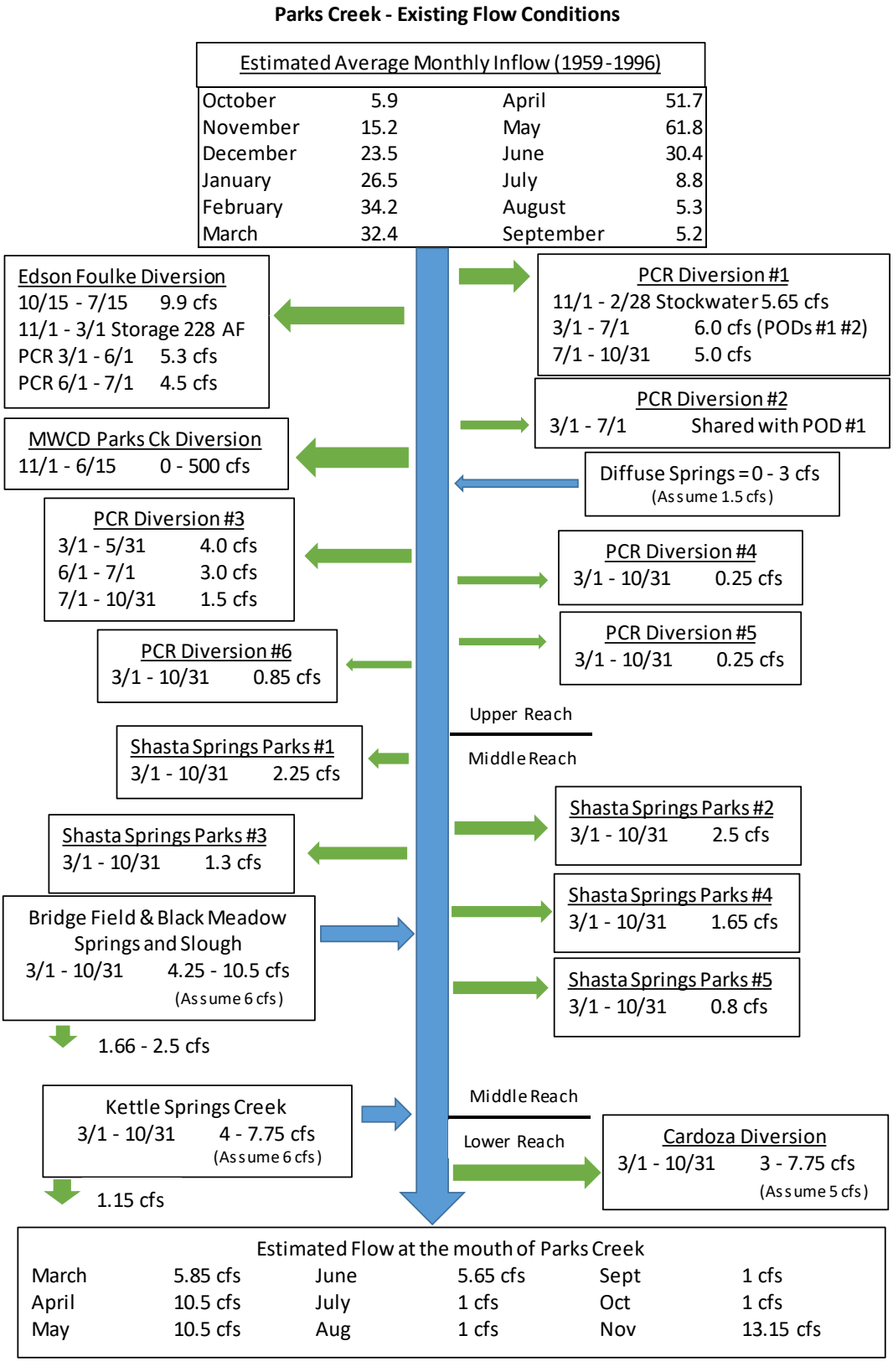


Figure 12. Current estimated flow schematic for Parks Creek based on inflow data from 1959 to 1996 and diversion rates for each water right by season.

Upper Parks Creek Flow Management Strategy

This reach includes Parks Creek from Interstate 5 crossing to the upstream boundary of Covered Area. Unlike the other reaches, coho salmon are not known to currently use habitats in this reach. This reach has three sub-reaches that each contain different habitat characteristics. Of the three sub-reaches, the middle sub-reach located upstream of the railroad crossing and downstream of the MWCD's Parks Creek diversion, has the potential to support spawning and rearing of coho salmon if adequate flow and water quality can be maintained during critical times. Habitat in this reach is generally of good quality with a healthy riparian plant community; however, water temperatures during the summer are of concern and are often in the detrimental range for rearing coho salmon based on Stenhouse et al. (2012). The following section describes the TAC's flow objectives and each landowners flow commitment in order to collectively meet the outlined flow objectives for the reach. Since the flow available in the reach is highly dependent upon available flow coming from rain/snow events, how the contribution will be managed will be on a real-time basis, using new or existing real-time monitoring equipment. The stations identified in the Adaptive Management and Monitoring Plan that will be utilized in managing this flow strategy are as follows:

- UPC, which will measure the amount of water entering the agreement area;
- PME, which measures flow in the Parks Creek downstream of MWCD's diversion, and;
- PCE, which measures flow upstream of Interstate 5 crossing.

Edson-Foulke and Parks Creek Ranch collaborated to develop a joint flow strategy for the Upper Parks Creek reach. Flow objectives will be meet through collaborative management of their diversions, some of which share the same infrastructure, completion of water conservation projects, and reductions in diversion during times when existing flows would fall short in meeting stated biological objectives.

Adult migration and spawning (October 1 to December 31) Flow Objectives:

Suitable spawning habitat for adult coho salmon is present in this reach. However, coho salmon presence is this reach has not been documented. Restoration actions should consider improving flows in this section to a level that would provide upstream passage and suitable spawning habitat when natural flow levels allow. Priority should be given to manage flows to enhance downstream conditions for adult coho salmon (ie. Mid-Parks Creek).

A. Base Flows - To the extent practicable; develop a flow strategy that ensures a minimum flow 11 cfs to provide suitable spawning and migration conditions for coho salmon in the Mid Parks Creek reach downstream (Table 1, Reach 2A).

Adult migration and spawning (October 1 to December 31) Permittee Commitments:

MWCD: Currently MWCD has an agreed upon minimum bypass of 6 cfs at the Parks Creek diversion during this time period. However, after the infrastructure projects to improve the Parks Creek Diversion of completed MWCD has proposed an increase of this bypass to 21 cfs from October 1 to December 31st.

Parks Creek Ranch and Edson-Foulke: October 1st to November 1st: Parks Creek Ranch's water rights for irrigation purposes are utilized until November 1 and they have agreed to contribute to meeting the minimum flow objective of 1 cfs from October 1st to October 14th at PCE and 2 cfs immediately upstream of the Parks Creek Ranch #3 POD. From October 16th to November 1st 4 cfs should be provided from at lower end of the property at the Parks Creek gage near Edgewood (PCE). Meeting this objective would be achieved through

water conservation projects described in the site plan for the ranch. Edson-Foulke has a water right of 9.9 cfs for irrigation use that is utilized until November 1st and they have agreed to contribute to meeting the minimum flow objective of 1 cfs from October 1st to October 14th and 4 cfs from October 16th to November 1st at PCE. Pending the results of a ditch loss study, Edson-Foulke anticipates that water conservation projects in the Edson-Foulke Ditch will provide a minimum of 3 cfs of conserved water for instream beneficial uses. Edson-Foulke has committed to provide 3 cfs of water instream to help meet the flow objectives during this time period.

November 1st to January 15th: Parks Creek Ranch proposes to reduce their stock water rights from 5.6 cfs to 1.2 cfs which would allow the ranch to contribute an additional 4.4 cfs to the 10 cfs minimum flow objective at PCE. Edson-Foulke proposes to contribute 3 cfs from stockwater rights for instream benefit to meet the 10 cfs minimum flow objective at PCE. In addition, Edson-Foulke also has a 228 acre-feet storage right that they historically diverted when flows were available, but their site plan developed under the Agreement stipulates that that storage right will not be exercised until the minimum flow objective of 10 cfs has been met and the diverted volume will not exceed 5 cfs.

Upper Parks Creek Reach Total Flow Contributions: Adult Migration and Spawning

Winter instream flows are expected to be between 1 and 12 cfs at the bottom of this reach depending on water year type. Unimpaired flows at I-5 during this life stage if using the DWR data collected between 1959-1996, which summarized average discharges entering the reach, would be between 5.9 cfs and 26.5 cfs. The estimates do not assume additional accretion, as these can change from year to year and could also change after pipeline projects are implemented.

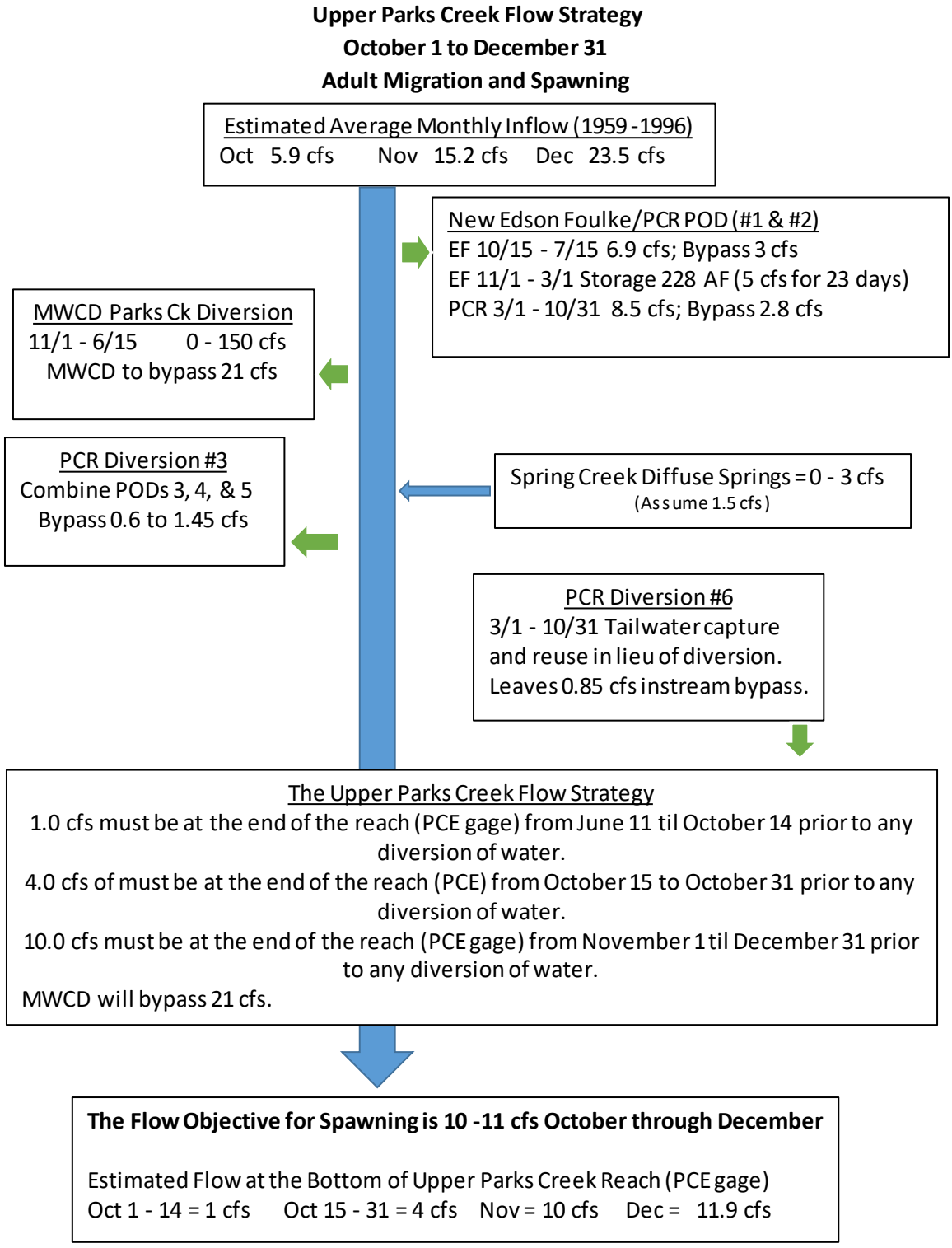


Figure 13. Estimated irrigation diversion volumes and instream flows based on the Upper Parks Flow Strategy proposed under the Shasta Safe Harbor Agreement during the salmon spawning season after all conservation measures have been implemented.

Upper Parks Creek Flow Objectives: Coho Salmon Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

The middle sub reach (from MWCD diversion downstream to the railroad crossing) has a healthy riparian community and there is floodplain connectivity with multiple secondary channels that would provide over wintering habitat for juvenile coho salmon if present. With the exception of stock water and storage rights (Edson-Foulke and MWCD), flows in this reach during the winter generally fluctuate with winter storm events. Flow management during the winter should seek to maintain base flows that provides free fish passage and flow connectivity throughout the reach.

A. Base Flows - To the extent practicable; develop a flow strategy that ensures a minimum flow of 10 cfs to provide suitable over wintering conditions for coho salmon in the Mid Parks Creek reach downstream (Table 1, Reach 2A). If lower flows can be shown to provide adequate protection for incubating eggs and embryos a lower flow target (6 cfs) may be acceptable.

Upper Parks Creek Permittee Commitments: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

MWCD: MWCD has an agreed to bypass adequate water to ensure that a minimum of 6 cfs is available instream at the PCE between January 1st and February 28th. MWCD commits to participate in a collaborative study with the agencies and other participants in the Upper Parks Creek reach to evaluate if redds are sufficiently protected under a 6.0 cfs by-pass. Studies to assess these conditions will be completed within 5 years of signing the Agreement. If coho salmon redds are not sufficiently protected, up to 10.0 cfs may be by-passed at PCE to meet the biological objective. MWCD will ensure 10.0 cfs is at PCE before diverting more than 20 cfs during this period.

Parks Creek Ranch and Edson-Foulke: After signing of the Agreement, Parks Creek Ranch proposes to reduce their stock water rights from 5.6 cfs to 1.2 cfs, or contribute 4.4 cfs to instream use with the goal of providing a minimum flow of 6 cfs at PCE. After signing of the Agreement, Edson-Foulke has agreed to contribute 3 cfs of their 9.9 cfs stockwater right for instream benefits towards meeting a minimum flow of 6 cfs that they propose at PCE during this time period. In addition, Edson-Foulke also has a 228 acre-feet storage right that they historically diverted whenever excess flows were available. However, Edson-Foulke's site plan that was developed un the Agreement stipulates that this storage right will not be exercised until the minimum flow objective of 6 cfs has been met, and the diverted volume will not exceed 5 cfs.

Upper Parks Creek Total Flow Contributions: Egg Incubation and Juvenile Winter Rearing:

Winter instream flows are expected to be between 6 cfs at minimum and could reach as high as 30 cfs at the bottom of this reach depending on water year type. After the signing of the Agreement, MWCD has also committed to curtailing diversion for 24 hours in order to obtain a pulse event at PCE over 100 cfs, if an event of this magnitude doesn't occur within a 2-year period during the term of the Agreement.

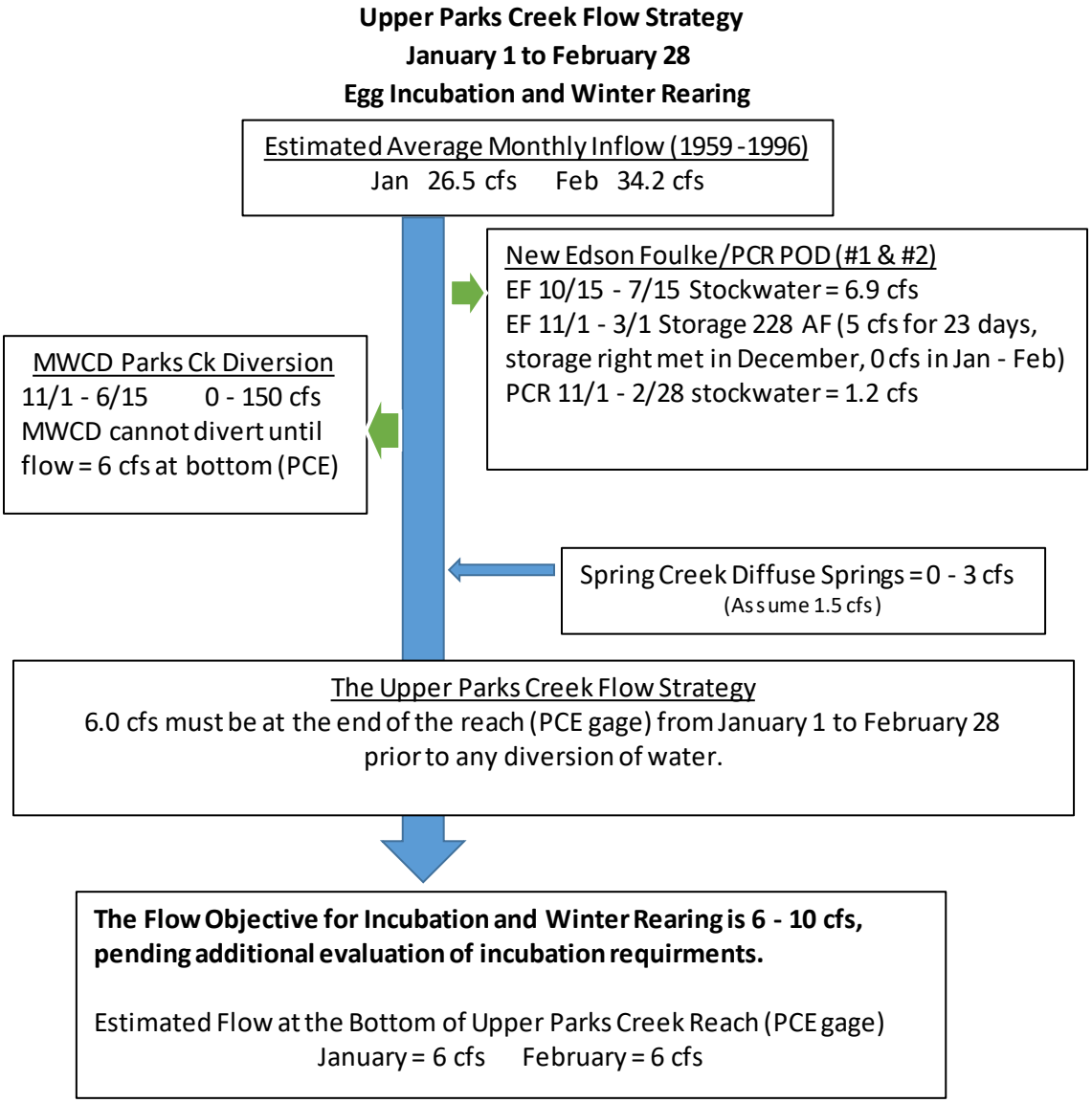


Figure 14. Estimated irrigation diversion volumes and instream flows based on the Upper Parks Flow Strategy proposed under the Shasta Safe Harbor Agreement during the salmon incubation and winter rearing season after all conservation measures have been implemented.

Upper Parks Creek Flow Objectives: Coho Salmon Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

Since coho salmon are not known to utilize this reach at this time, flow management scenarios should focus on helping to provide suitable rearing habitat and emigration flows for rearing coho salmon in the downstream reaches to the confluence with the Shasta River.

A. Base Flows- To the extent practicable; develop a flow strategy that ensures a minimum flow 20 cfs to provide suitable rearing and migration conditions for coho salmon in the Mid Parks Creek reach downstream (Table 1, Reach 2A). Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment throughout this reach. To accomplish this objective a gradual drawdown of spring flows to summer base flow levels would be desired.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage in reaches downstream.

Upper Parks Creek Permittee Commitments: Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

MWCD: Once additional flows become available as a consequence of conservation projects on neighboring properties, MWCD agrees to meet minimum flow objectives at the bottom of the reach, at the PCE real-time station, as follows prior to diverting:

1.) PCE must equal 21 cfs before MWCD can begin diversion and can divert up to 20 cfs

2.) In order for MWCD to divert more than 20 cfs but less than 90 cfs, 30 cfs must be provided for instream flow at PCE.

3.) In order for MWCD to divert more than 90 cfs but less than 150 cfs, 40 cfs must be provided for instream flow at PCE.

Parks Creek Ranch and Edson-Foulke: Parks Creek Ranch and Edson-Foulke proposed to initiate improvements to instream flows in two stages during March which are based on the timing of completion of water conservation projects described in their site plans. Stage 1 would begin when infrastructure improvements to combine the Parks Creek Ranch diversion numbers 1 and 2 with the Edson-Foulke point of diversion. Stage 2 would commence once the Parks Creek diversion numbers 3, 4, 5, and possibly 6, are combined to one point of diversion with additional improvements to the irrigation ditches. Pipelines and irrigation risers would be replace the existing open earthen ditches to improve irrigation efficiencies.

After Stage 1 Parks Creek Ranch and Edson-Foulke have agreed to contribute by pass flows to ensure that a minimum flow of 8.45 cfs from March 1st to March 31st at PCE prior to diverting more than 12.9 cfs. Under this condition flows at PCE generally meet or exceed 20 cfs at PCE during March based on comparisons to conditions observed in 2012 (dry water year) and 2013 (very dry water year). Water conservation projects on Parks Creek Ranch would contribute between 3.4 cfs and 4.25 cfs of their 16.68 cfs of water rights between March 1st and March 31st. Edson-Foulke has a water right of 9.9 cfs for irrigation use that is utilized beginning March 1st and they have agreed to contribute additional bypass flows to meet the minimum flow objective of 8.45 cfs from March 1st to May 15th at PCE. In their site plan water conservation projects are anticipated to contribute a minimum of 3 cfs of their 9.9 cfs of water rights between March 1st to March 31st to contribute towards meeting the above identified flow objectives.

After Stage 2 Parks Creek Ranch and Edson-Foulke will collectively ensure that a minimum flow of 20 cfs is present at PCE prior to diverting more than 6.95 cfs.

May 16th – June 15th : Parks Creek Ranch and Edson-Foulke have committed to managing their diversions to simulate the descending limb of the snow melt hydrograph which will improve conditions for riparian recruitment, maintain suitable rearing for a longer period of time than occurs currently, and provide natural ques for fish movement downstream or to summer refugial habitats. To accomplish this Parks Creek Ranch and

Edson-Foulke have agreed to meet flow objectives at PCE (Table 7) prior to diverting water for irrigation purposes after signing of the Agreement.

Table 7. Minimum flow requirements for the bottom of the Upper Parks Creek reach (PCE) that must be achieved prior to irrigation diversions upstream.

Dates	Flow @ PCE
May 16 to May 23	12 cfs
May 24 to May 31	8 cfs
June 1 to June 10	4 cfs
June 11 through summer	1 cfs (2 cfs at PCR #3)

Upper Parks Creek Total Flow Contributions: Spring Rearing, Redistribution and Emigration

Spring instream flows are expected to be as low as 1 cfs during base flow conditions and up to 40 cfs at the bottom of this reach depending on water year type. An estimate of unimpaired flows at this location would be 30.4 to 35.4 cfs using the DWR data collected between 1959-1996, which summarized average discharges entering the reach. No accretion assumptions were added to these discharge estimates.

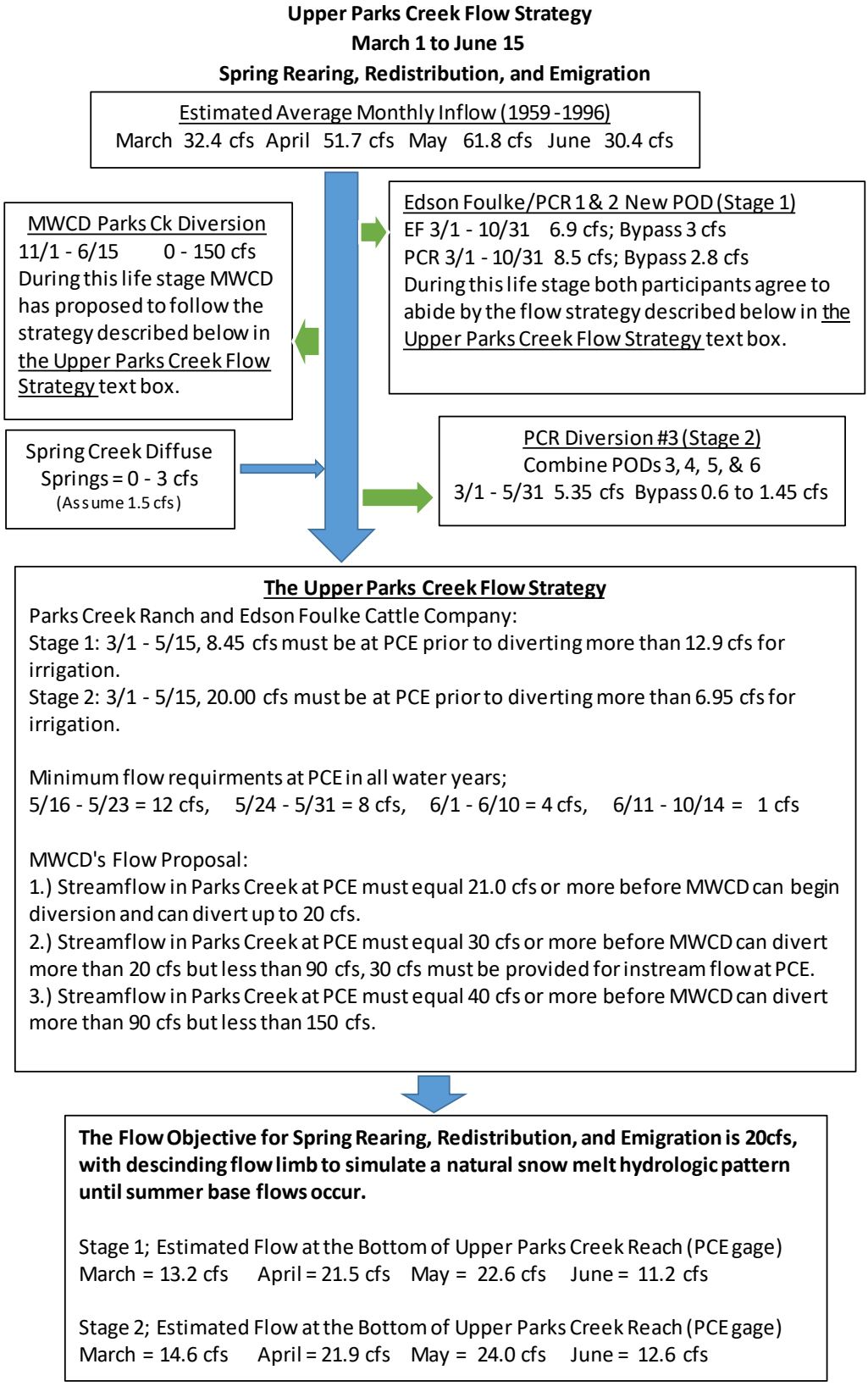


Figure 15. Estimated irrigation diversion volumes and instream flows based on the Upper Parks Flow Strategy proposed under the Shasta Safe Harbor Agreement during the spring rearing, juvenile redistribution, and smolt emigration season after all conservation measures have been implemented.

Upper Parks Creek Flow Objectives: Coho Salmon Juvenile Summer Rearing (June 16 to September 30):

Flow management planning efforts should attempt to provide suitable over summering habitat conditions in the section of Parks Creek upstream of the railroad crossing located on Parks Creek Ranch. Flow levels should attempt to maintain juvenile fish passage and inundation of food producing riffles. Information gathered by the SWCG during the 2017 flow experiment (AquaTerra Consulting 2017) helped determine these flow levels. Additional investigation may be needed to better understand the relationship between surface flows, hyporheic flows, and water temperatures. Pending this information summer base flows should be maintained to support ecological functions (riparian vegetation, invertebrate production) important to maintain coho salmon rearing habitats.

Upper Parks Creek Permittee Commitments: Summer Juvenile Rearing (June 16 to September 30):

MWCD: MWCD's storage right from Parks Creek is limited to the season from October 1st through June 15th. Therefore, MWCD will not be diverting during the time period.

Parks Creek Ranch and Edson-Foulke: Parks Creek Ranch and Edson-Foulke have water rights for irrigation purposes that are typically utilized during this time period when base flows allow. Together, Parks Creek Ranch and Edson-Foulke have agreed to contribute to meeting the minimum flow objective 1.0 cfs from June 16th to September 30th at PCE and 2 cfs in the middle sub-reach of upper Parks Creek between MWCD's Parks Creek diversion and Parks Creek Ranch's diversion #3 located upstream of the railroad crossing west of Interstate Highway 5. This provides improved flow conditions and fish passage for coho salmon in the middle sub-reach where better instream and riparian habitat conditions currently exist and water temperatures tend to be more favorable than those reaches upstream or immediately downstream. Parks Creek Ranch also is proposing to determine the feasibility of releasing spring water from Spring Creek to improve water temperatures during this life stage. It is estimated that between 0.2 to 0.6 cfs of cold water may be available for this reach during this summer months to further improve water temperature conditions.

Upper Parks Creek Total Flow Contributions: Summer Juvenile Rearing:

Summer instream flows at PCE are expected to be between 1 and 2 cfs during this life stage. Water temperatures during base flow conditions generally range between suitable and detrimental (Stevenson et al. 2000) in the middle sub-reach and are generally elevated beyond what is tolerable for rearing coho in the degraded reaches downstream of the railroad crossing.

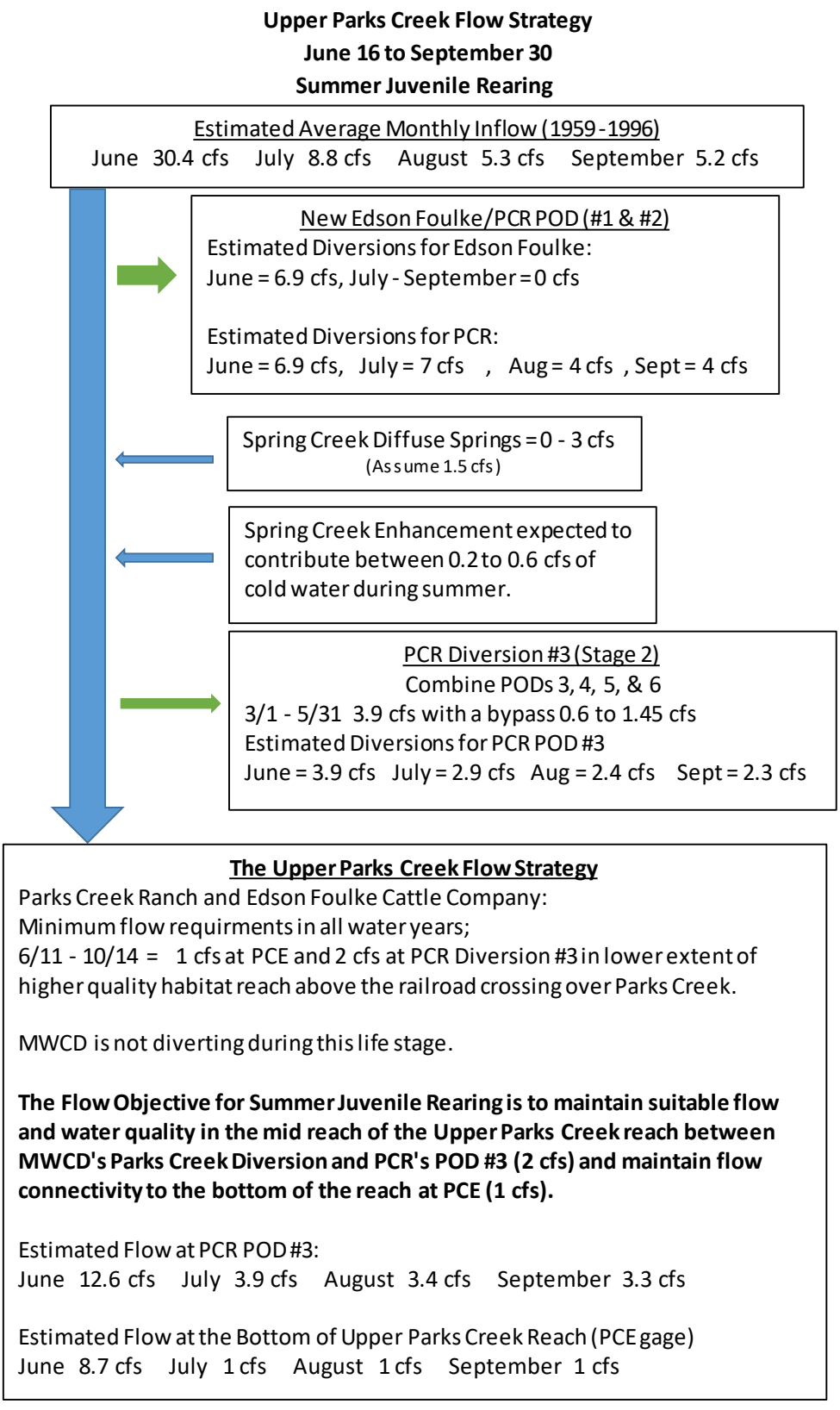


Figure 16. Estimated irrigation diversion volumes and instream flows based on the Upper Parks Flow Strategy proposed under the Shasta Safe Harbor Agreement during the summer rearing season after all conservation measures have been implemented.

Mid Parks Creek Flow Strategy

This reach includes Parks Creek and its tributaries from the confluence of Kettle Springs Creek to the Interstate 5 crossing. The following section describes the NOAA flow objectives and landowners flow commitment in order to meet the outlined flow objectives for this reach. Since the flow available in the reach is highly dependent upon available flow coming from the upstream reach and is identified as upstream contribution in the following section. This reach is located entirely within the boundaries of the Shasta Springs Ranch.

Mid Parks Creek Flow Objectives: Coho Salmon Adult Migration and Spawning (October 1 to December 31):

A. Base Flows - To the extent practicable; develop a flow strategy that ensures a minimum flow 11 cfs to provide suitable spawning and migration conditions for coho salmon (Table 1, Reach 2A).

Upstream Flow Contributions

Winter instream flows coming from the upper Parks Creek reach are expected to range from 1 cfs in the beginning of October and gradually increase in flows through December (> 10 cfs) as minimum flow thresholds and early rain storms begin to move through the region. Based on the mean monthly instream flow estimates entering the upstream boundary of the SHA Covered Area, flows entering this reach from the Upper Parks Creek reach upstream would be 1 cfs on October 1st, 4 cfs on October 15th, 10 cfs in November, and about 12 cfs in December. The minimum bypass flows downstream through the Mid Parks Creek reach are 1 cfs from October 1 through October 14th, 4 cfs from October 15th through October 31, and 10 cfs in November and December.

Mid-Parks Creek Permittee Commitments: Adult migration and spawning (October 1 to December 31):

Shasta Spring Ranch: The Shasta Springs Ranch has agreed to work with the agencies to develop a feasibility study to restore natural stream channel characteristics and improve irrigation practices through a sub reach downstream of Slough Road to about the Parks #5 diversion. The stream channel in this reach has been straightened and habitats are severely degraded. This reach includes the Bridge Field and Black Meadow Springs which provide an important source of cold water for salmonids rearing during the summer. Although coho salmon have not been observed spawning in Bridge Field Springs Creek, Chinook salmon have been observed spawning below the spring source in the past. This reach is currently believed to be the upstream extent of the coho populations present in Parks Creek. If restoration is feasible in this reach, habitat diversity will improve, including the abundance and quality of spawning habitat at the upper end of the reach where stream gradients decrease downstream. Restoration efforts may also improve access and spawning habitat in Bridge Field Springs Creek immediately downstream of the spring source and point of diversion. The feasibility study for this work has been named the East Side Pastures and Spring Channels Renovation Project and is expected to be completed during the first 5 years following the issuance of the SHA Section 10 Enhancement of Survival permit. During the first 5 years the Shasta Springs Ranch has agreed to bypass 1 cfs of cold spring water from the Bridge Field and Black Meadow Spring complex. This will improve the abundance of cold water refugia habitat during the summer and fall rearing season. The 1 cfs of bypass would occur during an interim period when the East Side Pastures and Spring Channels Renovation Project is being evaluated and planned. The goals of the East Side Pastures and Spring Channels Renovation Project are to:

1) Increase the volume of self-sustaining, complex instream habitat for salmonids in Mid-Parks Creek reach and/or unnamed spring channels, including but not limited to safe passage at irrigation diversions in spring channels;
2) Increase the reliability and quality of spring water inflow into Parks Creek from springs east of Parks Creek in the Mid-Parks Creek reach;
3) Increase the productivity of the pastures east of Parks Creek on the Shasta Springs Ranch through improved reliability of water and efficiency of irrigation; and,
4) Increase channel and floodplain function, minimize landowner emergency actions to protect property, and reduce overall maintenance during flood flows and the aftermath.

Pending the results of the evaluation for the East Side Pastures and Spring Channels Renovation Project additional bypass of spring flows may become available with improved irrigation efficiency. Given the topography and underlining geology in this location, restoration of this reach may also increase water table elevations which should improve sub irrigation in adjacent pastures further reducing surface diversion of spring water sources. For this strategy we assume the Bridge Field and Black Meadow Spring provide a total of 6 cfs.

Kettle Springs is located within the Shasta Springs Ranch and the Mid Parks Creek Reach. However, the confluence of Kettle Springs Creek with Park Creek denotes the boundary between the Mid Parks Creek Reach and the Lower Parks Creek Reach. Flow contributions between Kettle Springs and the confluence of Kettle Springs Creek with Parks Creek provide benefits to the Mid Parks Creek Reach. Flow contribution from Kettle Springs Creek, as measured at the source, will benefit the Lower Parks Creek reach. Kettle Springs Creek is consistently used by juvenile coho salmon during the summer rearing season. The Shasta Springs Ranch has an adjudicated water right to divert 1.15 cfs during the irrigation season from March 1 to November 1. During the development of the SHA, with the support of the resource agencies the Shasta Springs Ranch constructed a new irrigation management facility at Kettle Springs. The project also included installation of 2,300 feet of pipe with irrigation risers to improve irrigation efficiency. Shasta Springs Ranch is currently limited to their 1.15 cfs water right and all additional flow (about 2.5 to 4.85 cfs) is allowed to flow downstream unimpeded providing water temperature and consistent flow patterns for rearing coho salmon. Habitat structures have also been installed to improve hydraulic diversity and cover for salmonids. Coho salmon have not been observed spawning in Kettle Springs Creek, however, suitable spawning habitat may be created as habitat structures help improve gravel conditions. Instream flow contributions from Kettle Springs to Kettle Springs Creek is estimated to be about 2.5 to 4.85 cfs.

Mid Parks Creek Total Flow Contributions: Adult Migration and Spawning

Fall and early winter instream flows are expected to be range between about 9.7 cfs in early October and about 22.6 cfs in December (Figure 17). The minimum bypass flow requirements from the Upper Parks Creek reach upstream are 1 cfs from October 1st through the 14th, 4 cfs from October 15th through the 31st, and 10 cfs in November and December. The conserved water bypass requirements at the bottom of the Mid Parks Creek reach including 4.85 cfs estimated contribution from Kettle Springs is 8.69 cfs from October 1st through the 14th, 11.69 cfs from October 15th through the 31st, and 19.35 cfs in November, and 21.56 cfs in December. This includes the bypass flows from upstream plus the bypass flow commitment for Kettle Springs (4.85 cfs) and 1 cfs from the Bridge Field and Black Meadow Springs.

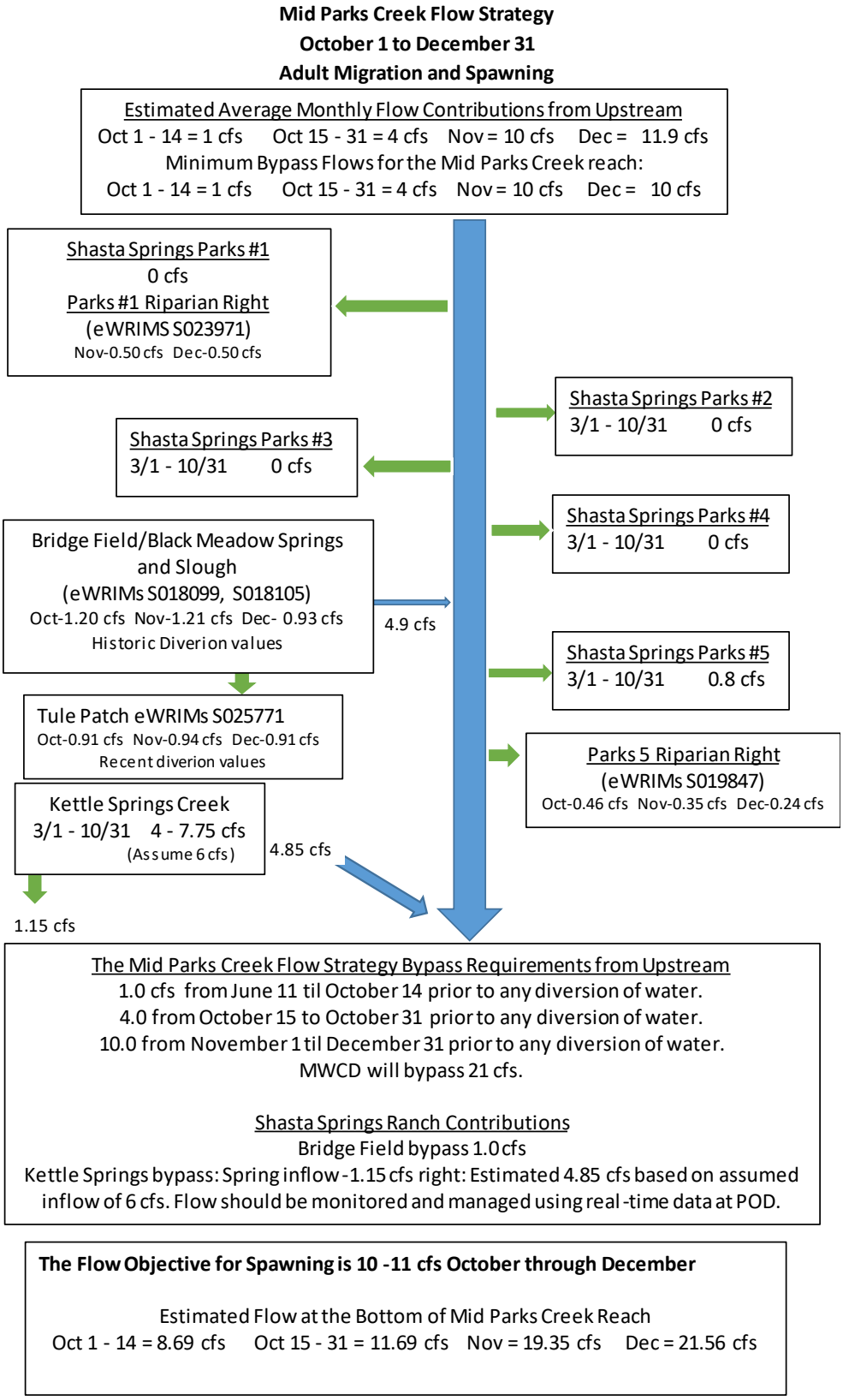


Figure 17. Estimated irrigation diversion volumes and instream flow in the Mid Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the fall migration and spawning season in a normal water year after all conservation measures have been implemented.

Mid Parks Creek Flow Objectives: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

A. Base Flows – To the extent practicable; develop a flow strategy that ensures a minimum flow of 10 cfs to support conditions for over wintering coho salmon (Table 1, Reach 2A).

Upstream Flow Contributions

Winter instream flows entering this reach from upstream are expected to be about 6 cfs, which is the minimum bypass flow requirement for the Upper Parks Creek reach in January and February.

Mid Parks Creek Permittee Commitments: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

Shasta Springs Ranch: Shasta Springs Ranch has not proposed any additional flow contributions during this time period. Diversions are limited to winter stockwater and are limited to a total of 1.15 cfs diverted at Parks #1, Bridge Field and Black Meadow Spring.

Mid Parks Creek Total Reach Contributions: Egg Incubation and Winter Rearing:

Winter instream flows are expected to be between 15.4 cfs and 16.7 cfs at the bottom of this reach in a normal water year type (Figure 18).

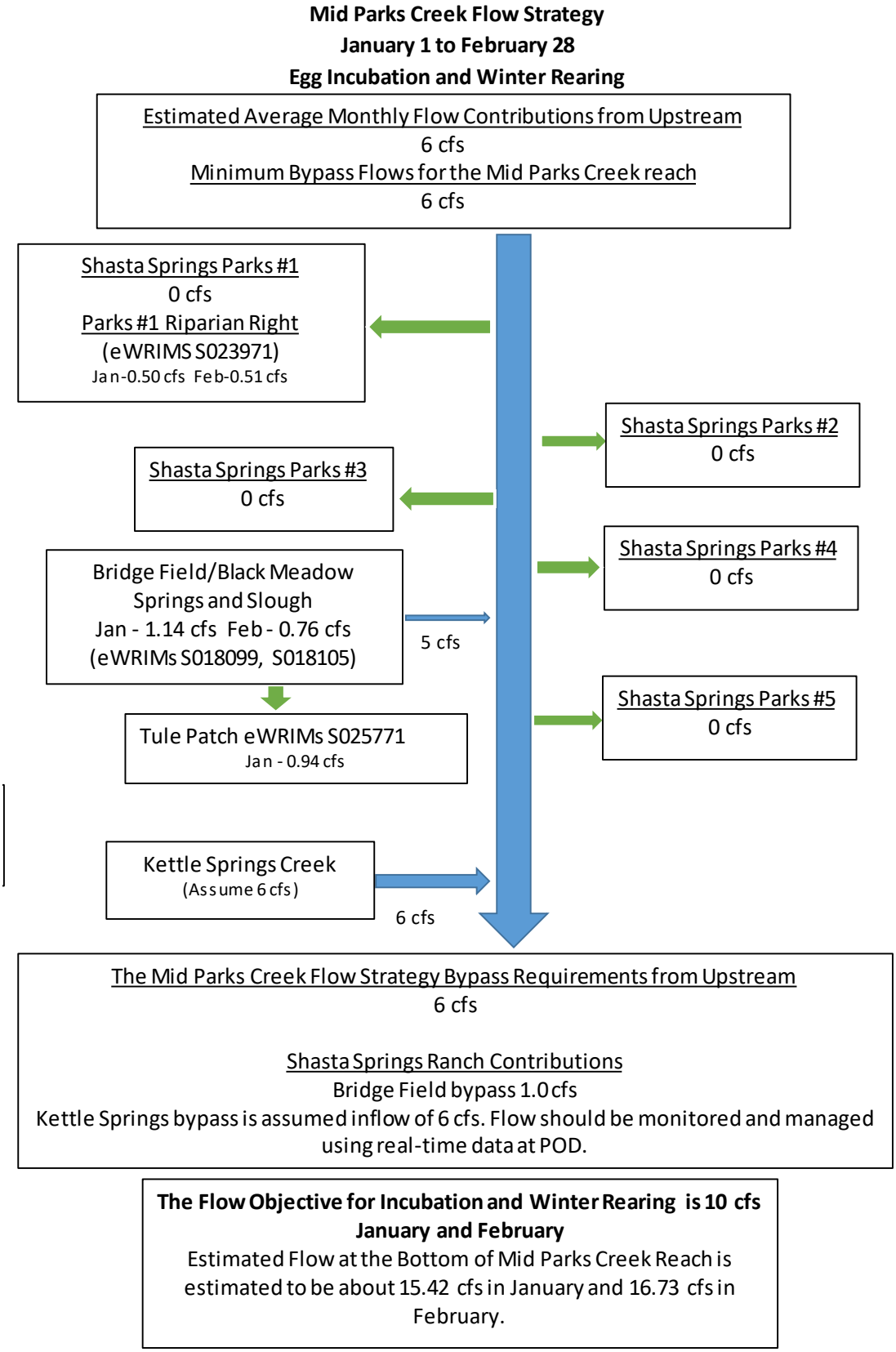


Figure 18. Estimated irrigation diversion volumes and instream flow in the Mid Parks Creek based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the winter rearing and incubation season in a normal water year after all conservation measures have been implemented.

Mid Parks Creek Flow Objectives: Coho Salmon Juvenile Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

A. Base Flows- To the extent practicable; develop a flow strategy that ensures a minimum flow of 20 cfs to provide suitable rearing and migration conditions for coho salmon in this reach (Table 1). Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment in the alluvial sections present towards the upstream sections of this reach.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage. A flow management strategy that includes pulse flows will help support a net conservation finding.

C. Temperature Considerations - As ambient air temperatures rise in the late spring, flow management should optimize cold water releases from spring sources to prevent water temperatures from exceeding 18°C for as long as is possible. The primary goal is to maintain cold water (<18°C) connectivity for as long as possible. This will help to delay triggering temperature avoidance behavior by juvenile coho salmon and will help to maximize the distribution and connectivity of suitable rearing habitat within this reach. The incorporation of water temperature thresholds (18°C and 20.3°C) may help inform management of irrigation diversions while optimizing water temperatures to allow juvenile coho salmon with ample opportunities to redistribute to over summering habitats based on natural environmental cues.

Upstream Flow Contributions

Spring instream flows are expected to be as low as 1 cfs during baseflow conditions and up to 40 cfs entering this reach from Upper Parks Creek depending on water year type. It is anticipated that the flows from the Upper Parks Creek strategy entering the Mid Parks Creek reach will be bypassed throughout Mid Parks reach.

Spring rearing, redistribution and smolt emigration (March 1 to June 15) Permittee Commitments:

Shasta Springs Ranch: Shasta Springs Ranch can irrigate during this life stage and their site plan indicates that Parks #1 water could be kept in stream and could be diverted at Parks #4, keeping that entire diversion amount and ditch loss instream for a longer stretch of the creek. Fields on the east side of the creek are currently irrigated by diverting at Parks #1. Between ditch loss savings (of an undetermined quantity) and flow bypassed between Parks #1 and #4, stream habitat quality could benefit. Additional flows during the spring should improve smolt migration and provide better environmental ques to trigger juvenile coho redistribution to refugial habitats as water temperatures increase in the late spring and early summer. Higher flows in this reach will also improve fish passage conditions over alluvial riffles at the upstream extent of this alluvial reach downstream of Parks #1 diversion. A project proposed in the site plan would reconstruct the diversion at the location of Parks #4 to supply irrigation water to both sides of the stream. This would allow flow to be bypassed at Parks #1, 2, and 3, when water volume and temperature requirements are suitable for coho salmon passage over shallow riffles. As flows and water quality diminish in late spring and early summer, irrigation demand could be taken at either or both POD, mimicking seasonal change in instream aquatic conditions and responding to seasonal increases in crop and stock water demand. This proposed management change improves conditions

for this sub reach but will not result in additional bypass of flow downstream of Parks #4 diversion. The Parks #1 has a diversion rate of 2.25 cfs, so it can be assumed that 2.25 cfs will be kept instream until Parks #4 point of diversion when suitable water temperatures for rearing coho salmon are still available at the upstream point of diversion.

Shasta Springs Ranch has agreed to bypass 1 cfs of cold spring water from the Bridge Field and Black Meadow Spring complex for a 5 year interim period while the East Side Pastures and Spring Channels Renovation Project is being evaluated and planned.

Kettle Springs is located within the Shasta Springs Ranch and the Mid Parks Creek Reach. However, the confluence of Kettle Springs Creek with Park Creek denotes the boundary between the Mid Parks Creek Reach and the Lower Parks Creek Reach. The Shasta Springs Ranch has an adjudicated water right to divert a continuous volume of 1.15 cfs during the irrigation season from March 1 to November 1. The design of the new diversion head works currently limits diversion from Kettle Springs to 1.15 cfs and all additional flow (about 2.5 to 4.85 cfs) is allowed to flow downstream unimpeded providing water temperature and consistent flow patterns for rearing coho salmon. Habitat structures have also been installed to improve hydraulic diversity and cover for salmonids. Instream flow contributions from Kettle Springs is estimated to be about 2.5 to 4.85 cfs.

Shasta Springs Ranch contributions during this life stage is about 6 cfs of spring water from the Bridge Field and Black Meadow Spring complex and Kettle Springs.

Mid Parks Creek Total Flow Contributions: Juvenile Spring Rearing, Redistribution and Smolt Emigration

Spring instream flows are expected to be between 12.1 cfs and 25.1 cfs at the bottom of this reach in a normal water year type (Figure 19).

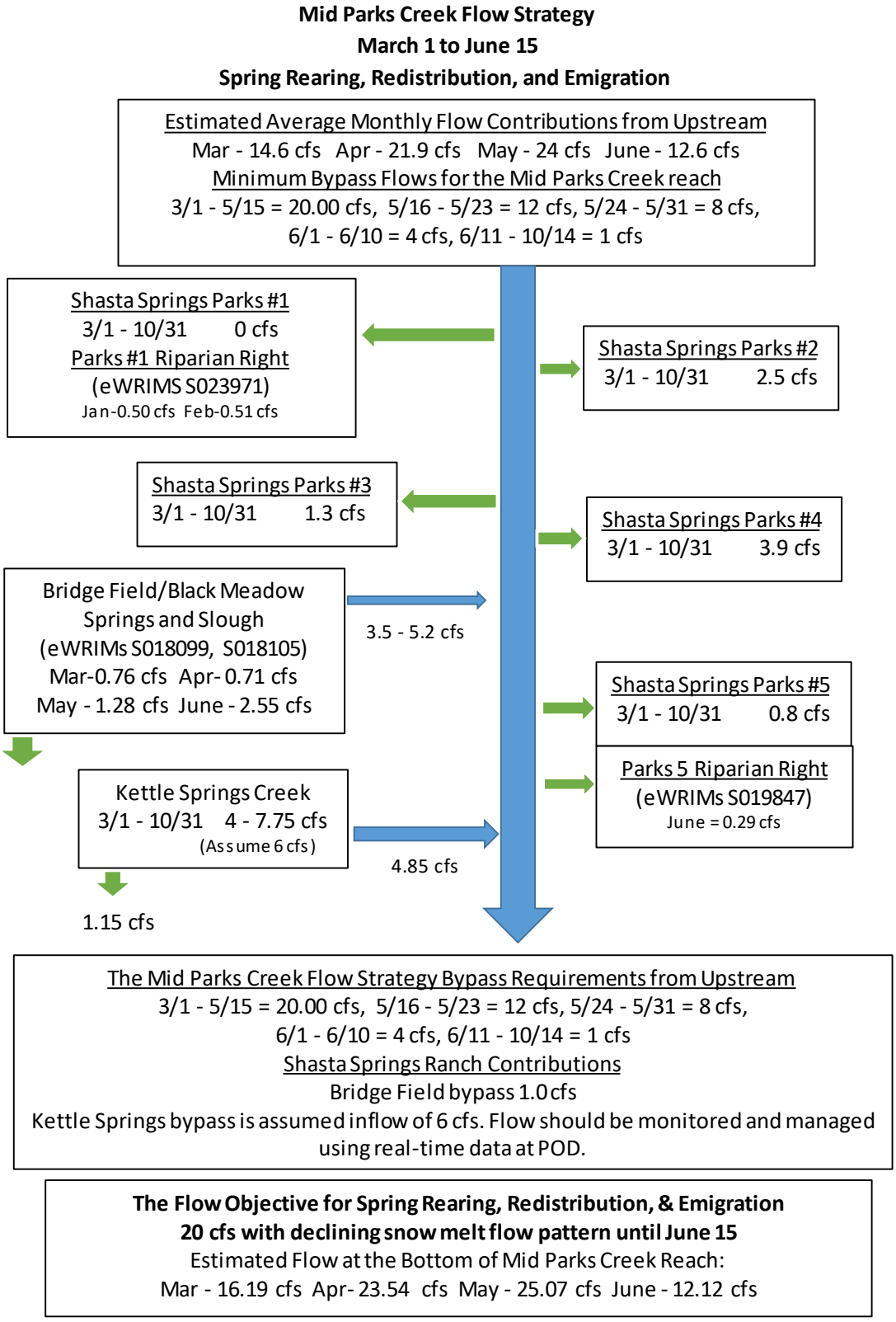


Figure 19. Estimated irrigation diversion volumes and instream flow in the Mid Parks Creek based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the spring rearing, redistribution and emigration season in a normal water year after all conservation measures have been implemented.

Summer Juvenile Rearing (June 15 to September 30) Flow Objectives:

The objective in this reach is to increase the availability cold spring water sources to optimize the duration and extent of cold water habitats available to rearing coho salmon. Development of instream flow strategies need to consider the relationship between flow volume and cold water sources and should seek to maintain fish passage and connectivity over food producing riffles where possible given water temperature objectives. Recent information gathered by the SWCG during flow experiments should be considered to achieve optimum flow and water temperature conditions throughout this important reach.

Upstream Flow Contributions

Summer instream flows entering this reach are expected to be between 1 and 2 cfs during this life stage.

Summer Juvenile Rearing (June 16 to September 30) Permittee Commitments:

Shasta Springs Ranch: Shasta Springs Ranch has several important cold water spring opportunities that will and do provide summer juvenile rearing. The Shasta Springs Ranch has agreed to work with the agencies to develop a feasibility study to restore natural stream channel characteristics and improve irrigation practices through a sub reach downstream of Slough Road to about the Parks #5 diversion. The stream channel in this reach has been straightened and habitats are severely degraded. This reach includes the Bridge Field and Black Meadow Springs that produce an important source of cold water for salmonids that would be beneficial during the summer. The feasibility study for this work referred to as the East Side Pastures and Spring Channels Renovation Project and is expected to be completed during the first 5 years following the issuance of the SHA Section 10 Enhancement of Survival permit. In the interim period, Shasta Springs Ranch has agreed to bypass 1 cfs of cold spring water from the Bridge Field and Black Meadow Spring complex during development of the East Side Pastures and Spring Channels Renovation Project. This will improve the abundance of cold water refugia habitat during the summer rearing season. As described previously, the goals of the East Side Pastures and Spring Channels Renovation Project are to:

1) Increase the volume of self-sustaining, complex instream habitat for salmonids in Mid-Parks Creek reach and/or unnamed spring channels, including but not limited to safe passage at irrigation diversions in spring channels;
2) Increase the reliability and quality of spring water inflow into Parks Creek from springs east of Parks Creek in the Mid-Parks Creek reach;
3) Increase the productivity of the pastures east of Parks Creek on the Shasta Springs Ranch through improved reliability of water and efficiency of irrigation; and,
4) Increase channel and floodplain function, minimize landowner emergency actions to protect property, and reduce overall maintenance during flood flows and the aftermath.

Pending the results of the evaluation for the East Side Pastures and Spring Channels Renovation Project additional bypass of spring flows may become available with improved irrigation efficiency. Given the topography and underlining geology in this location, restoration of this reach may also increase water table elevations which should improve sub irrigation in adjacent pastures further reducing surface diversion of spring water sources.

The Shasta Springs Ranch has an adjudicated water right to divert 1.15 cfs during the irrigation season from March 1 to November 1 and all additional flow (about 2.5 to 4.85 cfs) is allowed to flow downstream unimpeded providing water temperature and consistent flow patterns for rearing coho salmon. Habitat structures have also been installed to improve hydraulic diversity and cover for salmonids. Instream flow contributions from Kettle Springs is estimated to be about 2.5 to 4.5 cfs.

Shasta Springs Ranch contributions during this life stage is estimated to be about 5 cfs of spring water from the Bridge Field and Black Meadow Spring complex and Kettle Springs.

Mid-Parks Creek Total Reach Contribution: Summer Juvenile Rearing

Summer instream flows are expected to range between 8.8 cfs and 9.9 cfs at the bottom of this reach in a normal water year and depending upon spring flows coming from Bridge Field and Black Meadow Springs (Figure 20).

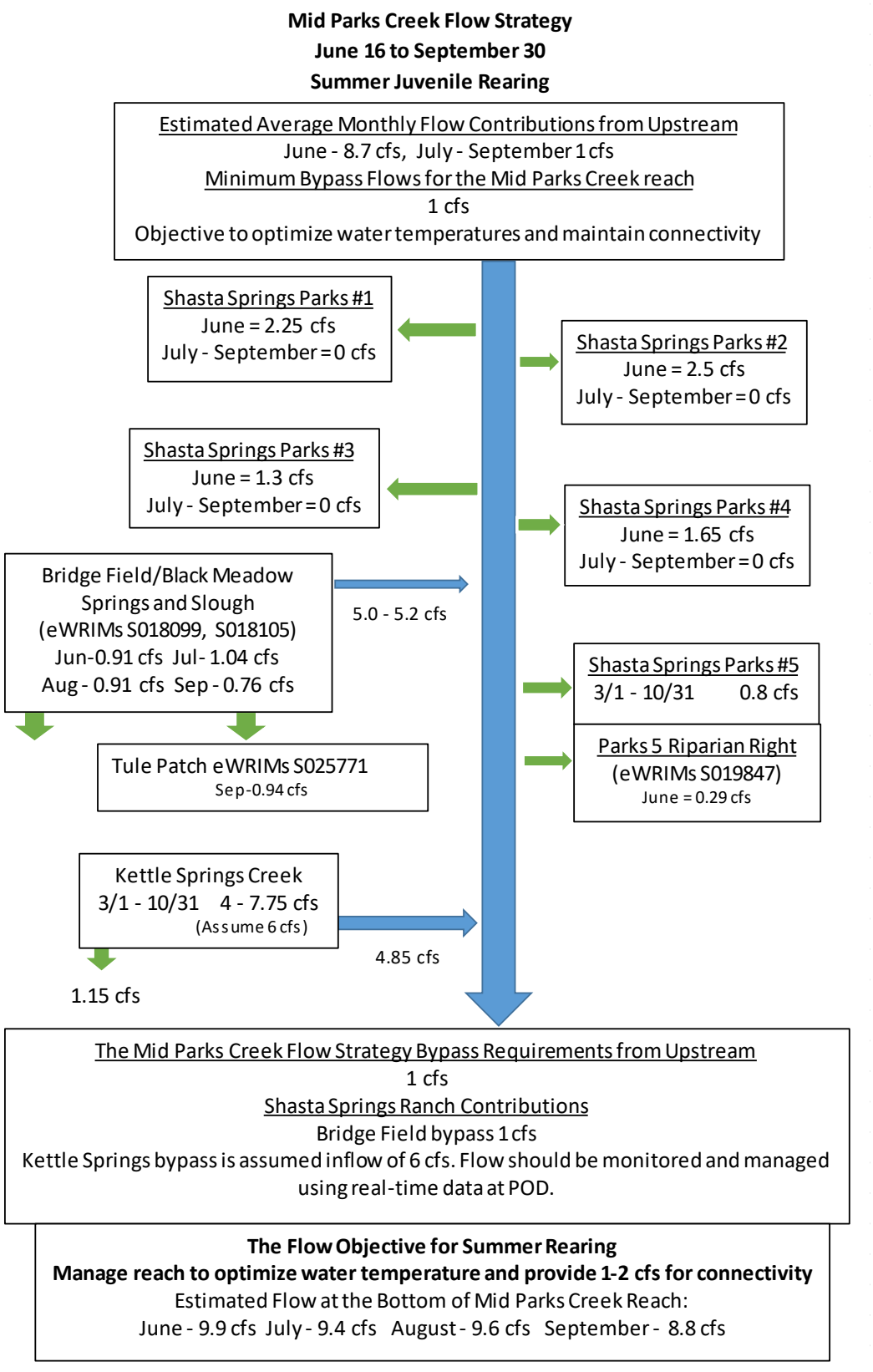


Figure 20. Estimated irrigation diversion volumes and instream flow in the Mid Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the summer rearing season in a normal water year after all conservation measures have been implemented.

Lower Parks Creek

Lower Parks Creek Flow Strategy

This reach includes Parks Creek from its confluence with the Shasta River to the confluence of Kettle Springs Creek. The following section describes the NOAA flow objectives and the landowners flow commitment in order to meet the outlined flow objectives for this reach. Since the flow available in the reach is highly dependent upon available flow coming from the upstream reach and is identified as Upstream Contribution in the following section. The Cardoza interim management of the existing POD is outlined in this section of the Flow Management Plan.

Lower Parks Creek Flow Objectives: Adult migration and Spawning (October 1 to December 31)

A. Base Flows - To the extent practicable; develop a flow strategy that ensures a minimum flow of 11 cfs to provide suitable spawning and migration conditions for coho salmon (Table 1, Reach 2C).

Upstream Flow Contributions

Winter instream flows entering this reach are expected to be between 9.69 cfs from October 1st through the 14th, 12.69 cfs from October 15th through the 31st, and 20.35 cfs in November and 22.56 cfs in December in a normal water year.

Lower Parks Creek Permittee Commitments: Adult Migration and Spawning (October 1 to December 31)

Shasta Springs Ranch: Shasta Springs Ranch does not have active diversions within this reach. Kettle Springs diversion is located in the Mid Parks Creek reach, however, the diversion at Kettle Springs is limited to 1.15 cfs with the remainder of the spring production allowed to flow downstream in Kettle Springs Creek where it enters Parks Creek at the top of the Lower Parks Creek reach boundary.

Cardoza Ranch: The Cardoza Ranch does not divert during October or November when this life stage is present. The POD for the Cardoza Ranch is to be moved downstream to the Shasta River where a new pump diversion will be installed that limits the amount of water diverted to the water right of 2.98 cfs during the irrigation season. In the future this reach will no longer have any diversions of surface flow. Therefore, all flows entering from upstream in addition to flows entering from Kettle Springs Creek will pass through this reach to the Mid Shasta River reach downstream. The adverse water quality impacts caused by the impoundment that was created at the current POD on Parks Creek will be eliminated and diversion volumes will no longer include carriage water of rotation management which allows for diversion rates to be increased above the water right volume will no longer occur. In addition, volitional fish passage through the reach will also be restored.

Lower Parks Creek Total Flow Contribution: Adult Migration and Spawning

Winter instream flows in a normal water year are expected to range between 9.69 cfs in early October and 21.41 cfs in December (Figure 21). These estimates may fluctuate depending on rain fall, and variations in groundwater contribution throughout the year.

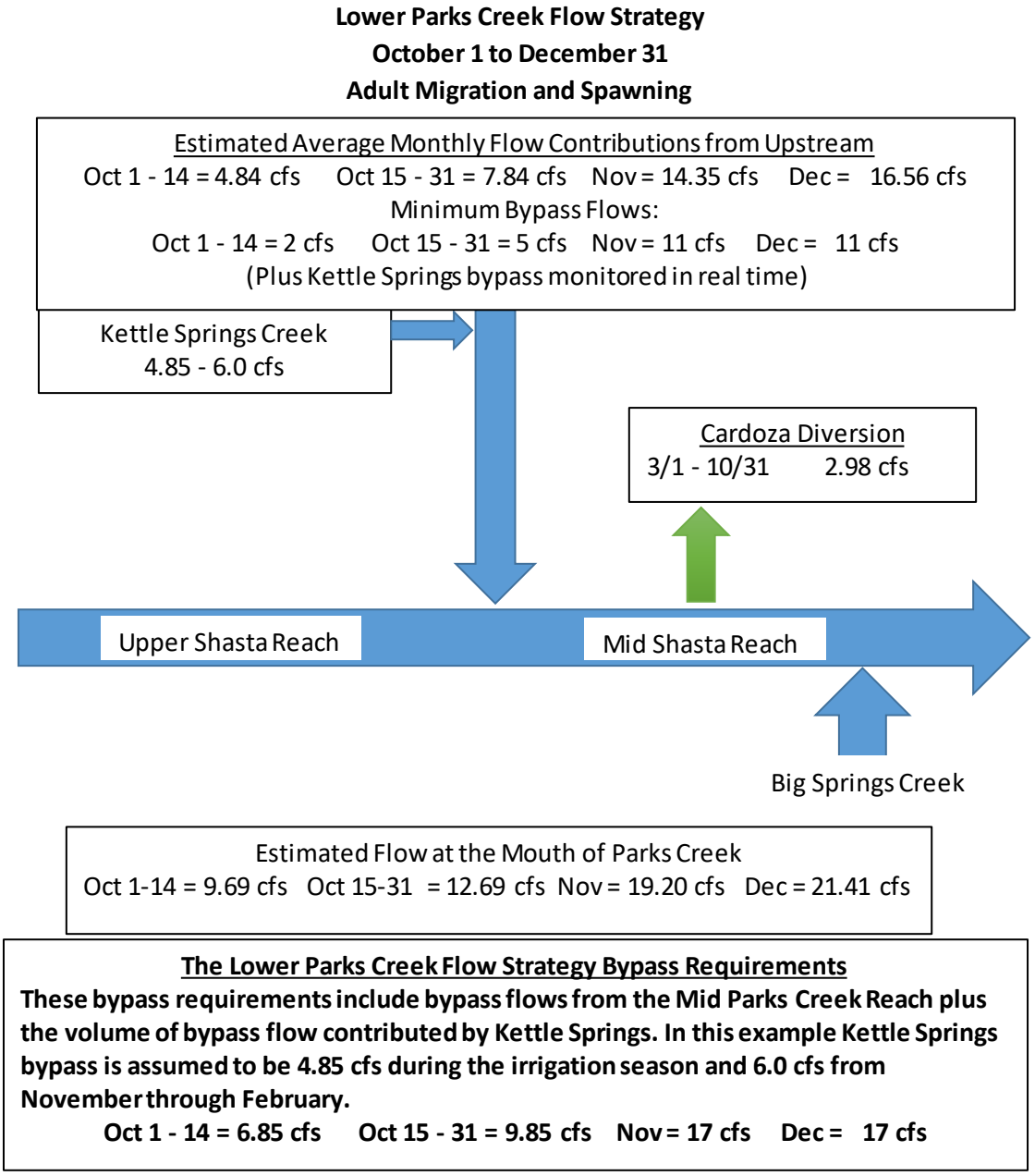


Figure 21. Estimated irrigation diversion volumes and instream flow in the Lower Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the fall migration and spawning season in a normal water year after all conservation measures have been implemented.

Lower Parks Creek Flow Objectives: Coho salmon egg incubation and juvenile winter rearing (January 1 to February 28):

A. Base Flows – To the extent practicable; develop a flow strategy that ensures a minimum flow of 10 cfs to support conditions for over wintering coho salmon (Table 1, Reach 2C).

Upstream Flow Contributions

Winter instream flows entering this reach are expected to be between 10 cfs and 12 cfs in a normal water year (Figure 18). These estimates may fluctuate depending on rain fall, and variations in groundwater contribution throughout the year.

Lower Parks Creek Permittee Commitments: Egg incubation and winter rearing juveniles (January 1 to February 28):

Shasta Spring Ranch: Shasta Springs Ranch does not have active diversions within this reach.

Cardoza Ranch: The Cardoza diversion is to be moved downstream to the Mid Shasta River reach and the water right for this point of diversion is only active from April through September.

Lower Parks Creek Total Flow Contributions: Egg Incubation and Juvenile Winter Rearing

Winter instream flows are expected to be between 16.42 cfs to 17.73 cfs at the bottom of this reach in a normal water year assuming the Kettle Springs contribution is 6 cfs during this time (Figure 22).

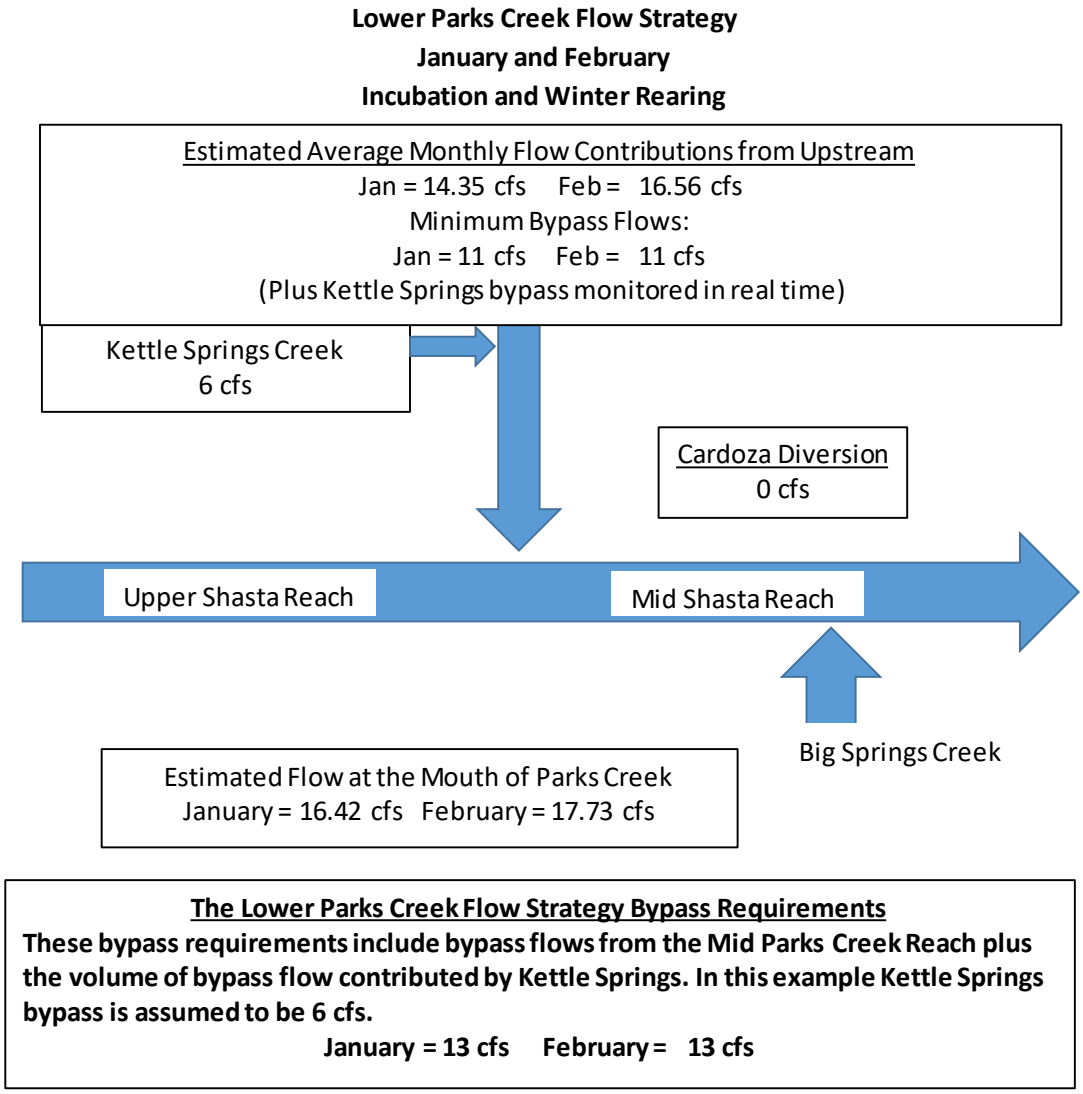


Figure 22. Estimated instream flow in the Lower Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the egg incubation and winter rearing season in a normal water year after all conservation measures have been implemented.

Lower Parks Spring rearing, redistribution and smolt emigration (March 1 to June 15) Flow Objective:

A. Base Flows- To the extent practicable; develop a flow strategy that ensures a minimum flow of 20 cfs to provide suitable rearing and migration conditions for coho salmon in this reach (Table 1, Reach 2C). Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment in the alluvial sections present towards the upstream sections of this reach.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage. A flow management strategy that includes pulse flows will help support a net conservation finding.

C. Temperature Considerations - As ambient air temperatures rise in the late spring, flow management should optimize cold water releases from spring sources to prevent water temperatures from reaching 18°C for as long as is possible. The primary goal is to maintain cold water (<18°C) connectivity for as long as possible. This will help to delay triggering temperature avoidance behavior by juvenile coho salmon and will help to maximize the distribution and connectivity of suitable rearing habitat within this reach. The incorporation of water temperature thresholds (18°C and 20.3°C) may help inform management of irrigation diversions while optimizing water temperatures to allow juvenile coho salmon with ample opportunities to redistribute to over summering habitats based on natural environmental cues.

Upstream Flow Contributions

Spring instream flows entering this reach are expected to be between 8.26 cfs and 21.22 cfs depending on water year type. These estimates may fluctuate depending on rain fall, and variations in groundwater contribution throughout the year.

Lower Parks Creek Permittee Commitments: Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15)

Shasta Spring Ranch: The project that has been implemented at Kettle Springs limits the diversion to 1.15 cfs with the remainder of the spring production allowed to flow downstream in Kettle Springs Creek and Parks Creek at the top of the reach boundary.

Cardoza Ranch: The Cardoza Ranch does not have lands adjacent to Lower Parks Creek but does have a diversion on Parks Creek located on the Hole in the Ground Ranch. The diversion structure consists of an earthen dam with two corrugated metal pipes, which are blocked with flashboards during the irrigation season. The water is backed up behind the dam to gain the force (head) needed to convey the diverted water down approximately 7,000 feet of open, unlined diversion ditch. This ditch goes to a concrete lined ditch, to the place of use. The current diversion, including the dam and ditch is maintained by the Hole in the Ground Ranch by agreement between the two Permittees and is water mastered by the Scott Valley and Shasta Valley Water Master District. The water master allowed for periodic "combine and rotate" management of the diversion, where the diversion amount is increased for a shorter period of time. As a result of these practices, diversion rates ranged between about 6 and 9 cfs during each irrigation cycle. In addition, the current diversion structure

is a fish passage barrier and the impoundment exacerbates water quality problems and provides habitat for non-native fish that likely prey on fry and juvenile salmonids. To correct this problem and improve conditions in Lower Parks Creek, The Cardoza Ranch has agreed to move their point of diversion downstream to the Shasta River near the Louie Road Bridge crossing just upstream from the confluence of Big Springs Creek with the Shasta River. This project has funding for the design, environmental review, and permits, which will be completed by early 2019. Implementation money will be pursued once designs are at 65%, with the goal to have it fully constructed in 2020-2021. Completion of this project will provide free fish passage, improve water quality conditions and will increase flows through out the spring and summer seasons. Once completed, this project will increase flows in the Lower Parks Creek by between 6 to 9 cfs at times when the diversion would be in operation. Sudden changes in flow and increased fine sediment flushes that currently occur when dam boards are placed or removed during the irrigation season would also be eliminated.

In the interim period the Cardoza Ranch has agreed to modify their operation of the existing diversion to allow fish passage to cold water refugial habitats as water quality and temperatures begin to degrade. The interim conditions require that prior to the removal of the diversion on Parks Creek the Cardoza Ranch will remove dam boards at the existing point of diversion when water temperatures first reach 19°C at the PBS (Parks Big Springs gage). This station is a real-time monitoring location (located near at the mouth of Parks Creek). The impoundment shall be fully drained, then left open for at least 7 consecutive days to allow for redistribution of fish. After the 7 days, permittee can resume normal diversion operations throughout the rest of the irrigation season. The flow schematic displayed in Figure 23 below represents a future condition in a normal water year after the Cardoza POD has been moved downstream to the Mid Shasta River reach.

Lower Parks Creek Total Flow Contributions: Spring Rearing, Redistribution and Emigration

Spring instream flows are expected to be between 13.12 cfs to 26.07 cfs at the bottom of this reach in a normal water year (Figure 23). These estimates may fluctuate depending on rain fall, and variations in groundwater contribution throughout the year.

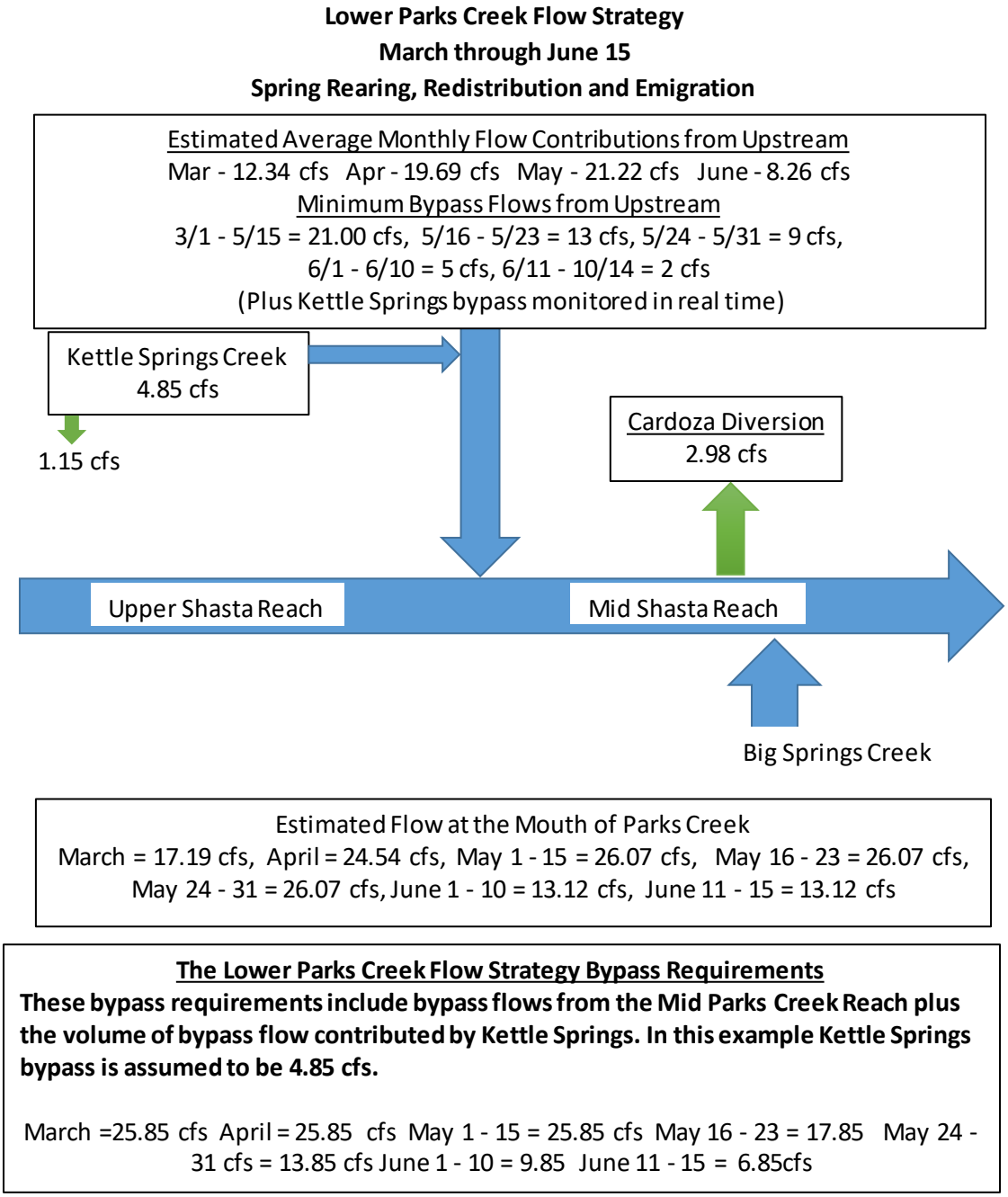


Figure 23. Estimated instream flow in the Lower Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the Spring rearing, redistribution and emigration season from March through mid-June in a normal water year after all conservation measures have been implemented.

Lower Parks Creek Flow Objectives: Coho Salmon Juvenile Summer Rearing (June 15 to September 30)

The objective in this reach is to increase the availability cold spring water sources to optimize the duration and extent of cold water habitats available to rearing coho salmon. Development of instream flow strategies need to consider the relationship between flow volume and cold water sources and should seek to maintain fish passage and connectivity over food producing riffles where possible given water temperature objectives. Recent

information gathered by the SWCG during flow experiments should be considered to achieve optimum flow and water temperature conditions throughout this important reach.

Upstream Flow Contributions

In a normal water year summer instream flows entering this reach are expected to range from about 6 cfs in June to about 4.92 cfs in September.

Lower Parks Creek Permittee Commitments: Juvenile Summer Rearing (June 16 to September 30)

Shasta Springs Ranch: Shasta Springs Ranch has committed to managing the Kettle Spring irrigation efficiency improvement, which piped ditches and maintains a consistent amount of spring water to Kettle Springs Creek, while keeping the amount diverted for irrigation to 1.15 cfs. All of the remaining spring flow is left instream to benefit coho salmon. For this exercise flow contributions from Kettle Springs Creek to the Lower Parks Creek reach are assumed to be 4.85 cfs during this time period.

Cardoza Ranch: The removal of the existing point of diversion for the Cardoza Ranch will provide free fish passage, improve water quality conditions and will increase flows throughout the summer seasons. Once completed, this project will increase flows in the Lower Parks Creek by between 6 to 9 cfs at times when the diversion would be in operation. Sudden changes in flow and increased fine sediment flushes that currently occur when dam boards are placed or removed during the irrigation season would also be eliminated.

In the interim period the Cardoza Ranch has agreed to modify their operation of the existing diversion to allow fish passage to cold water refugial habitats as water quality and temperatures begin to degrade. The interim conditions require that prior to the removal of the diversion on Parks Creek the Cardoza Ranch will remove dam boards at the existing point of diversion when water temperatures first reach 19°C at the PBS (Parks Big Springs). This station is a real-time monitoring location (located near at the mouth of Parks Creek). The impoundment shall be fully drained, then left open for at least 7 consecutive days to allow for redistribution of fish. After the 7 days, permittee can resume normal diversion operations throughout the rest of the irrigation season. The Cardoza Ranch will not provide any additional flow to the Lower Parks Creek Flow Strategy during this interim period. The flow schematic displayed in Figure 24 below represents a future condition in a normal water year after the Cardoza POD has been moved downstream to the Mid Shasta River reach.

Lower Parks Creek Total Flow Contributions: Summer Rearing

Summer instream flows are expected to be about 10.85 cfs in June to about 9.80 cfs in September during a normal water year (Figure 24).

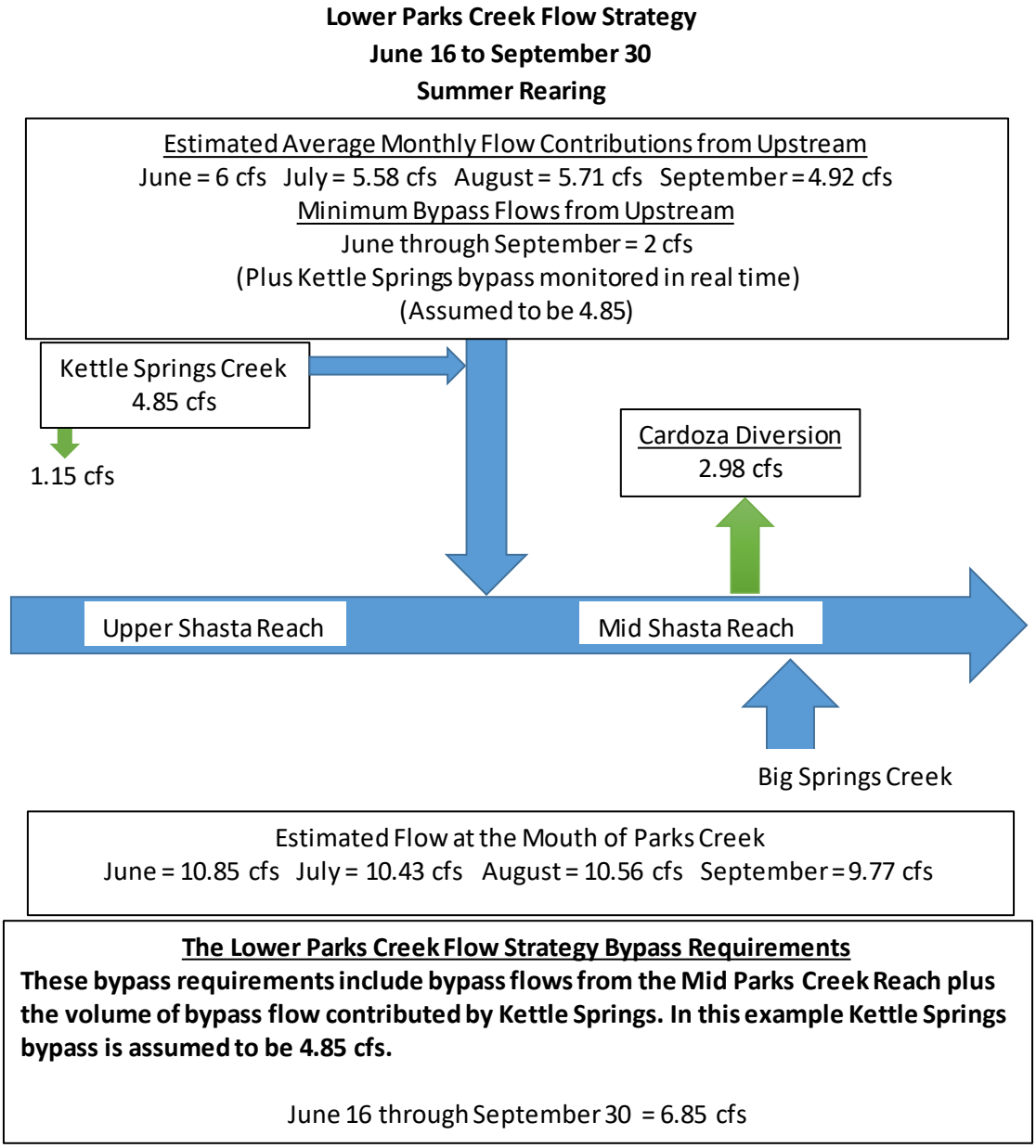


Figure 24. Estimated irrigation diversion volumes and instream flow in the Lower Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the summer rearing season in a normal water year after all conservation measures have been implemented.

Big Springs Creek

Big Springs Creek Background

The Shasta Big Springs Ranch (SBSR) is owned by the California Department of Wildlife (CDFW). CDFW plans to rename the ranch the Big Springs Ranch Wildlife Area (BSRWA) and CDFW has submitted a site plan describing their management plans. The Big Springs Creek Reach is defined as Big Springs Creek from Shasta River Confluence to Water Wheel (RM 0 to RM 1.6). The following section outlines operations, water rights and how those water rights are exercised along these reaches.

SBSR/BSRWA: The property has adjudicated water rights that total 18.11 cfs. A summary of the existing water rights for the property is provided in Table 8. Prior to 2009 when the property was purchased by The Nature Conservancy, 1,182 acres were under irrigation and the water rights were fully exercised. The Nature Conservancy reduced the number of irrigated acreage down to 494 acres and diversions to irrigate these acres were reduced to 10.51 cfs. In addition, the CDFW had authority of the water rights and they placed additional restrictions on the use of the water rights to further improve conditions for fish and wildlife. In a letter dated August 31, 2015, the CDFW stipulated criteria limited ranch operations as follows:

- Water rights from Little Springs Creek and Hole in the Ground shall not be utilized.
- Water withdrawal pursuant to water right from the Shasta River may be used as deemed appropriate to meet irrigation needs.
- Water withdrawal from Big Springs Creek pursuant to the 6.7 cfs right may occur if maximum daily temperatures measured at the mouth of Big Springs Creek remain below 18 degree C. If water temperatures reach 18 degree C then all irrigation must cease and irrigation may only begin or be resumed when maximum temperatures are less than 18 degrees C for five consecutive days.

These water temperature restrictions generally eliminated the possibility of irrigating from Big Springs Creek from mid-April to mid-August. However, operation of the Nelson diversion on the Shasta River, which has a 2.3 cfs water right to irrigate 200 acres of pasture continued. The Nature Conservancy filed California Water Code Section 1707 petitions with the State Water Resources Control Board (SWRCB) in July 2012 with the expressed intent to recognize fish and wildlife preservation and enhancement as a beneficial use, while retaining the beneficial uses of irrigation and stock water. Davids Engineering Inc. was hired to calculate the consumptive use of those water rights. The consumptive use is the portion of the water right that is evaporated, transpired by plants, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment and therefore would not be available downstream if irrigation was occurring. To successfully add fish and wildlife as a beneficial use to the property's water rights, The Nature Conservancy showed that such an action would not harm other water right holders. As a result, SWRCB added instream flow as a beneficial use for fish and wildlife preservation and enhancement to the water rights on the property (18.11 cfs) but only the consumptively used portion of these water rights can be bypassed downstream as specified in the Order approved by the SWRCB on May 8, 2014. Table 8 shows the consumed values by month, and Table 9 shows the coho salmon life stages that are expected to benefit by the improved flows provided by the consumed portion of the water rights.

Table 8. The amount of consumed water identified for the Big Springs Ranch Wildlife Area.

Diversion Number	Irrigated Area, Acres	Water Right Flow (cfs)	Calculation of Consumed Water (CFS)[1]								Water Source
			Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
167-172	93.9	1.5		0.08	0.55	0.75	0.91	0.79	0.55		Hole in the Ground Creek
241	392.2	6.71		0.34	2.33	3.15	3.8	3.29	2.3		Big Springs Creek
243	251.3	4		0.18	1.43	2.02	2.43	2.11	1.48		Little Springs Creek
244	16.95	0.5		0.01	0.1	0.14	0.16	0.14	0.1		Little Springs Creek
245	122.01	1.15		0.09	0.7	0.98	1.18	1.02	0.72		Little Springs Creek
246	82.98	1.95		0.07	0.49	0.67	0.8	0.7	0.49		Little Springs Creek
247-248	187.39	2.3	0.01	0.16	1.11	1.5	1.81	1.57	1.1	0.33	Shasta River
TOTAL =	**1146.73**	**18.11**	**0.01**	**0.93**	**6.7**	**9.21**	**11.1**	**9.61**	**6.73**	**0.33**	

1 Blank cells indicate that there are no water rights in that month

Table 9. The coho salmon life stages that benefit by the 1707 dedication of the consumed portion of the ranches water rights.

	Target Species	Life Stage targeted for benefit	Objective of potential instream use	Monitoring Location	General timing of potential benefit
Scenario 1	**Coho**	Over summer rearing	Improve water temperatures in Upper Shasta River	Point of Diversion	April through August
Scenario 2	**Fall Chinook**	Adult spawners	Improve water quality in Shasta River Canyon	Montague/Grenada Weir (~RM 15.5)	Late August through September 30th
Scenario 3	**Coho and Fall Chinook**	Out-migrating smolts	Improve water temperature and increase flow volume for out-migrating smolts	Montague/Grenada Weir (~RM 15.5)	April

Big Springs Creek Flow Management Strategy

The CDFW has submitted a site plan for the ranch and proposes the following Beneficial Management Activities for the BSRWA.

- Continue Nelson Ranch irrigation from the Shasta River.
- Divert Hole in the Ground (HIG) Creek tail water return if water quality conditions are detrimental to salmonids (e.g. temperature above 18 degrees C).
    - Permanently dedicate the HIG Creek water right to instream fish and wildlife beneficial use if restoration actions are successful. The current discharge from this tail water source is estimated to be as high as 6.5 cfs.
- Little Springs Creek may be diverted from the spring if both of the following are met: 1) water temperature in Little Springs Creek is 16 degrees Celsius or less at the confluence with Big Springs Creek; and 2) culverts are removed.
    - Permanently dedicate water rights necessary to achieve the temperature criteria for Little Springs Creek.
- Water from Big Springs Lake may only be diverted if diversion would not affect temperature and flow objectives stated below, or it would improve downstream water quality. The temperature objectives are: 1) water temperature in Big Springs Creek at the confluence with Shasta River is 18 degrees Celsius or less; and 2) salmonid habitat flow criteria in the Shasta River Canyon reach are met for upstream adult passage and downstream juvenile passage (Table 2). Water may be diverted if the diversion would improve downstream water quality due to poor quality in Big

    - Springs Lake.Permanently dedicate water rights necessary to achieve the two criteria above for Big Springs Creek and the Shasta River Canyon reach in all months.
- Water availability for future irrigation on the property will be based on the following.
    - 16 °C or less at the confluence of Little Springs Creek and Big Springs Creek.
    - 18 °C or less at the confluence of Big Springs Creek and Shasta River.
    - Juvenile emigration and adult migration flow needs within the canyon reach (Table 2) of the Shasta River.
    - Juvenile rearing temperature and flow conditions needed in the Shasta River below Big Springs Creek.
- Permittee may irrigate in the winter for ground water recharge and to enhance wildlife habitat if legally allowed to do so.
    - Winter irrigation will be minimal and not impact temperature or habitat requirements.

These management actions are focused on protecting and improving habitat for coho salmon as a priority over other beneficial uses.

The landowner located upstream of the BSRWA boundary is not participating in the Agreement and they share some of the diversion infrastructure with the BSRWA. This landowner will likely continue to divert their water rights from Big Springs Creek in the future.

Big Springs Creek Flow Objectives: Adult Migration and Spawning (October 1 to December 31)

Big Springs Creek is recognized as one of the primary coho salmon spawning grounds in the Shasta River watershed. After purchase of the ranch, The Nature Conservancy installed fencing through the entire stream reach to exclude livestock and protect the stream channel. This action has resulted in increased emergent vegetation and associated narrowing and deepening of a previously wide and shallow channel when aquatic vegetation is present. The increased velocities also helped flush fine sediment deposits from localized areas, revealing abundant areas with suitable spawning gravel. Stream flows are currently adequate to support adult salmon migration and spawning within Big Springs Creek.

Suitable spawning habitat for adult coho salmon is present in the entire length of Big Springs Creek.

Big Springs Creek Permittee Commitments: Adult Migration and Spawning (October 1 to December 31)

SBSR/BSRWA: The majority of the water rights associated with this ranch are highly valuable cold water springs. The water resources on this ranch will continue to be managed to protect and improve coho salmon habitat in Big Springs Creek. Chinook and coho salmon currently use Big Springs Creek to spawn each year. The ranch does not divert during this time period.

Big Springs Creek Flow Objectives: Egg Incubation and Juvenile Winter Rearing(January 1 to February 28)

Big Springs Creek has abundant stable flows and favorable water temperatures that have the potential to provide favorable conditions for incubating eggs and over-wintering juvenile coho salmon.

Big Springs Creek Permittee Commitments: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28)

SBSR/BSRWA: The majority of the water rights associated with this ranch are highly valuable cold water springs. The water resources on this ranch will continue to be managed to protect and improve coho salmon habitat in Big Springs Creek. Chinook and coho salmon currently use Big Springs Creek to spawn each year and the stable flow regime provides good conditions for incubating eggs and embryos. During the summer the abundant sub-emergent and emergent aquatic vegetation provides abundant cover and habitat diversity for rearing fish. However, the aquatic vegetation senesces after the first hard freeze and during the winter the amount of cover for overwintering coho salmon is greatly diminished. This loss of habitat complexity may stimulate juvenile coho salmon to seek more suitable habitat elsewhere. Adams and Bean (2016) note that many individuals moved from Big Springs Creek to over-winter in the Upper Shasta River Reach. Those juvenile coho salmon from the 2012 brood year that remained in Big Springs Creek over the winter months exhibited poor survival (28%) relative to those cohorts that over wintered in the Shasta River below Big Springs Creek (71% survival), in the Upper Shasta River (54% survival), or in Parks Creek (55% survival). Lack of cover from predators may be a factor responsible for the lower winter survival rates that were observed. Placement of large woody debris is proposed by the CDFW to increase the amount of cover and improve velocity diversities for coho salmon throughout the year. The ranch may irrigate in the winter for ground water recharge and to enhance wildlife habitat. Winter irrigation will be minimal and would not impact temperature or habitat for coho salmon.

Big Springs Creek Flow Objectives: Juvenile Spring Redistribution and Smolt Emigration (April 1 to June 15)

Cold spring water from Big Springs Creek is important to spring rearing and redistribution of coho salmon in the Shasta River.

> A. Temperature Considerations - CDFW requires that the TNC water rights from Big Springs Creek be left instream once water temperatures reach 18°C. This generally occurs during late spring through early summer prior to the shading effects of the emergent aquatic vegetation. Irrigation may resume once five consecutive days pass with temperatures below 18°C.

Big Springs Creek Permittee Commitments: Juvenile Spring Redistribution and Smolt Emigration (April 1 to June 15)

SBSR/BSRWA: A majority of the water rights associated with this ranch are highly valuable cold water springs. CDFW proposes the following management actions to protect and improve conditions for coho salmon during the spring and summer irrigation seasons.

- Little Springs Creek may be diverted from the spring if both of the following are met: 1) water temperature in Little Springs Creek is 16 degrees Celsius or less at the confluence with Big Springs Creek; and 2) culverts are removed.
- Permanently dedicate water rights necessary to achieve the temperature criteria for Little Springs Creek.
- Water from Big Springs Lake may only be diverted if diversion would not affect temperature and flow objectives stated below, or it would improve downstream water

quality. The temperature objectives are: 1) water temperature in Big Springs Creek at the confluence with Shasta River is 18 degrees Celsius or less; and 2) salmonid habitat flow criteria in the Shasta River Canyon reach are met for upstream adult passage and downstream juvenile passage. Water may be diverted if the diversion would improve downstream water quality due to poor quality in Big Springs Lake. Permanently dedicate water rights necessary to achieve the two criteria above for Big Springs Creek and the Shasta River Canyon reach in all months.

- Water availability for future irrigation on the property will be based on the following.
    - 16 °C or less at the confluence of Little Springs Creek and Big Springs Creek.
    - 18 °C or less at the confluence of Big Springs Creek and Shasta River.
    - Once a temperature threshold is met, diversions from that water source will cease for that irrigation season.
    - Juvenile emigration and adult migration flow needs within the canyon reach of the Shasta River.
    - Juvenile rearing temperature and flow conditions needed in the Shasta River below Big Springs Creek.

Big Springs Creek Flow Objectives: Juvenile Summer Rearing (June 15 to September 30)

Big Springs Creek provides an important source of cold water for rearing coho salmon throughout the summer months.

A. Temperature and flow objectives:

- 16 °C or less at the confluence of Little Springs Creek and Big Springs Creek.
- 18 °C or less at the confluence of Big Springs Creek and Shasta River.
- Juvenile emigration and adult migration flow needs met within the canyon reach of the Shasta River.

Big Springs Creek Permittee Commitments: Juvenile Summer Rearing (June 16 to September 30)

SBSR/BSRWA: The majority of the water rights associated with this ranch are highly valuable cold water springs. CDFW proposes the following management actions to protect and improve conditions for coho salmon during the spring and summer irrigation seasons. CDFW will continue to implement the same management actions described above for juvenile Spring redistribution and smolt emigration during the summer rearing season. The Beneficial Management Actions proposed by CDFW in their site plan submitted under the Agreement are focused on protecting and improving habitats for coho salmon as a priority over other beneficial uses.

Mid Shasta River

Mid-Shasta River Reach Background

The following section describes the NOAA flow objectives and Permittees' flow commitments in order to meet the outlined flow objectives for this reach. The Mid Shasta River Reach is defined as the Shasta River from the end of Huseman ditch to Parks Creek Confluence (RM 25 to RM 35). There are five Permittees located within the Mid Shasta reaches, the Cardoza Ranch, GID, Grenada Novy Ranch, Rice Livestock Company and the NB Ranch.

Participants and Reach Operations

Cardoza (Post POD relocation to Shasta River): The Cardoza Ranch has a 2.98 cubic feet per second (cfs) water right, which is included in the Shasta River Decree. The current point of diversion is located on Lower Parks Creek, 1.5-miles upstream from the confluence with the Shasta River. The ranch has agreed to move their point of diversion from Parks Creek to the Shasta River near the Louie Road Bridge (Mid Shasta reach), which will change the management reach from Lower Parks Creek to the Mid Shasta River, and will end Cardoza Ranch's Parks Creek diversions. The diversion relocation is expected to result in an overall reduction of the total amount of water diverted by Cardoza Ranch, although the exact reduction is unknown at this time. Their diversion rate will remain within their adjudicated water right of 2.98 cfs or less if the full water right is not needed for irrigation between April 1st to September 30th. The ranch has filed a permissive 1707 on the full water right, as there are times when the ranch may cease to irrigate during summer months due to hay production. The 1707 dedication will allow the consumed portion of the Cardoza Ranch's water right to be bypassed downstream.

Grenada Irrigation District POD: The Grenada Irrigation District's (GID) water right is identified in the Shasta River Decree as Diversion #149. GID is a special district that owns and operates several parcels including the point of diversion, a lift station and a parcel along the ditch. GID provides water to over 60 users who irrigate up to 1,477 acres. While GID's water right is large in volume, it is low in priority. Under recent use, GID will routinely divert 40 cfs for short periods of time to fill the ditch and catch up on rotation. Within the past 10-15 years, GID operates between 135-140 (138 average) days a year through the irrigation season (4/1- 9/30) with an average diversion volume of approximately 28-32 cfs or 8,200 acre feet a year. GID diversion volumes are usually reduced or shut off due to priority during base flow conditions in August. GID typically will be allowed to divert again later in September when higher priority rights reduce their diversion volume.

GID's main canal is an inefficient earthen canal. Transmission losses as high as 35% can occur in the main canal when diverting at high levels according to recent investigations completed by NRCS and loss calculations extrapolated from a water balance conducted by Davids Engineering in 2006. On average, ditch loss values during 2006 were 17% for per the study period and 1,100 acre feet were lost in delivery transmission. The project proposed in the Site Plan will reduce GID's maximum diversion rate to 24 cfs.

Novy Pump Diversion: The Novy Pump has a capacity of 5.5 cfs and operates on average 31 days per month from March to November every season. A total of approximately 465 acres are irrigated with this diversion, solely on the Novy property. As this is a riparian right, there are no recorded winter rights on this point of diversion, but the pump can be operated during any part of the year. The diversion pumps water into an open

ditch system and flood irrigation practices are utilized throughout the ranch, with the proposed plan to increase efficiency by replacing main ditches with buried mainline with risers.

Novy-Rice-Zenkus Diversion: Novy-Rice diversion is shared between Novy Ranches, Rice Livestock and Truttman-Zinkas on rotation. According to the 2014 statement of use, a continuous diversion of 10 cubic feet per second (cfs) from March to November or a total of 4520 acre-feet per season was utilized. This diversion is currently taken at a flash board dam and conveyed through open ditches and flood irrigation practices are used. The rotation is dependent on land ownership, with approximately 302 acres irrigated from that diversion owned between the three ranches. As this is a riparian right, there are no recorded winter rights on this point of diversion, but can be operated during any part of the year. The Novy Rice Diversion will be designed as part of their SHA, the diversion structure will be reconstructed as a roughed channel to provide fish passage throughout the year, with an on channel fish screen and the diversion will be reduced to 5 cfs.

Huseman Diversion (Rice Livestock Company and NB Ranches, Inc.): The Huseman diversion has adjudicated water rights during the irrigation season (April 1 to October 1) and during the remainder of the year for stockwater use. The diversion has a capacity of 11.9 cfs which is used from April to October every season. A total of approximately 629.74 acres are irrigated with this diversion between three different users in the Huseman Ditch Association, two of which are Permittees to the Agreement. Rice Livestock irrigates approximately 270 acres with the Huseman Ditch water and has ownership of 50-percent of the entire right. NB Ranches, Inc. irrigates approximately 182 acres for water supplied by the Huseman Diversion and controls 33.5 percent of the total water right. The winter right on the Huseman Ditch is 5 cfs.

In 2011, the Huseman POD was moved from the Grenada Irrigation District POD to a selected location on the Rice Livestock property, located approximately 31,300' feet (5.9 miles) downstream. The project included installing buried pipe and flood risers to replace approximately 4,500 feet of open ditch. As a result of these improvements, irrigation now includes using flood risers on approximately 60 acres of the ranch (known as the Boot Field), improving irrigation efficiency. A second lateral water line delivers water to the remaining fields and other Huseman Ditch users. This lateral water line eliminates the need to deliver water through an additional 7,000' of inefficient open ditch. As a result of this project, 11.9 cfs of water remains instream for 31,300' before being diverted at the second POD. Huseman Ditch Association now pumps Huseman Ditch Water from Shasta River rather than by gravity diversion via the previous POD. Instead of the practice of continuous diversion that was used prior to the project implementation in 2011, the Permittees use approximately 142 AF of water per 15 day irrigation rotation cycle. Thirteen irrigation rotations typically occur during the season. The Permittees (Rice Livestock and NB Ranches) currently apply a total of approximately 3,736 AF of water per year, where previously the amount of water applied was approximately 4,242 AF, which is a reduction of 506 AF of water use or about 1.39 cfs during each irrigation season.

The flow schematic provided in Figure 25 depicts the diversion rates and instream flow conditions that currently exist in the Mid Shasta River reaches as described above.

Mid Shasta Flow Strategy
Irrigation Season: March 1 - November 1
Existing Conditions

Estimated Flow Contribution from Parks Creek

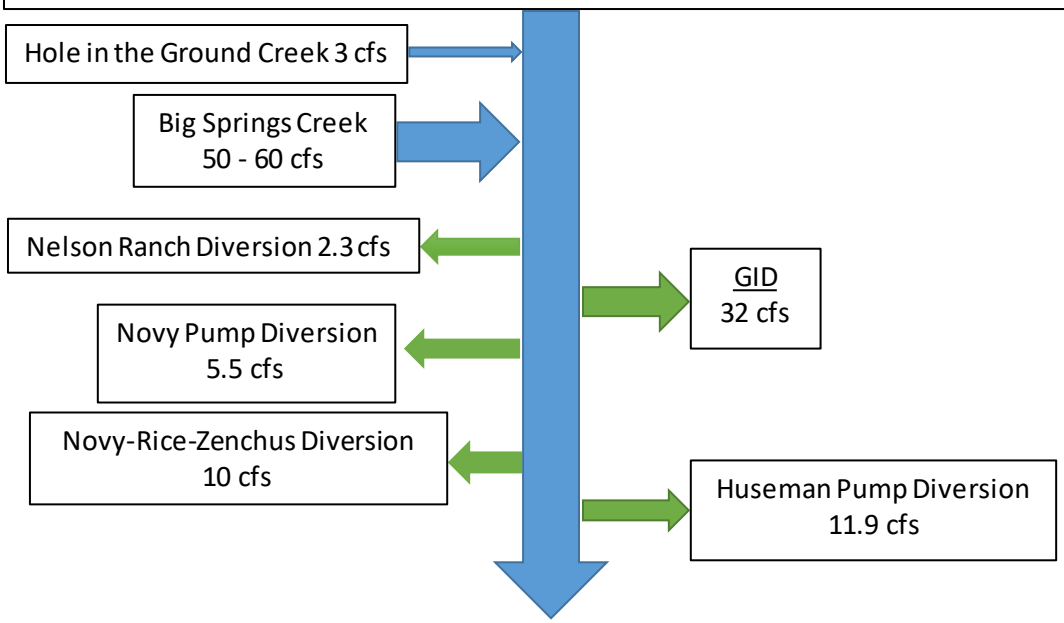
March	5.85 cfs	June	5.65 cfs	Sept	1 cfs
April	10.5 cfs	July	1 cfs	Oct	1 cfs
May	10.5 cfs	Aug	1 cfs	Nov	13.15 cfs

Estimated Flow Contribution from the Upper Shasta River (Normal Water Year)

Flows at the bottom of the reach range from about 25 to 15 cfs in March - April and drop to a summer low base flow of about 3 cfs + minor acretions from tailwater and hyporheic flow contributions.

Total Flow Contribution to the Mid Shasta River Reach

March and April about 21 - 36 cfs. Flows decline in May and June and reach a base flow in July of about 4+ cfs.



Total Estimated Flow Leaving the Mid Shasta River

The irrigation season in this reach begins in April for adjudicated rights. Riparian rights may divert all year. The estimated flows in March include riparian diversions and after April all diversions are assumed to be diverting.

Based on these assumptions the flow estimates are:

March = 64 - 89 cfs April = 12 - 37 cfs Base flows from July - Sept exclude GID based on low priority and would be about 26 to 36 cfs in a normal year less a reduced GID diversion rate.

Figure 25. Estimated irrigation diversion volumes and instream flow in the Mid Shasta River reach under existing conditions prior to implementation of the CHERP flow releases from Dwinnell Dam and the proposed Flow Management Strategy developed under the Shasta Safe Harbor Agreement in a normal water year.

Mid Shasta River Flow Strategy

Adult migration and spawning (October 1 to December 31) Flow Objectives:

A. Base Flows - To the extent practicable; development of instream flow strategies in this reach should contribute towards providing favorable upstream migration conditions (125 cfs) through the lower river canyon (Table 2). Management of diversions should also attempt to reduce large deviations in flow downstream during the migration and spawning season through development of a coordinated irrigation strategy. Downstream diversions have been considered in this flow management strategy, with over 58 cfs of adjudicated water rights and 14 cfs of riparian rights downstream of the geographic scope of the agreement. Given the downstream adjudicated rights, a realistic objective for the SHA to contribute to canyon flows would be 70 cfs (56% of total diversion volume) at the A-12 gage. It should be noted that many of the water rights in the geographic area of the SHA agreement, as well as those water rights downstream end on October 1st.

Upstream Flow Contributions

Upper Shasta River- Winter instream flows entering the Mid Shasta from the Upper Shasta reach are expected to be between 8 and 14 cfs during a normal year.

Parks Creek- Winter instream flows entering the Mid Shasta from Parks Creek are expected to range from about 10 cfs in October to about 21 cfs in December during a normal water year.

Therefore, in a normal water year the total amount of instream flow entering this reach is anticipated to range from about 23 cfs in October to about 35 cfs in December.

Mid Shasta River Permittee Commitments: Adult migration and spawning (October 1 to December 31):

SBSR/BSRWA: The SBSR/BSRWA has an active stock water right on the Nelson Unit which is a total of 0.25 cfs.

Cardoza Ranch: The Cardoza Ranch does not have a stockwater right, thus will not divert during this life stage.

Grenada Irrigation District (GID): GID does not divert during this time period.

Novy Pump: The Novy pump is a riparian right and they may exercise this right during this time period and have not proposed any flow commitment during this time period. Based on current diversion patterns it is likely that 5.5 cfs of water would be diverted at this location during October and diversions would not begin again until March at the start of the next irrigation season.

Novy-Rice-Zenkus Diversion: The Novy-Rice-Zenkus diversion is a riparian right and they may exercise this right during this time period. The users of this diversion (Grenada Novy Ranch and Rice Livestock Company) have proposed to reduce this diversion from 10 cfs down to 5 cfs as part of the water conservation project to improve irrigation delivery efficiencies and eliminate fish passage concerns at the point of diversion.

Huseman Diversion: If diverting for stock water from 10/1-3/31, Rice livestock and NB Ranches will reduce the maximum diversion volume 5.0 to 4.0 cfs and limit days of operation to 25 days a year as opposed to continuous right of 5.00 cfs during non-irrigation season. Maximum cumulative diversion for stock water during winter period will be 200 AF per year.

Mid-Shasta River Reach Total Reach Contribution: Adult Migration and Spawning

Fall instream flows are expected to be between about 65 cfs and 96 cfs at the bottom of this reach during a Normal Water Year (Figure 26). This does not include natural accretion that have been documented in this reach.

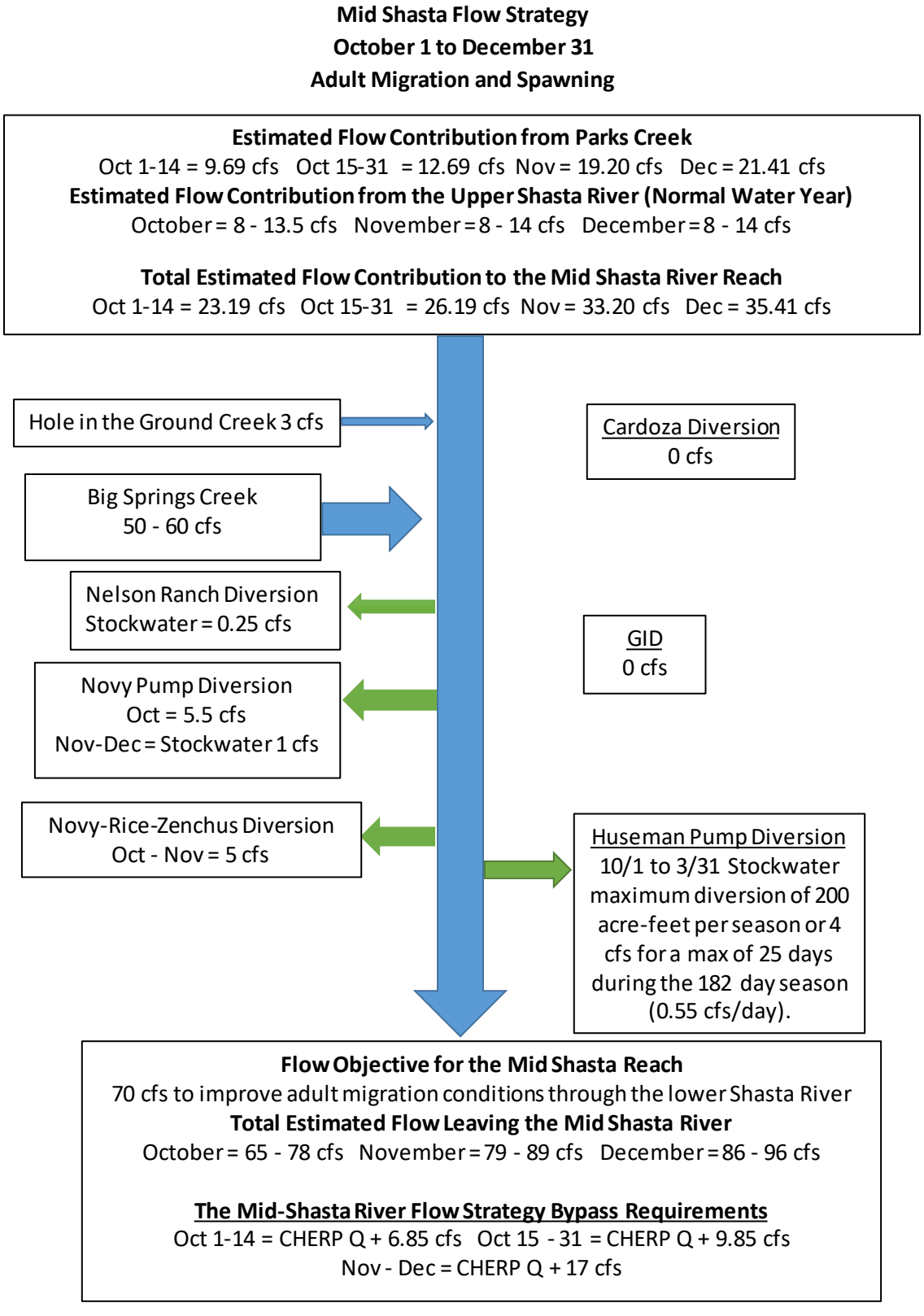


Figure 26. Estimated irrigation diversion volumes and instream flow in the Mid Shasta River during the adult migration and spawning season under normal water year type conditions with the Flow Management Strategy proposed under the Shasta Safe Harbor Agreement after all conservation measures have been implemented.

Mid Shasta River Flow Objectives: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

A. Base flow conditions during the winter may not require additional management actions. Diversions during this period of time are greatly reduced and spring flow contributions from upstream (Big Springs Creek) provide stable base flow conditions.

Upstream Flow Contributions

Upper Shasta River- Winter instream flows entering the Mid Shasta reach from the Upper Shasta reach are expected to range between about 5.5 cfs and 12 cfs during a normal water year.

Parks Creek- Winter instream flows entering the Mid Shasta reach from Parks Creek during a normal water year are expected to be between 16 cfs to 18 cfs.

Total flow enter the Mid Shasta Reach from upstream in a normal type water year are anticipated to be between about 18 cfs and 30 cfs during the incubation and winter rearing season.

Mid Shasta River Permittee Commitments: Egg incubation and winter rearing juveniles (January 1 to February 28:

SBSR/BSRWA: The SBSR/BSRWA have an active stock water right on the Nelson Unit which is a total of 0.25 cfs, which has minimal impact to the amount of available flow for this reach.

Cardoza Ranch: The Cardoza Ranch does not have a stockwater right, thus will not divert during this life stage.

GID: GID does not divert during this time period.

Novy Pump: The Novy pump is typically operated from March through October and this riparian right is generally not used during this time period with the exception of a stockwater pump that may divert about 1 cfs.

Novy-Rice-Zenkus Diversion: The Novy-Rice-Zenkus diversion is a riparian right and they may exercise this right during this time period however, based on the water right reports for this diversion (eWRIMs application #S000808) this diversion has not been active during January and February since at least 2009.

Huseman Diversion: If diverting for stock water from 10/1-3/31, Rice livestock and NB Ranches will reduce the maximum diversion volume 5.0 to 4.0 cfs and limit days of operation to a maximum of 25 days a year as opposed to a continuous diversion of 5.00 cfs during non-irrigation season. Maximum cumulative diversion for stock water during winter period will be 200 AF per year. If this volume were to be diverted continuously the diversion rate would be equivalent to 0.55 cfs per day.

Mid Shasta River Total Flow Contributions: Egg Incubation and Juvenile Winter Rearing

Winter instream flows are expected to be between 70 cfs to 91 cfs at the bottom of this reach depending on water year type (Figure 27). This does not include natural accretion that has been documented in this reach.

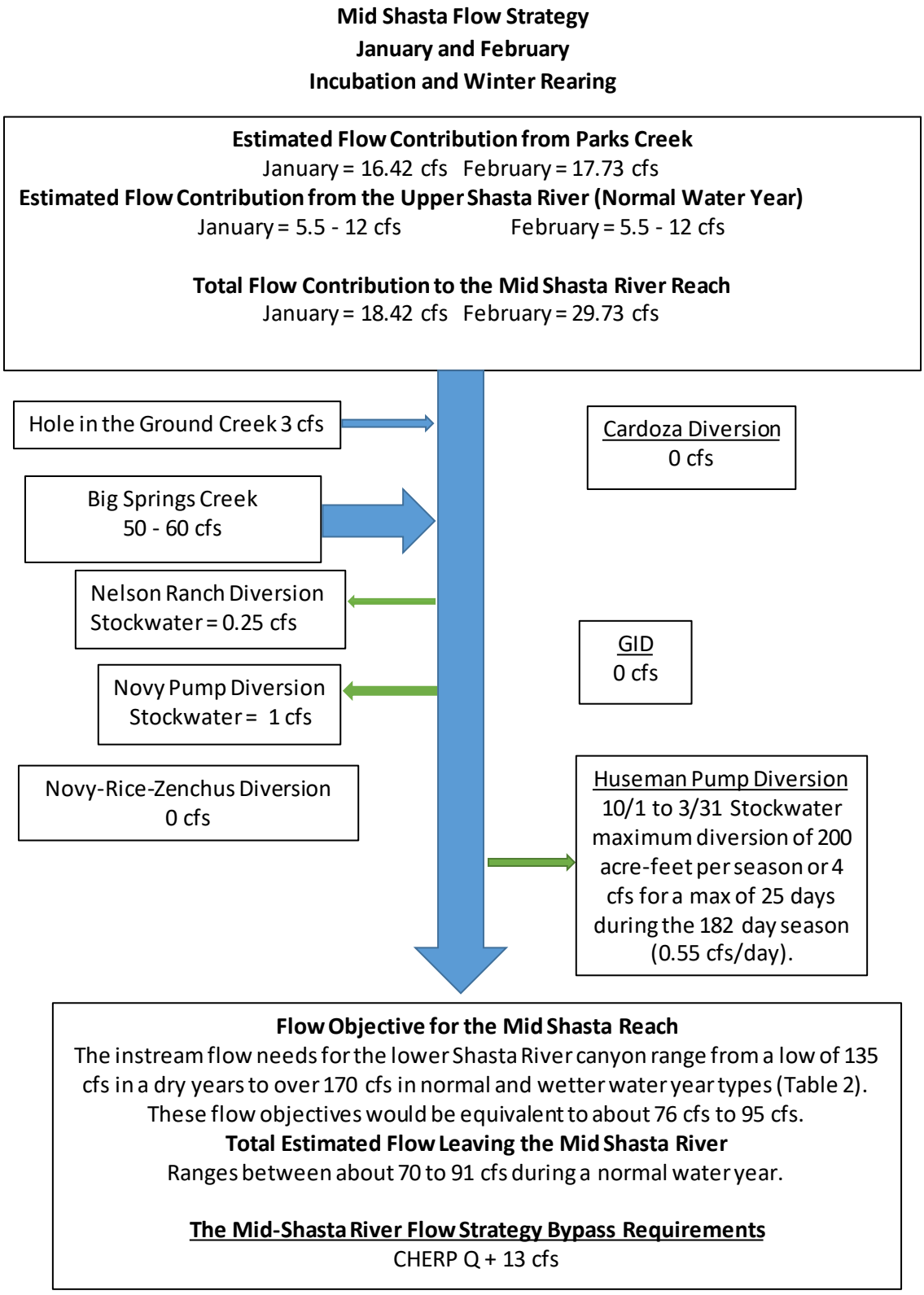


Figure 27. A schematic of the estimated diversion volumes and instream flow in the Mid Shasta River during the egg incubation and winter rearing season during a normal water year type that would occur under the Flow Management Strategy proposed under the Shasta Safe Harbor Agreement after all conservation measures have been implemented.

Mid Shasta River Flow Objectives: Coho Salmon Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

The reductions in flows coincident with the onset of the irrigation diversion season greatly reduce rearing habitat in the lower river canyon and large variations in flow can result in stranding of fry and juvenile coho salmon rearing in off channel habitats an may threaten survival of embryos still incubating in redds present in side channel habitats.

A. Base Flows – Development of flow strategies should try to temper the large variations in flow downstream to help maintain abundant off channel rearing habitats and reduce the frequency of dewatering these habitats prematurely. Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment throughout this reach.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage.

C. Temperature Considerations - Development of flow strategies should seek to maintain and extend cold water temperatures downstream for as long as possible.

Upstream Flow Contributions

Upper Shasta River- In a normal water year the instream flows entering the Mid Shasta reach from the Upper Shasta reach are expected to range between 17 cfs and 34 cfs in March and April, declining to a low of about 7 cfs to 12 cfs in June.

Parks Creek- The instream flow contributions entering the Mid Shasta reach from Parks Creek in a normal water year are expected to be between 17 cfs and 26 cfs from April through May and then decline to about 13 cfs in June.

The total amount flow entering the Mid Shasta reach during the time period in a normal water year is expected to range from about 51 cfs in March, 48 cfs in April, 45 cfs in June and 25 cfs by mid-June.

Mid Shasta River Permittee Commitments: Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

SBSR/BSRWA: The majority of the water rights associated with this property are highly valuable cold water springs. In concurrence with the conservation easement and as the future owners of the property CDFW will continue to manage the water resources on the property to improve conditions for coho salmon during this life stage.

The water right associated with the Nelson unit will continue to be active throughout this time period, where 2.3 cfs may be diverted during this time period.

GID: GID has committed to the following diversion schedule after a proposed water conservation project is implemented.

Normal and Drier Years

Date	Life Stage	Current CFS	Proposed CFS	Conserved
4/01-4/9 (9 days)	Juvenile	30	0 cfs	535 AF
4/10-5/20 (39 days)	Juvenile	30	24 cfs	464 AF
5/21-8/15 (86 days)	Over-summering	24	24 cfs*	00 AF

Wet and Very Wet Years

Date	Life Stage	Current	Proposed	Conserved
4/01-4/9 (9 days)	Juvenile	30	0 cfs	535 AF
4/10-5/20 (39 days)	Juvenile	30	24 cfs	464 AF
5/21-8/15 (86 days)	Over-summering	24	24 cfs*	00 AF

*Schedule does not consider limitations of diversion caused by bypass of conserved water, decree priority and water mastering.

Novy Pump: The Novy Ranch has committed to reducing the Novy Pump diversion from 5.5 cfs to 2.75 cfs between April 1st to April 10th to help alleviate the drop in the hydrograph at the start of irrigation season. After April 10th the Novy pump will operate at full capacity.

Novy-Rice-Zenkus Diversion: The Novy-Rice-Zenkus diversion conservation project will allow the landowner to reduce the current diversion from 10 cfs to 5 cfs.

Huseman Diversion: The Huseman diversion, as described in the Rice Livestock Company and NB Ranches, Inc. Site Plans, will not initiate diversion until April 6th and after the Huseman pipeline project is implemented, the maximum diversion rate will be reduced from 11.9 cfs to 10 cfs.

Mid Shasta River Total Flow Contributions: Juvenile Rearing, Redistribution and Smolt Emigration:

In a normal water year the spring season instream flows at the bottom of the Covered Area for the Safe Harbor Agreement are expected to be range from about 89 cfs to 99 cfs on April 1, 62 cfs to 52 cfs on April 10th, 58 cfs to 48 cfs in May and 38 cfs to 28 cfs in June (Figure 28). These estimates do not include natural accretion that occurs in this reach.

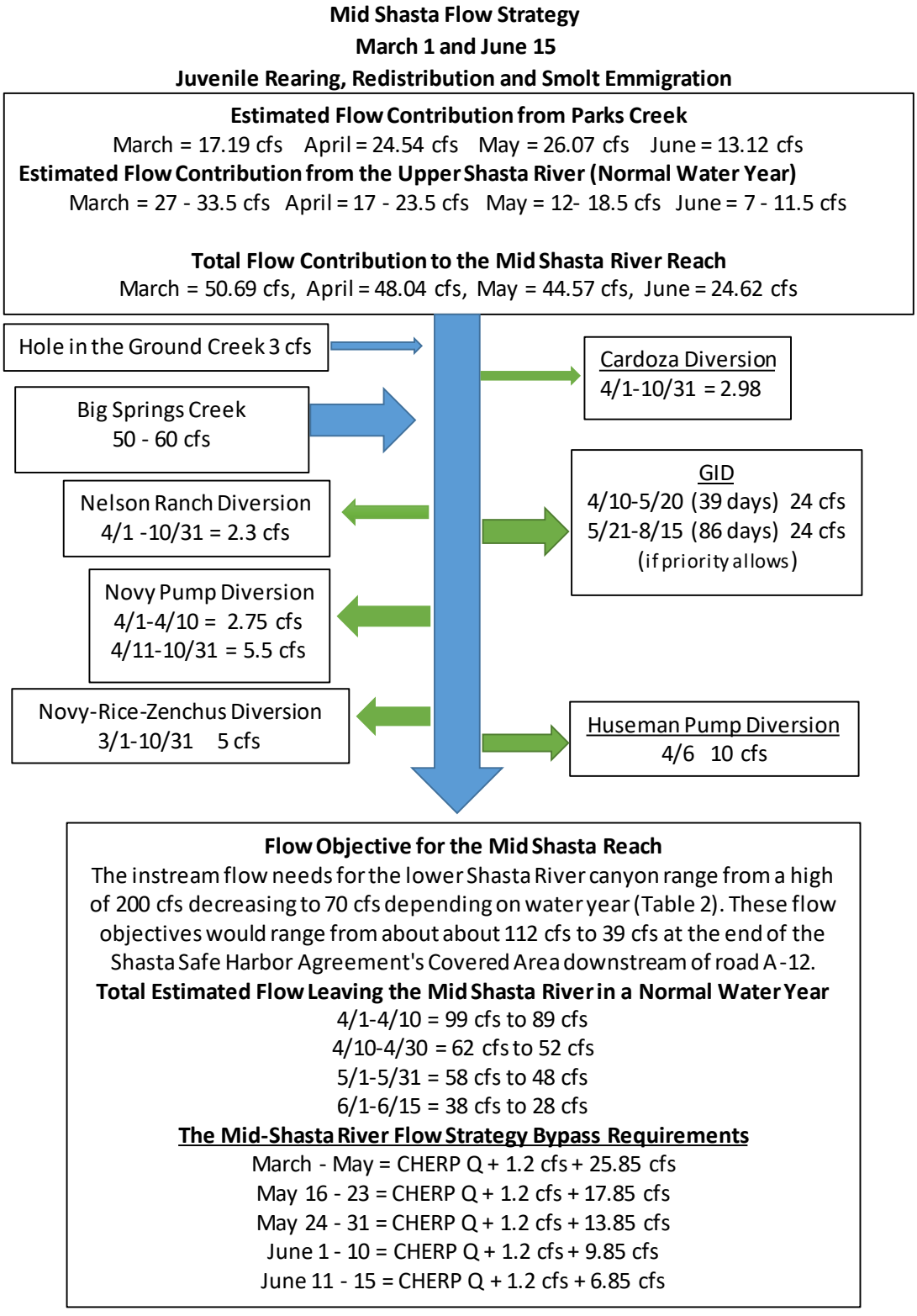


Figure 28. A schematic of the estimated diversion volumes and instream flow in the Mid Shasta River during the spring rearing, redistribution and emigration season during a normal water year type that would occur under the Flow Management Strategy proposed under the Shasta Safe Harbor Agreement after all conservation measures have been implemented.

Mid Shasta River Flow Objectives: Coho Salmon Summer Rearing (June 15 to September 30):
Improvements in flow, water quality and habitat quality that will occur upstream have the potential to improve over summering habitat within this reach, particularly in those areas further upstream. Water management strategies should focus extending these benefits downstream to the extent practicable. Efforts should focus on restoring spring sources to the mainstem to create additional cold water refugia opportunities. Water management should also seek to reduce large variations in flow through effective coordination of diversions.

Upstream Flow Contributions

Upper Shasta River- Summer instream flows entering the Mid Shasta reach from the Upper Shasta reach are expected to range between 5 cfs and 13 cfs in a normal water year.

Parks Creek-Summer instream flows entering the Mid Shasta reach from Parks Creek are estimated to be about 10 cfs during this time period.

The total amount of flow entering the Mid Shasta River reach is expected to range from about 20 cfs in June, July and August with a slight increase to about 23 cfs in September under a normal water year.

Mid Shasta River Permittee Commitments: Summer Rearing (June 15 to September 30):
SBSR/BSRWA: The majority of the water rights associated with this ranch are highly valuable cold water springs. In concurrence with the conservation easement and as the future owners of the ranch CDFW will continue to manage the water resources on the ranch to improve conditions for coho salmon during this life stage.

The water right associated with the Nelson unit will continue to be active throughout this time period, where 2.3 cfs may be diverted during this time period.

GID: GID has committed to the following flow schedule as part of the site plan agreement:

Normal and Drier Years

Date	Life Stage	Current	Proposed	Conserved
5/21-8/15 (86 days)	Over-summering	24	24 cfs*	00 AF
8/16-9/6 (22 days)	Over-summering	0-15	0-15*	00 AF
9/7-9/30 (23 days)	Over-summering	21	18 cfs*	137 AF

*Schedule does not consider limitations of diversion caused by decree, priority and water mastering.

Wet and Very Wet Years

Date	Life Stage	Current	Proposed	Conserved
5/21-8/15 (86 days)	Over-summering	24	24 cfs*	00 AF
8/16-9/6 (22 days)	Over summering	24	24 cfs *	00 AF
9/7-9/30 (23 days)	Over-summering	24 cfs	18 cfs*	274 AF

*Schedule does not consider limitations of diversion caused by decree, priority and water mastering.

Novy Pump: The Novy Ranch will divert 5.5 cfs from June 16th to September 20th and then will reduce diversion to 2.75 cfs to assist with fall flows for Chinook.

Novy-Rice-Zenkus Diversion: The Novy-Rice-Zenkus diversion conservation project will allow the landowner to reduce the current diversion from 10 cfs to 5 cfs and has committed to reducing the diversion to 2.5 cfs to assist with fall flows for Chinook.

Huseman Diversion: The Huseman diversion, under the Rice and Nicolletti Site Plan agreements, will reduce diversion from the current 11.9 cfs to 10 cfs after the Huseman pipeline project is implemented. The diversion will be shut off on September 25th to assist with fall flows for Chinook.

Mid Shasta River Total Flow Contributions: Juvenile Summer Rearing

In a normal water year the summer season instream flows are expected to range between 47 cfs and 62 cfs (Figure 29). When GID is not diverting and are expected to range between 23 cfs and 45 cfs when GID is diverting volumes proposed under the Flow Management Strategy provided those flows are available to GID based on their water right priority. These estimates do not include natural accretion.

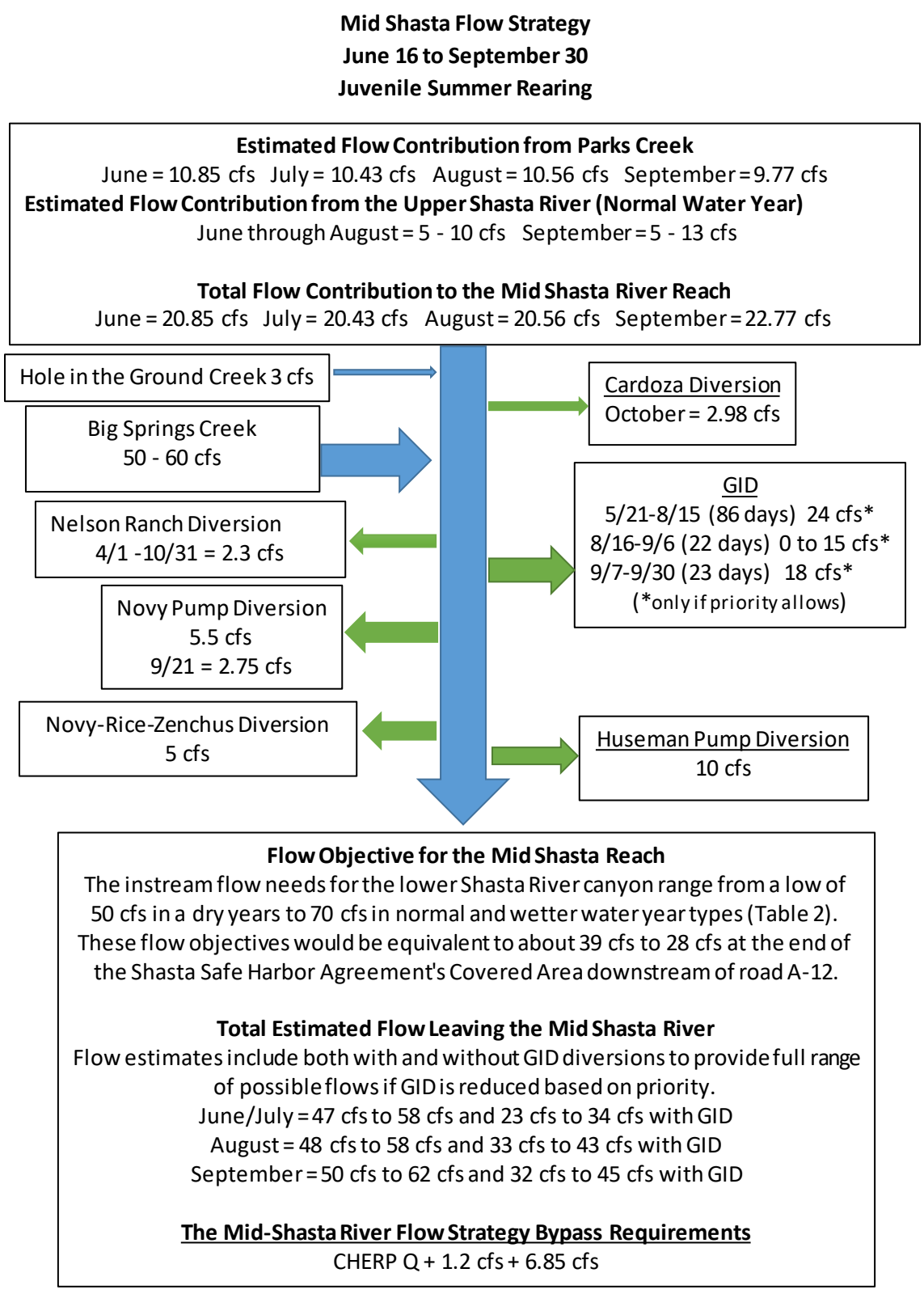


Figure 29. A schematic of the estimated diversion volumes and instream flow in the Mid Shasta River during the summer rearing season during a normal water year type that would occur under the Flow Management Strategy proposed under the Shasta Safe Harbor Agreement after all conservation measures have been implemented.

Conclusion

Agreement Parties have developed a flow management strategy under the Shasta River Safe Harbor Agreement that will increase instream flow and improve water quality conditions (Tables 10, 11 and 12). The greatest improvements are anticipated to occur during the spring and summer seasons when fry and juvenile coho salmon are present. Spring flows will better mimic natural snow melt hydrology and peak flows will generally meet or exceed minimum instream Tier 1 objectives recommended by McBain and Trush, Inc. and Humboldt State University for upper Shasta River and Parks Creek. Summer base flows will slightly improve in Upper Parks Creek Reach, with greater improvements accumulating downstream. Spring flow contributions will increase throughout the Covered Area increasing the availability of cold water refugia habitats in several locations with the greatest improvements expected to occur in Upper Shasta River and Mid-Parks Creek reaches. Adult coho salmon will have access to all stream reaches due to improved fish passage conditions. In addition, adult Chinook salmon will receive benefits to migration and spawning habitat availability due to the earlier onset of increased fall flows. Over wintering flows generally remain similar to current conditions with some localized improvements that should benefit over wintering juvenile coho salmon and incubating eggs.

Benefits to coho salmon described above are expected to be fully realized in a phased approach as water conservation projects described in individual site plans are completed. As such, the Agreement Parties are committed to strategic coordination to optimize project funding opportunities. NOAA anticipates the benefits from projects on instream flows may vary somewhat from those described in site plans the Flow Management Strategy. In addition, there is limited understanding of the mechanisms that influence spring flow volumes, hyporheic flows, and tailwater return pathways to the river. Hydrological uncertainties underscore the importance of implementing effectiveness monitoring program described in the Adaptive Management Program to validate the flow requirements of the Agreement.

Table 10. Comparison between current instream flow conditions and instream flow conditions anticipated under the Shasta Safe Harbor Agreement's Flow Management Strategy in the Upper Shasta River Reach.

Reach	Life Stage	Flow Objectives	Current conditions	SHA Flow Strategy	Result
Upper Shasta River	Adult Migration and Spawning	10 - 13 cfs	5 - 11 cfs	8 - 14 cfs	+ 3 cfs, Objective met more often and exceeded at times
	Incubation and Winter Rearing	7 - 10 cfs	3.5 - 10 cfs	5.5 - 12 cfs	+2 cfs, Objective met more often
	Spring Rearing, Redistribution, Emigration	20 - 25 cfs peak with declining flows to mimic snow melt hydrograph	3 - 25 cfs	6.5 - 33 cfs	+ 3 cfs to 8 cfs throughout the season
	Summer Rearing	6 cfs	3 cfs	5 - 13 cfs	+2 cfs to 10 cfs, Objectives met more frequently and exceeded at times

Table 11. Comparison between current instream flow conditions and instream flow conditions anticipated under the Shasta Safe Harbor Agreement's Flow Management Strategy in Parks Creek.					
Upper Parks Creek	Adult Migration and Spawning	10 - 11 cfs	0.05 - 7.5 cfs	1 - 12 cfs	+ 4.5 cfs, The objective is met earlier in the season
	Incubation and Winter Rearing	6 - 10 cfs	7.5	6 cfs	Small decrease
	Spring Rearing, Redistribution, Emigration	March-April 20 cfs; 5/16 - 5/23 = 12 cfs; 5/24 - 5/31 = 8 cfs; 6/1 - 6/10 = 4 cfs	March = 7.4 cfs April = 12.2 cfs May = 12.2 cfs June = 7.2 cfs	March = 14.6 cfs April = 21.9 cfs May = 24.0 cfs June = 12.6 cfs	Flow volumes are nearly doubled and better mimic natural flow patterns.
	Summer Rearing	1 cfs	1.45 - 0 cfs	1 cfs	Connectivity and fish passage improved
Mid Parks Creek	Adult Migration and Spawning	10 - 11 cfs	0 - 5.4 cfs	Oct 1 - 14 = 8.7 cfs Oct 15-31 = 11.7 cfs Nov = 19.4 cfs Dec = 21.6 cfs	Objectives met sooner and exceeded after Oct 15
	Incubation and Winter Rearing	10 cfs	11 - 12 cfs	15 - 17 cfs	+ 5 cfs, Objective met
	Spring Rearing, Redistribution, Emigration	3/1 - 5/15 = 20 cfs; 5/16 - 5/23 = 12 cfs; 5/24 - 5/31 = 8 cfs; 6/1 - 6/10 = 4 cfs,	Mar-4.1 cfs Apr- 8.9 cfs May - 8.4 cfs June - 2.1 cfs	Mar-16.2 cfs Apr- 23.5 cfs May - 25.1 cfs June - 12.1 cfs	Flow volumes are much higher and better mimic natural flow patterns
	Summer Rearing	1 cfs	June = 2.1 cfs July= 0 cfs August= 0 cfs Sept = 0 cfs	June = 9.9 cfs July = 9.4 cfs August = 9.6 cfs Sept = 8.8 cfs	Base flows are and cold water habitat is increased
Lower Parks Creek	Adult Migration and Spawning	Oct 1 - 14 = 6.85 cfs; Oct 15 - 31 = 9.85 cfs; Nov = 17 cfs; Dec = 17 cfs	Oct - 1 cfs Nov - 11.4 cfs Dec - 18.1	Oct 1-14 = 9.69 cfs Oct 15-31 = 12.69 cfs Nov = 19.20 cfs Dec = 21.41 cfs	Flows are improved earlier and objectives are met.
	Incubation and Winter Rearing	13 cfs	Jan = 17.9 cfs Feb = 18.2 cfs	Jan = 16.4 cfs Feb = 17.7 cfs	Small decrease, objectives exceeded
	Spring Rearing, Redistribution, Emigration	March =25.85 cfs; April = 25.85 cfs; May 1-15 = 25.85 cfs; May 16-23 = 17.85 cfs; May 24-31 = 13.85 cfs; June 1 - 10 = 9.85 cfs; June 11 - 15 = 6.85 cfs	March = 5.1 cfs April = 9.9 cfs May = 9.4 cfs June = 3.1 cfs	March = 17.2 cfs April = 24.5 cfs May 1-15 = 26.1 cfs, May 16 - 23 = 26.1 cfs, May 24 - 31 = 26.1 cfs, June 1-10 = 13.1 cfs, June 11-15 = 13.1 cfs	Spring flows are substantially increased and objectives are exceeded
	Summer Rearing	6.85 cfs	1 cfs	9.8 - 10.6 cfs	Base flows are increased substantially and cold water refugia is increased

Table 12. Comparison between current instream flow conditions and instream flow conditions anticipated under the Shasta Safe Harbor Agreement's Flow Management Strategy in the Mid-Shasta River Reach.

Mid Shasta River	Adult Migration and Spawning	70 cfs	140 -170 cfs[1]	Oct = 65 - 78 cfs Nov = 79 - 89 cfs Dec = 86 - 96 cfs	Objectives generally met or exceeded
	Incubation and Winter Rearing	76 cfs to 95 cfs	257 cfs[2]	70 - 91 cfs	Objectives generally met or exceeded
	Spring Rearing, Redistribution, Emigration	112 cfs decreasing to 39 cfs by summer	89 cfs to 12 cfs	4/1-10 = 99 to 89 cfs 4/10-30 = 62 to 52 cfs 5/1-31 = 58 to 48 cfs 6/1-15 = 38 to 28 cfs	Flow are improved and better mimic snow melt hydrology
	Summer Rearing	28 cfs to 39 cfs	25 to 36 cfs less GID Diversion Rates	23 - 62 cfs	Flows are similar however, flows during the spring and fall transitions are improved to help juvenile emigration and adult immigration

1: Average monthly flow at USGS Yreka gage for water years 2000 to 2016 for October and November.

2: Average flow at the USGS Yreka gage for water years 2000 to 2016 for December and January, combined.

Citations

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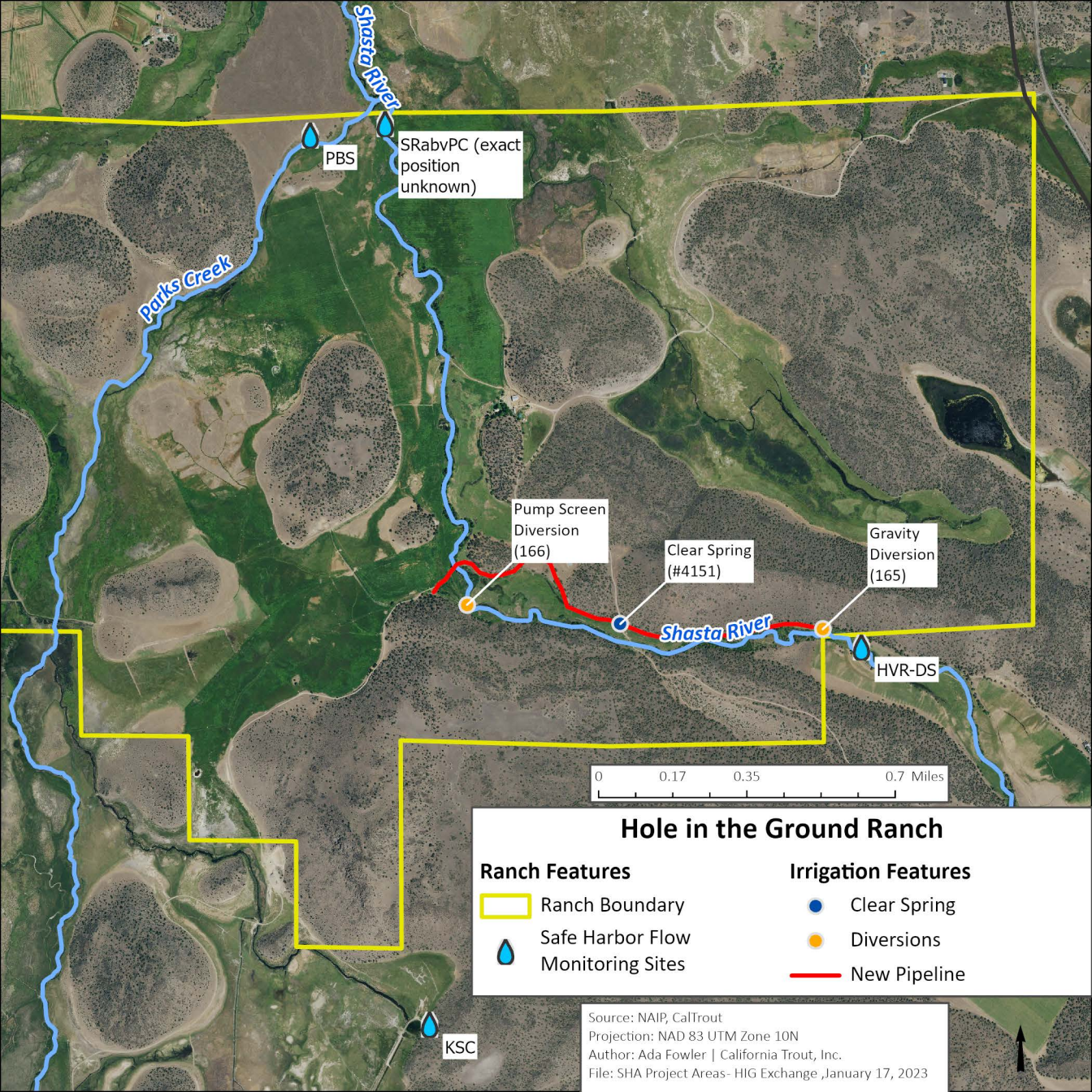
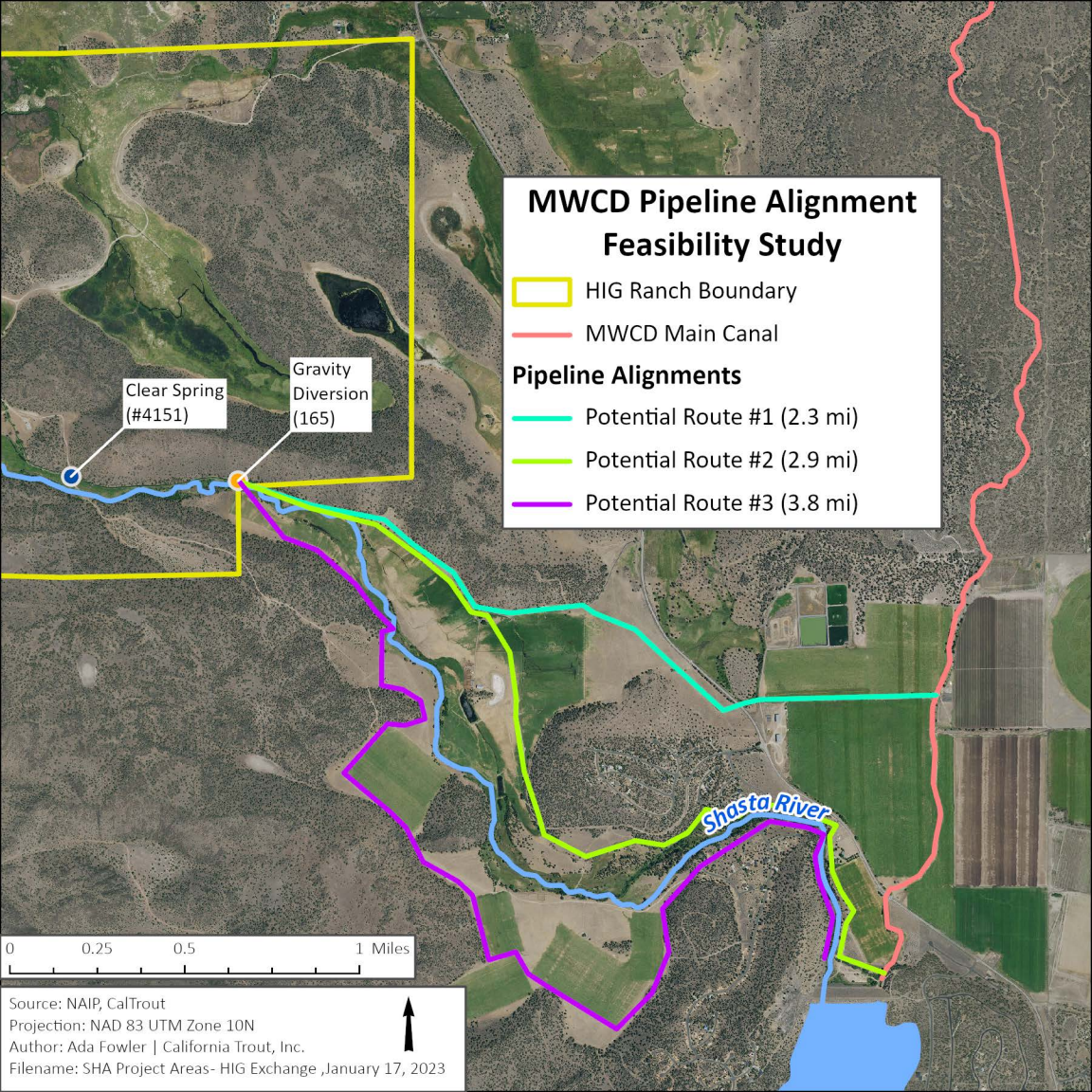

Shasta River
PBS
SRabvPC (exact position unknown)
Parks Creek
Pump Screen Diversion (166)
Clear Spring (#4151)
Gravity Diversion (165)
Shasta River
HVR-DS
KSC
0
0.17
0.35
0.7 Miles
Hole in the Ground Ranch
Ranch Features
Ranch Boundary
Safe Harbor Flow Monitoring Sites
Irrigation Features
Clear Spring
Diversions
New Pipeline
Source: NAIP, CalTrout
Projection: NAD 83 UTM Zone 10N
Author: Ada Fowler | California Trout, Inc.
File: SHA Project Areas- HIG Exchange ,January 17, 2023


MWCD Pipeline Alignment Feasibility Study
HIG Ranch Boundary
MWCD Main Canal
Pipeline Alignments
Potential Route #1 (2.3 mi)
Potential Route #2 (2.9 mi)
Potential Route #3 (3.8 mi)
Clear Spring (#4151)
Gravity Diversion (165)
Shasta River
0
0.25
0.5
1 Miles
Source: NAIP, CalTrout
Projection: NAD 83 UTM Zone 10N
Author: Ada Fowler | California Trout, Inc.
Filename: SHA Project Areas- HIG Exchange ,January 17, 2023

PROPERTY ACCESS AGREEMENT
FOR
Hole-in-the-Ground
Water Quality and Flow Enhancement Project

This Property Access Agreement ("Agreement") is made and entered into as of this Thirteenth day of May, 2025, ("Effective Date") by and between California Trout Inc. ("CalTrout"), a public entity, North Coast Regional Water Quality Control Board, ("NCRWQCB"), a public entity, and Emmerson Investments, Inc. c/o Len Lindstrand, Emmerson Representative for Hole-in-the-Ground Ranch ("Landowner") (individually, a "Party" and together, the "Parties").

RECITALS

A. CalTrout received grant funding through the California Department of Transportation ("Grant") to implement a diversion replacement, ditch piping, and water exchange project ("Project") that includes the installation of telemetered monitoring stations to help improve impaired water quality conditions;

B. CalTrout has selected, and NCRWQCB may select, qualified contractors ("Contractors") to be identified in writing to Landowner who may conduct activities on the Property; and

C. Landowner agrees to cooperate by allowing the NCRWQCB, CalTrout, and their respective Contractors reasonable access to Landowner's property as described herein.

TERMS AND CONDITIONS

This Agreement is made upon and subject to the following terms and conditions:

Section 1. The Property. Landowner is the owner of real property with Assessor Parcel Numbers 020-030-030, 020-030-040, 020-040-430, 020-030-110, 020-030-100, 020-030-080, 020-060-020 (the "Property"), with monitoring, access, and work locations designated on the map attached as Attachment "A" as such map may be modified in writing from time to time.

Section 2. Grant of Access. Landowner grants the NCRWQCB, CalTrout, and their respective contractors for a term of twenty-five (25) years from the Effective Date, vehicular and pedestrian access to, and across, the Property to the Project location, as further delineated on the map attached as Attachment "A". Property access shall be limited to times agreed upon by CalTrout or NCRWQCB and Landowner with twenty-four (24) hours advance notice to Landowner by CalTrout or NCRWQCB. Such notice shall be provided in email and by phone to the Landowner's designated party. In accessing the Property, CalTrout, NCRWQCB and their respective authorized Contractors shall follow reasonable safety and security requirements established by the Landowner prior to such access. Nothing in this Agreement is intended to limit the

lawful use of the Property by the Landowner.

Section 3. Limitations on Use. The Grant of Access set forth in Section 2 is for the purpose of conducting Project-related site visits, CEQA and environmental permit-related surveys, construction activities, required Project monitoring equipment installation and maintenance, and inspections. Access to the Project may take place by NCRWQCB, CalTrout, and their respective authorized Contractors to review the site, locations of Project improvements, equipment, and meetings regarding the Project and site as it relates to the Grant. The NCRWQCB, CalTrout, and its Contractors, shall exercise reasonable care in accessing the Property so as not to damage the Property.

Section 4. Email Notice Prior to Access. CalTrout, NCRWQCB, and the Contractors shall provide at twenty four (24) hours notice to Landowner prior to accessing the Property for the purposes described in the Agreement. This notice may be given by electronic mail and shall include the contact information for the NCRWQB employee, CalTrout employee or their respective Contractors that will be accessing the Property.

Section 5. Monitoring Equipment; Monitoring Techniques. During the Term of this Agreement, Project effectiveness and water exchange monitoring will be conducted by NCRWQB, CalTrout or their respective Contractors as described in Exhibit B. Monitoring equipment shall be placed on the Property at locations mutually agreed by the parties.

Section 6. No Recording. No party shall record this Agreement or cause the recording of this Agreement so as to create an encumbrance on the Property.

Section 7. Data Disclosure. Data collected from the Property is subject to requests for public disclosure under the California Public Records Act (the "Act" Gov. Code § 7920.000 et seq.). To the extent allowed by law, and consistent with the limitations of the Act and Water Code section 13752, CalTrout and NCRWQCB will maintain the confidentiality of Landowner's information in compliance with the Information Practices Act (Civ. Code § 1798 et seq.); however, such information is subject to disclosure as permitted by law, including through a public records request, or when requested by governmental agencies and required by state or federal law. In the event of any public disclosure of data obtained pursuant to the Project, CalTrout or NCRWQCB will provide reasonable notice to Landowner of a disclosure.

Section 8. Removal of Equipment. CalTrout shall remove monitoring equipment from the Property two (2) irrigation seasons after the monitoring equipment is first placed. This does not include removal of telemetered monitoring equipment intended to monitor effectiveness site(s) or cold water substitutions with MWCD.

Section 9. Hold Harmless. To the extent permitted by law, CalTrout and NCRWQCB shall hold harmless Landowner and its respective officers, agents, and employees, from any and all claims, liabilities, and losses, but only in proportion to and to the extent such liability, loss, expense, attorneys' fees or claims for injuries or damages arise from or are in connection with performance of this Agreement, unless such claims, liabilities or losses arise out of the negligence or willful misconduct of

Landowner. The NCWRQB shall not defend, indemnify or hold harmless any of CalTrout's officers, employees or agents.

Notwithstanding the above-limitations, with respect to the NCRWQCB, as a State agency, the NCRWQCB shall be liable only to the extent allowed by the California Claims Act, (Gov. Code sections 810 et seq.), for claims of personal injuries or property damage resulting solely from the negligent or wrongful act or omission of any employee while acting within the scope of their official duties in accordance with this Agreement.

To the extent permitted by law, Landowner shall hold harmless CalTrout, NCRWQCB its officers, agents, and employees, from any and all claims, liabilities, and losses, but only in proportion to and to the extent such liability, loss, expense, attorneys' fees, or claims for injuries or damages arise from or are in connection with performance of this Agreement, unless such claims, liabilities or losses arise out of the negligence or willful misconduct of CalTrout or NCRWQCB or Contractor.

Section 10. Termination. The term of this agreement shall be twenty-five (25) years from the Effective Date unless sooner terminated by any party. Any party may terminate this agreement at any time by providing thirty (30) days advance written notice to the other parties. Provided, however, in the event of early termination of this Agreement by Landowner, Landowner shall promptly repay to CalTrout the amount of the Grant funds that CalTrout has expended up to the point of termination. If monitoring equipment remains on the Property at the time a notice of termination is received, the parties shall reasonably schedule its removal by CalTrout. In the event of early termination of this Agreement by either CalTrout or NCRWQCB, Landowner shall be entitled to retain any improvements made pursuant to the Grant up to the point of termination by either CalTrout or NCRWQCB.

Section 11. **Regional Water Board Authorities.** This Agreement shall not be construed as limiting the regulatory authority of the Regional Water Board, including the Board's authority to access the property consistent with its regulatory authorities.

Section 12. Notices. Any notices required or permitted under this Agreement, unless otherwise noted, shall be in writing and shall be given to each Party at its physical address and at the email address as set forth below, or at such other addresses that a Party has most recently specified in written notice to the other Parties.

Notices to California Trout shall be sent to:
Damon Goodman
Shasta/Klamath Regional Manager
701 So. Mt Shasta Blvd., Ste. A
Mt Shasta, CA 96067
Tel: (707) 496-0529
Email: dgoodman@caltrout.org

Ada Fowler
Senior Project Manager
701 So. Mt Shasta Blvd., Ste. A
Mt Shasta, CA 96067
Tel: (530) 905-3345
Email: afowler@caltrout.org

Notices to the NCRWQCB shall be sent to:
Valerie Quinto Executive Officer
5550 Skylane Blvd., Ste. A
Santa Rosa, CA 95403
Tel: (707) 543-7147

Notices to Landowner shall be sent to:
Emmerson Investment, Inc
c/o Len Lindstrand III
19794 Riverside Avenue
Anderson, CA 96007
llindstrand@spi-ind.com
Phone: (530) 378-8117

with a copy to

General Counsel
Emmerson Investment, Inc.
19794 Riverside Avenue
Anderson, CA 96007

Section 13. Operations and Maintenance. The Landowner shall operate and maintain the facilities and structures constructed or improved during the term of this Agreement as outlined in Attachment C, including the telemetered monitoring sites, consistent with the purposes for which this Agreement was made. The Landowner assumes all operations and maintenance costs of the facilities and structures that are utilized for their ranch operations. For this Agreement, operation and maintenance costs include, but are not limited to material and labor needed for operation, utilities, insurance, repairs and replacements of a recurring nature necessary to prolong the life of, replace, or reconstruct capital assets and basic structures.

Section 14. Transfer of Ownership. In the event of a sale of the Property to a third party, the Parties agree to work collaboratively together to transfer this Agreement and the remaining obligations to the purchaser, including the monitoring, maintenance, and access obligations outlined in Attachment C.

Section 15. Entire Agreement. This is the entire agreement between the Parties and supersedes and prior agreement regarding access to the Property, whether or oral or in writing.

Section 16. Amendment. Any amendment to this Agreement shall be in

writing and signed by all Parties.

Section 17. Disputes. The Parties shall make a good faith effort to settle any dispute or claim arising under this Agreement. If any Party determines that the dispute cannot be informally resolved, either Party may submit to the other party in writing a description of the dispute and desired outcome. Party representatives shall meet and attempt to seek a mutually agreeable resolution within 30 days of the written notice above. Pending the final resolution of any dispute arising under this Agreement, the Parties agree to diligently proceed with the performance of this Agreement. If both Parties cannot agree upon a resolution after following the processes described in this Agreement, both Parties retain the right to bring a lawsuit or seek any other legal or equitable remedy either Party may have. This dispute resolution process does not preclude any party from exercising its right to terminate this Agreement pursuant to Section 10.

Executed in Siskiyou County, California, on the date and year first written above.

California Trout, Inc.

By: _____ Date: 05/13/25
Damon Goodman, Regional Director

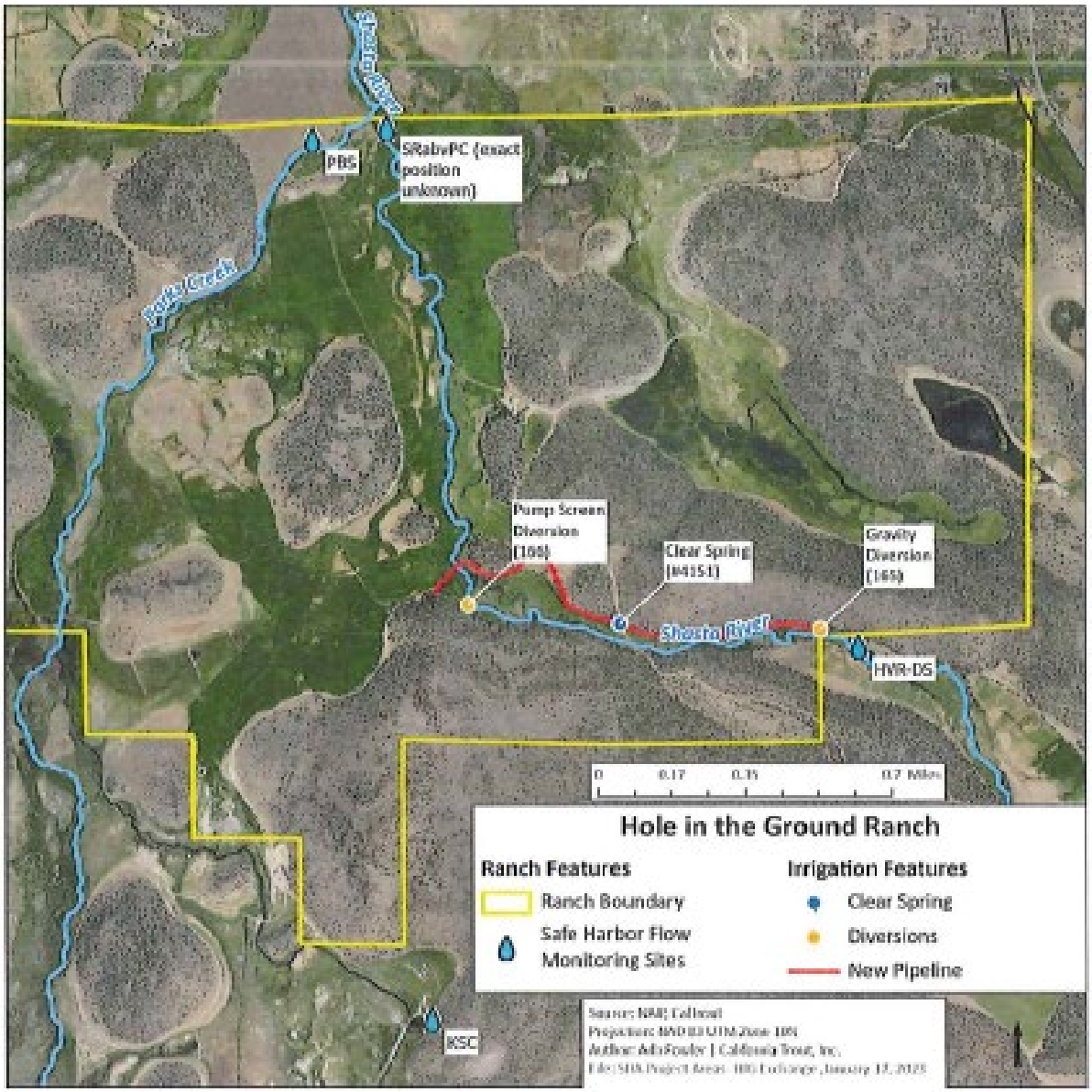
North Coast Regional Water Quality Control Board

By: _____ Date: 05/12/25
Valerie Quinto, Executive Director

Landowner

By: _____ Date: 5/19/25
A.A. ("Red") Emmerson, Emmerson Investments, Inc.

Attachment A



Attachment B

Monitoring Station	Sensors	Telemetered	Type of Requirement	Duration 1 = *Life of Grant* Pre- and 2 Years Post-Project Implementation	Duration 2 = *Life of Project*	Notes
SHA Effectiveness Monitoring Station at upstream fence line (HVR-DS)	Air & water temperature, stage	Yes	Air & water temperature and stage are SHA requirements	Yes	Yes	Add pH, DO for the life of the contract
POD 165 (Gravity Diversion)	Flow	If technically feasible	Project requirement	Yes	Yes	
Clear Springs	Flow	If technically feasible	Diversion license requirement; required for MWCD exchange, if approved	Yes	Yes	A condition of exchange, if approved.
Shasta River Below Clear Springs	DO, pH, Water temperature	If technically feasible	Project requirement	Yes	No	
POD 166 (Pump Diversion)	Flow	If technically feasible	Diversion license requirement	Yes	Yes	
SHA Effectiveness Monitoring Station near downstream property boundary (SRabvPC)	Water temperature, stage, flow	Yes	SHA requirement	Yes	Yes	Add pH, DO for the life of the contract
S-10 temperature loggers	Water temperature	No	Project requirement	Yes	No	

Attachment C

Hole-in-the Ground Ranch Water Quality and Flow Enhancement Project
Draft Operations and Monitoring Plan:

Introduction: The objectives of this Operations and Monitoring Plan (Plan) is to define the intended function and operations (including methods to verify compliance) of the Hole-in-the-Ground Water Quality and Flow Enhancement Project (project). The project is currently funded by CalTrans and NRCS, with CalTrout serving as the entity implementing the project with funding it has secured. The Hole-in-the-Ground (HIG) Ranch property is owned by Emmerson Investments Incorporated. The funding provided by CalTrans is directed by State Water Resources Control Board. The project intent is to provide the infrastructure to operate the Hole-in-the-Ground Gravity (165) and Pump Screen (166) diversions and ranching operations in a manner that meets Safe Harbor and TMDL objectives. There are several habitat enhancement benefits provided by the project as further described below. This Plan also defines the monitoring used to verify project benefits, project and compliance measures, and/or management triggers that affirm the project is managed and operated as intended for 25 years, the expected life of the project, and for the foreseeable future as the integrity of the project infrastructure allows.

This Plan provides guidance for project compliance that recognizes and provides for adaptive management and operations refinement based on achieving the maximum conservation benefit for the resource while meeting the irrigation watering needs of the HIG Ranch. This Plan clarifies the project objectives, responsibilities, and methods to verify the project is being managed properly based on continuous monitoring. The project success depends on how the project components are managed through proper operations. To meet project objectives, the project must provide clear triggers to inform the HIG Ranch when management changes are required. This Plan is expected to be iterative based on the results of project implementation and initial results that occur based on project operation.

Project Objectives: Currently, the HIG Ranch has two active points of diversion from the Shasta River: the Hole-in-the-Ground Gravity (165) and Pump Screen (166) diversions. Clear Springs is a critical cold water spring source located between the two diversion points that flows into the Shasta River. Summer water temperatures in the Shasta River entering the project reach are typically warm and dilute the cold water contribution of Clear Springs, limiting its potential to contribute to cooler stream temperatures. The HIG Ranch has a water right on Clear Springs and currently uses the spring water by diverting it at it's the Pump Screen Diversion (Diversion #166). A major project objective is to expand the capacity of the Gravity Diversion (#165), located above Clear Springs, and use it as the primary source of diversion when water temperatures at the upper property boundary exceed 16° C. This will allow diversion of up to 8.0 cfs of warmer stream flow and further allow Clear Springs contributions, which range between 1.5 - 6.5 cfs on average, to provide an increased proportion of flow and expand the cold water habitat during the summer months.

A second component of the project is to increase irrigation delivery efficiency of the upper diversion ditch by installing buried PVC pipe as a substitute for existing earthen canal. Based on two seepage loss tests an estimated 0.2-0.7 cfs will be conserved by the piping component of the project and provide for instream benefit from Clear Springs when diversion occurs from the Gravity Diversion. The proposed pipeline at the upper ditch will be

able to serve the acreage currently irrigated by the Gravity and Pump Screen diversions.

The project infrastructure will provide a third conservation opportunity where Montague Water Conservation District (MWCD) will provide instream dedication of flow up to 1.5 cfs intended to be utilized for irrigation by the HIG Ranch so if the Ranch releases an equal value up to 1.5 cfs from Clear Spring, as verified by real time data, if technically feasible. This project component facilitates such a transaction, but the terms of the transaction are dependent on SWRCB approval, continuance of Safe Harbor Agreement, and results of effectiveness monitoring.

Several additional project components include an assessment to bring the Pump Screen Diversion (#166) into compliance with updated fish screen criteria. During the spring when water temperatures are not a concern, using the diversion #166 benefits the project stream reach by providing more flow in the stream longer. Further, a stream flow gage will be installed below the Pump Screen Diversion including a roughened channel to verify flow is by-passed to the Shasta River due to the project and the if an exchange is occurring. The site is also an SHA effectiveness station.

Post Construction Monitoring is required for the life of the project (25 years). These sites are termed Life of Project monitoring sites. Real-time (telemetered) monitoring sites will be used to capture instream flow and water temperature conditions, which drive management changes. The monitoring responsibility and costs ultimately fall on the HIG Ranch. CalTrout and NCRWQCB commit to actively seek funding to support the Life of the Project monitoring effort. Monitoring results may find that the adaptive management could be met by implementing diversion changes based on the calendar dates if real time data becomes problematic. In that event, a third party, such as the Watermaster or MWCD would verify management changes comply with the amended Plan.

Operations - Project components and project management
As described previously, the HIG Ranch has two active diversion points from the Shasta River. Both points of diversion (POD) will remain due to the project. However, the Gravity Diversion POD will be modified to allow for typical full diversion at that point of diversion when that management action is achievable. The volume of water diverted at the upper diversion and left in stream passed the upper diversion is undetermined at this time. Monitoring and trials will determine the best management related to the resource and ranch operation.

Use of both diversion points: Irrigation typically begins on the HIG Ranch on April 1st. Depending on need, one or both diversions from the Shasta River are opened and the appropriate amount of water is diverted per the water right(s). Assuming water temperatures in early-April are under 16°C at the Upper HIG Ranch property line, the ranch may divert from both POD's according to their adjudicated rights. When water temperatures in the Shasta River are under 16°C in the spring, the resource benefits from the Pump Screen Diversion being in operation as the stream reach between the two POD's receives more flow. Diversion volume data will be collected at both POD's to capture diversion throughout the irrigation season (based on initial monitoring at nearby stations no management changes would likely need to be required until early-May).

Trigger to shift to upper Diversion Point (#165):
The proposed management changes resulting from the project are based on real time water quality data collected at the HIG Ranch's Upper boundary. As spring progresses, water temperatures at the HIG Ranch upper boundary will begin to approach 16°C as an

instantaneous daily maximum. As this condition approaches, HIG Ranch will cease or reduce diversion at the Pump Screen Diversion, depending on the flow volume of Clear Springs and if an exchange with MWCD is enacted. For the remainder of irrigation season, the Gravity Diversion will be the primary diversion point of Shasta River water. If maintaining a real time station proves infeasible, conservative calendar dates could be selected as the management trigger. Diversion Monitoring data would be collected, but not in real time if data telemetry service issues exist.

Flow measurement site below Gravity POD (#165): If the volume of water conserved and/or exchanged, and therefore bypassed at Clear Springs, cannot be measured at Clear Springs, a flow measuring site will be required below the Gravity POD to measure the volume of water in the Shasta River. The volume of water conserved through piping and/or exchange will be provided by Clear Springs and bypassed beyond the lower diversion (#166) for instream benefit. The difference in gained flow would be measured at the proposed effectiveness site located below the pumped diversion (#166).

Flow measurement site below Pumped Diversion (#166): The project will install a short, roughened channel in the Shasta River below the Pump Screen Diversion if a sufficient existing flow measurement site does not exist. The roughened channel will function as a verification site for the project as well as an effectiveness station for the SHA. Related to the project, flow and water temperature will be collected at the site. This site will be used to verify water conserved by improving the Gravity Diversion is bypassed from Clear Springs below all project-related diversion points. The site can also verify that a cold water exchange is occurring with MWCD up to 1.5 cfs and whether additional water conservation commitments made upstream of HIG Ranch are being met (note: Clear Springs is measured independently and may be a better site to verify flows conserved as a result of the project are being bypassed; currently, measurement of Clear Springs requires manual measurement above and below the spring).

Life of Project Monitoring: After the grant contract is closed, the agreement requires continued monitoring for the life of the project. The following sites are required to verify proper Project operation. Monitoring devices routinely fail, as do real time services. The HIG Ranch will work with signatories to notify of such interruptions and failures. All parties must recognize data gaps may occur due to system failure. If monitoring problems are chronic, signatories will meet and develop alternative approaches. Agency staff from NOAA, CDFW, and NCRWQCB will be provided password protected real-time data. This real-time data is available for agency review; however, data summaries or reports outside agency review will require EII concurrence. The HIG Ranch will provide an annual data summary that verifies the Ranch used the infrastructure to benefit the resource as intended. This annual summary will be available for public review and can be used to justify the project is properly operated and maintained.

While project signatories commit to seek continued monitoring and funding assistance, the monitoring used to properly operate the Project and verify Project commitments is ultimately the responsibility of the HIG Ranch to maintain for the life of the project. Collected data will be reviewed annually and submitted to NOAA, CDFW, and NCRWQCB where it will be accessible to the public. The following monitoring sites are required to be maintained for the life of the project:

1.) HIG Ranch upstream boundary: Data collected at this location will include water

temperature. A telemetered real-time data station will be established as a result of the project. Water temperature above 16°C is the current trigger to divert primarily from the HIG upper diversion. If the telemetered real time station is problematic, parties could use a conservative calendar date based on pre- and post-construction monitoring data collected during the duration of the project. Any shift away from real-time telemetered data must be discussed with all agency partners prior to implementing this approach.

2.) Verification site below the Gravity Pump Diversion: Data collected at this location will include flow derived from a constructed rating curve. This is also an SHA Effectiveness monitoring site and should be part of the SHA monitoring responsibility. A real-time data station will be established due to the project. If the real time station is problematic, measurement of by-pass at Clear Springs may be an alternative to verify the volume of water conserved at the POD is by-passed.

(Not included here but included in table above as life of project monitoring – both PODs and Clear Spring – these should be included as Life of Project monitoring locations).

HIG management responsibilities: The HIG Ranch management responsibilities include assuring the project is operated correctly for the benefit of the resource and irrigated property and verify the conservation commitments are being upheld through monitoring. HIG Ranch responsibilities also include maintaining proper maintenance and repair of the infrastructure including fish screens to ensure fish passage and provide proper by-pass in accordance with the project terms and conservation commitments. In the event the project infrastructure is abandoned, neglected, intentionally damaged or repeatedly not managed properly in a manner that results in resource impacts, HIG Ranch could be held responsible to reimburse CalTrout for the cost of the project or a proportional value. In the event any of the above events are reportedly occurring, signatories agree to meet and confer to resolve prior to initiating a reimbursement process. The following are actions that would be considered improper and initiate the need to meet and confer:

- Repeated willful failure to maintain the project.
- Repeated willful failure to properly use the infrastructure to benefit resource.
- Intentional damage or removal of the project or components of the project without agency notice and approval.
- Repeated willful diversion significantly above legal volume to divert.
- Willful failure to verify compliance with project intent through lack of monitoring.

Five Counties Salmonid Conservation Program
@ Northwest CA Resource Conservation & Development Council

Project Title: Little Grass Valley Creek Fisheries Restoration and Sediment Reduction Project

Applicant: Northwest CA Resource Conservation & Development Council
Mark Lancaster
PO Box 2183
Weaverville, CA 96093
(530) 623-0671
mlancaster@5counties.org

Project Watershed: Little Grass Valley Creek, tributary to Grass Valley Creek, tributary to Trinity River. Project Watershed HUC:

Target Pollutant: Sediment

Project Start and End:
Phase 1- June 2024- June 2026
Phase 2- June 2026- September 2027

Detailed Project Description:

Problem Statement: A 8' diameter x 106' long CMP culvert crossing of Little Grass Valley Creek collapsed in February 2024 resulting in ~1,200 yd3 of decomposed granite soils being displaced and ~3500yd3 of fill over the crossing poised to deliver to the creek in the winter of 2024-25. The culvert, which had a 6' jump at the outlet, was a complete migration barrier to anadromous salmonids for at least 40 years. The collapse was apparently due to undermining of the culvert foundation soil (DG) and progressive, unconstrained displacement of the adjacent embankment fill in the downstream direction. The original, pre-failure elevation of the embankment was approximately 25' above the creek stage .

The structure including the embankment fill, which became the new main roadway, was installed in 1960 by CA Division of Highways in cooperation with the landowners (IOOF). The embankment fill served as a use for approximately 5,000's yd3 of excavation spoils (excess soil), which was composed of decomposed granite (DG) soils. An additional spoils area for highway operations was developed on the property as well.

Spoils storage needs were the result of highway maintenance and expansion work between 1970-2010. Any restoration project must be designed for the extent of fill placed at the site.

The failed crossing impacted 45 structures/residents on the opposite side of the creek creating an Emergency under Public Resources Code § 21080 et seq. and CEQA Guidelines §§ 15269, 15300.2(d), and 15301(d).

A Phase 1 stabilization of the site was completed in October-November of 2024 with the removal and storage of ~3800 yd3 of DG outside of the floodplain and restoration of a stable channel bottom that allows flows and fish migration[1]. Additional Phase 1 work including submitting additional grant funding proposals, designing a crossing structure, and environmental analysis review were completed. It should be noted that the completed design was not acceptable to agencies, because of concern with the use of welded wire walls within the crossing (but not within the wetted surface). The Council chose to re-evaluate the project rather than challenge the recommendation.

Proposed Action: Under the Emergency a two-phase approach was developed to address the situation. Phase I was to: stabilize the site; prevent additional sedimentation into Little Grass Valley Creek; restore fish passage; prevent channel incision after removing the failed crossing; prevent upstream channel incision and excessive channel erosion; design, permit and fund a long-term solution.

This funding will allow for a shift to a more complex and costly structure, but which will meet all goals and objectives of the multiple agencies that serve as, or influence, permitting authorities.

Phase 2 is to fund and construct a long-term crossing that would meet multiple objectives including being timely, economical, safe for the community served, and allow for fish passage. Partial funding for Phase 2 was secured, but the level of funding limited the ability to meet all objectives for the options preferred by authorities having jurisdiction. In the meantime, the Emergency situation for the residents remains until Phase 2 is completed.

Additional funding under this grant source will allow expansion of Phase 2 designs, resulting in significant design modification to the current Phase 2 plans. Implementation of this proposal would meet all objectives as well as additional opportunities not previously considered. For example, a bridge would allow terrestrial as well as aquatic species passage. The pre-existing fill was a barrier to all terrestrial migration, forcing animals up towards Highway 299 or around on the opposite banks.

[1] Salmonid migration into the project area may not be occurring due to downstream temporary barriers associated with previous restoration efforts including sediment basins. Maintenance of downstream restoration sites would re-establish migration into the upper watershed. Resident trout are known to occur in the project watershed.

Phase 2[2]- Under this grant Phase 2 will be modified to design, re-evaluate environmental effects, permit and install Options 1 or 2 based on funding levels to meet goals:

1) Option 1- 20' wide x 150' long pre-manufactured bridge capable of spanning the project reach
2) Option 2- Installation of an ~24' wide x ~16' tall x 50' long prefabricated bottomless concrete arch culvert set at 5% with headwalls and wingwalls

All options incorporate large wood habitat elements downstream of the channel, maintenance of existing grade structures and streambed materials that were installed in Phase 1 to maintain channel gradient and stability. Channel de-watering, fish relocation, erosion control, revegetation and post construction spoils management designs are similar for all structural options.

The Phase 2 Goals:

1) Restore safe access into and egress from the community from HWY 299W, and permit immediate access for first responders
2) Complete Construction by October 15, 2026
3) Complete Project Economically and Within Budget
4) Meet Road Standards set forth in Specific Unit Development (SUD) Plan
5) Replace Failed Crossing with A Properly Sized Crossing Capable of Conveying AEP 1% Flows and Bedload and Debris, While Providing Fish Passage for All Life Stages
6) Prevent Sediment Delivery to Little Grass Valley Creek
7) Enhance Instream Habitat Within the Project Reach

Phase 2 Objectives and Timelines:

1) Complete Design- March 2026*
2) Complete Environmental Review Update As Needed- March 2026*
3) Complete Permitting- May 2026*
4) Bid & Award Construction Contract- June 2026*
5) Order Structure- July 2026
6) Construct Structure & Habitat Elements- October 15, 2026
7) Complete Erosion Control of Project Area- November 15, 2026
8) Complete Conifer-Hardwood Seedling Revegetation of Project Area- April, 2027
9) Complete First Year Monitoring Report- September 2027
10) Administer Grant and Contracts- June 2028
11) Final Report and Closeout- June 2028

[2] The current Phase 2 design is a 14' diameter x 50' long embedded CMP culvert set at 5% with headwall and wingwallls, but it is the least desired option if funding and logistics allow for other options.

Detailed Scope of Work

1.0 Planning & Design[3]-

1. Utilize NOAA Fisheries *NOAA Fisheries Guidelines for Salmonid Passage at Stream Crossings in California* (NOAA, 2023) for fish passage design flows and crossing design selection.
   1.1. Evaluate Options 1,2 & 3 based on fish passage criteria (Refer to Section 2.0 (NOAA, 2023).
   1.2. If funding is sufficient implement options in order of preference
      1.2.1. Bridge
      1.2.2. Bottomless Arch
      1.2.3. Embedded CMP Culvert
2. Select wall and height if Option 2
3. Work with design team, including agencies participation, to rapidly select design option based on Project Goals and Objectives
4. Size and design crossing using either "Active Channel Design Method" or "Stream Simulation Design Method" consistent with Flood Capacity. Refer to 3.0-3.5 of NOAA, 2023
5. Utilize Geotechnical Engineering consultants as necessary to assess and design foundation/abutment requirements for bridge and bottomless arch structure, if either option is selected
6. Utilize pre-approved, stamped engineered structural designs for bridge or bottomless arch structure, if either option is selected
7. Design road elements (surfacing, guard rail, signage, etc) based on selected design criteria and Trinity County Road Standards and SUD Guidelines

2.0 Environmental Clearance

1. Most Environmental analysis work has been completed including:
   1.1. Botanical & wildlife surveys were completed in June-July 2024
   1.2. Cultural Section 106 compliance was completed in August 2024 by Spencer Lodge, Zone Archaeologist – Klamath Basin USFWS and included Tribal consultation and SHPO Programmatic Consultation
   1.3. A draft Initial Study was completed in September 2024, and it was determined the project was Categorically Exempt, but the determination was not submitted to OPR as the project is exempt from CEQA (CEQA Guidelines §§ 15269).
   1.4. USFWS initiated NEPA compliance under USFWS Categorical Exemption for Fisheries Restoration Program
   1.5. USFWS and USBoR completed Federal ESA Incidental Take coverage consultation with NOAA/NMFS using separate pathways
2. Remaining Environmental Tasks:
   2.1. Update Initial Study as necessary
   2.2. CESA & ESA consultation as necessary

[3] Existing precipitation and flow analysis has been completed and a localized discharge curve completed for Phase 2 design.

3.0 Permitting

1. Completed Permitting:
   1.1. CDFW 1610 Notification, September 2024
   1.2. Trinity County Decomposed Granite Grading Permit #01-24, September 2024
   1.3. Trinity County Specific Unit Development design standards incorporated into design criteria
   1.4. Regional General Permit 5 notification, September 2024
   1.5. NQRWCB SHRP determined incomplete, August 2025

2. Permitting To Be Completed:
   2.1. RWQB SHRP and/or CDFW HREA
   2.2. USACoE Nation-Wide 27
   2.3. TCDOT Revise Grading Permit, as necessary

4.0 Pre-Construction Tasks

1. Order Native Conifer-Hardwood Seedling for Reforestation
2. Survey, Layout and Stake
3. Bid & Award Contracts
   3.1. Formal Bid Construction
   3.2. Award Contracts
4. Order Structure and Materials and Supplies
5. Survey, Layout and Stake
6. Bid & Award Contracts
7. Landowner Notifications
8. Fish Exclusion/Fish Relocation
9. De-Water System Installation

5.0 Construction/Implementation

1. Construction Contractor
   1.1. Mobilization In
   1.2. De-Water Construction Site
   1.3. Site Excavation/Grading
   1.4. Foundation/Footing/Abutment
   1.5. Right Bank Stabilization
   1.6. Structure Placement
   1.7. Embed Stream Mix, if applicable
   1.8. Install Large Wood Habitat Elements in Channel and Banks
   1.9. Structural/Backfill
   1.10. Surface and Spoils Drainage Management
   1.11. Road Subsurface/Surfacing
   1.12. Guard Rail
   1.13. Signage
   1.14. Recycle Old Culvert
   1.15. Mobilization Out

2. Other Contractors (maybe separate from Construction Contractor)[4] or may be Grantee
    2.1. Fish Relocation, as needed
    2.2. Construction Inspection/Materials Testing
    2.3. Streambed Jetting and Water Management, if applicable
    2.4. Erosion Control
    2.5. Revegetation

6.0 Post Construction
1. Winter Monitoring
2. As Built Plans

7.0 Project Management
1. Landowner, Partner Coordination
2. Conduct Site Visits
3. Pre, during and post photo monitoring
4. Prepare formal and/or informal bid notices
5. Order materials
6. Manage multiple grants
7. Construction Inspection
8. Invoicing
9. Progress reports
10. Final report and Close out Site visit

[4] May include 5C Grantee which has expert experience in some aspects of project including streambed placement, reforestation, fire protection, & erosion control0

Detailed Project Budget

	Option 1
	Bridge
Total Personnel Services	$ 80,448
Operating	
Travel	$ 2,142
Equipment Rental	$ 6,750
Supplies/Materials	$ 918,929
Contractual/Construction	$ 270,171
Env & Regulatory Compliance Costs	$ 8,500
Subtotal Operating	$ 1,206,492
Subtotal	**$ 1,286,940**
Grantee Admin: 15%	$ 157,515
Total	$ 1,444,456
Other Grant & In Kind Sources	$ 408,545
Grant Request Total	**$ 1,035,911**

	Director/ Manager/ Forester	Engineer	Project Coordinator	Natural Resources Technician	Biologist/ Botanist	Office Manager	Book Keeper	TOTAL
Planning & Design	52	160	18					230
Environmental Clearance Update	16	8	17	16	16			73
Permitting	9	8	16				8	41
Pre-Construction Tasks	32	16	66	54		16		184
Construction/Implementation	64	200	80					344
Post Construction	32	40	80.5					152.5
Project Management	40	24	32			24	96	216
TOTAL HOURS	**245**	**456**	**310**	**70**	**16**	**40**	**104**	1240.5
Personnel Rate	$ 42.00	$ 62.50	$ 32.50	$ 27.50	$ 39.00	$ 31.00	$ 31.00	265.5
Personnel Benefit Rate	58%	31%	61%	31%	31%	64%	64%	44%
Total Personnel	$ 10,290	$ 28,500	$ 10,059	$ 1,925	$ 624	$ 1,240	$ 3,224	$ 55,862
Total Benefit	$ 5,968	$ 8,835	$ 6,136	$ 597	$ 193	$ 794	$ 2,063	$ 24,586
Total Personnel Services	**$ 16,258**	**$ 37,335**	**$ 16,195**	**$ 2,522**	**$ 817**	**$ 2,034**	**$ 5,287**	**$ 80,448**

Scope of Work Schedule (Gantt chart)

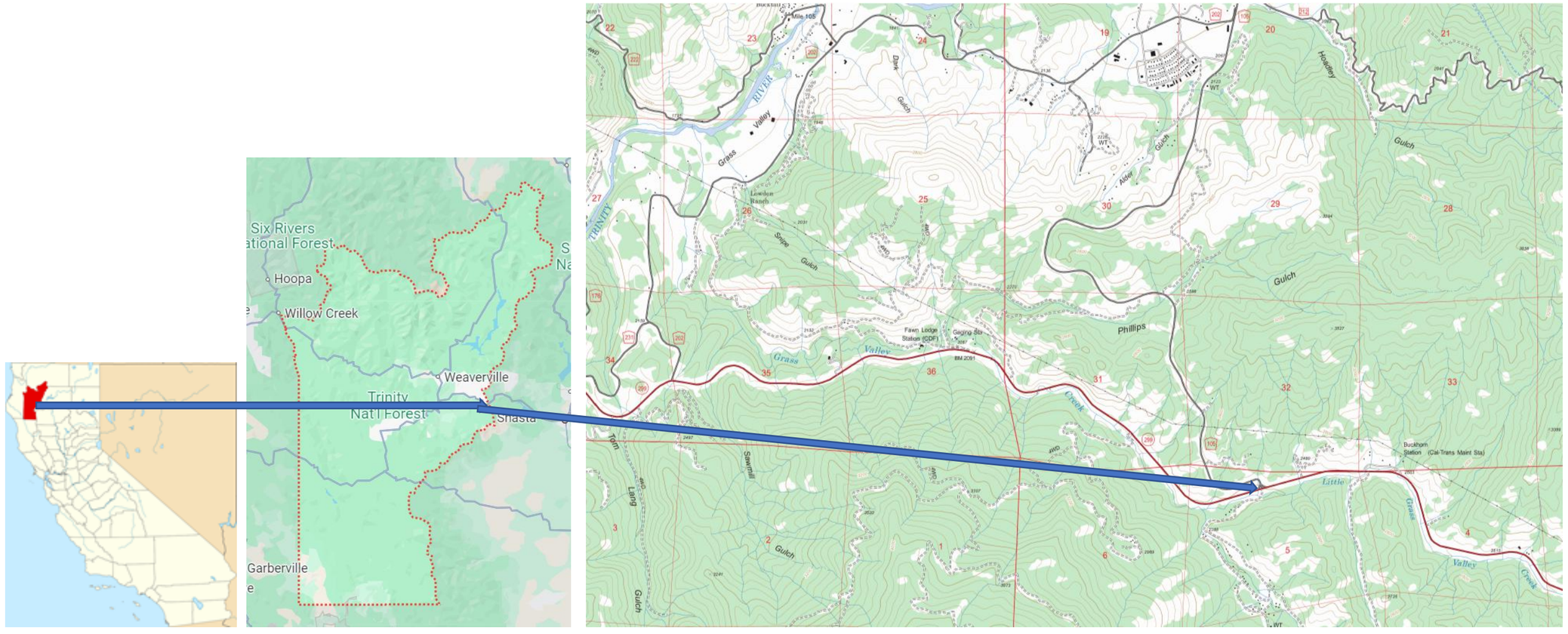
	25-Nov	25-Dec	26-Jan	26-Feb	26-Mar	26-Apr	26-May	26-Jun	26-Jul	26-Aug	26-Sep
Task 1.0 Complete Design											
Task 2.0 Complete Environmental Review Update As Needed											
Task 3.0 Complete Permitting											
Task 4. Bid and Award Construction Contract											
CalTrans Grant Notice To Proceed											
Task 4.4 Order Structure											
Task 5 Construct Structure & Habitat Elements											
Task 5.2.2.4 Complete Erosion Control of Project Area											
Task 5.2.2.5Complete Conifer-Hardwood Seedling Revegetation of Project Area											
Task 6.1 Complete First Year Monitoring Report											
Task 7 Administer Grant and Contracts											
Task 7.10 Final Report and Closeout											

	26-Dec	27-Jan	27-Feb	27-Mar	27-Apr	27-May	27-Jun	27-Jul	27-Sep	27-Oct
Task 1.0 Complete Design										
Task 2.0 Complete Environmental Review Update As Needed										
Task 3.0 Complete Permitting										
Task 4. Bid and Award Construction Contract										
CalTrans Grant Notice To Proceed										
Task 4.4 Order Structure										
Task 5 Construct Structure & Habitat Elements										
Task 5.2.2.4 Complete Erosion Control of Project Area										
Task 5.2.2.5Complete Conifer-Hardwood Seedling Revegetation of Project Area										
Task 6.1 Complete First Year Monitoring Report										
Task 7 Administer Grant and Contracts										
Task 7.10 Final Report and Closeout										

Project Maps

LITTLE GRASS VALLEY CREEK

Redding Lodge #271 IOOF Camp Emergency Road Repair and Stream Restoration Project



NWCA RC&D COUNCIL & REDDING LODGE #271 IOOF CAMP

91 IOOF CAMP ROAD

Section 5, T32N, R8W, MB&BM (*40.66298, -122.79721*)

LEWISTON, TRINITY COUNTY CALIFORNIA

Project Title: Pecwan Creek Sediment Reduction and Road Improvement Project

Applicant: Yurok Tribe Watershed Restoration and Roads Department

Project Watershed: West Fork and East Fork Pecwan Creek

Target Pollutant: Temprature will be the target pollutant for the Pecwan Road Improvement Project

Project Start and End: Starting July 15, 2026 and ending November 15, 2028

Project Description: The Yurok Tribe will conduct several high priority road and associated stream crossing improvements within the Pecwan Creek Watershed (Watershed) to protect and enhance water quality, increase watershed resiliency to climate change and community safety (i.e., improve a primary flood and fire evacuation route, and ability to manage wildfires), and help ensure effective Tribal management of vitally important water, wildlife, and forest resources in the Watershed and adjacent watersheds. Major components include drainage improvements, where possible removing the inboard ditches, reducing the debris torrent, and flows contributing sediment and implementing erosion control measures along approximately 5 miles of forest roads and replacing/improving approximately 15 water crossings for 100-year flow events. The project will benefit the watershed by reducing the amount of concentrated runoff and inboard ditch facilitating quick drainage of the water from the landscape. Eliminating inboard ditch and concentrated road runoff will benefit stream temperatures by slowing the transport of water off the landscape. This will help facilitate more water being able to penetrate the aquifer and groundwater table that is colder than surface water and dispersed during the warm summer months. Wider, shallower channels are more susceptible to solar radiation and heat exchange with the atmosphere, leading to increased water temperatures. Proper drainage helps to disperse and slow down runoff, minimizing erosion and maintaining the stream's natural morphology. This will help improve watershed hydrology and benefit a primary cold water refugia stream the salmon depend on in the lower reaches of the Klamath River.

Detailed Scope of work: Construction activities are outlined below.

Permitting: Complete environmental review pursuant to CEQA. Prepare all necessary environmental documentation.

Prepare letter stating no legal challenges (or addressing legal challenges).

Mobilization and Site Preparation: Assure project compliance has been met; initiate project site preparation; order project equipment and supplies; and conduct pre-project site photo-monitoring.

Install, Construct, and Excavate: Replace culverts and upgrade them to accommodate 100-year storm events; grade and recontour approximately 5 miles of road to reduce storm surface erosion and sediment transportation to stream crossings from the inboard ditches;

recontouring will be implemented according to the prescriptions in the Handbook for Forest, Ranch, and Rural Roads handbook

Close Out, Inspection, and Demobilization: Inspect project components and establish that work is complete; verify project components have been installed and functioning as specified during construction inspection and project closeout; conduct post-project photo-monitoring; prepare record drawings; ensure post-project erosion BMPs have been completed; demobilize equipment; and weatherize construction sites.

OutComes: Approximately 15 culverts installed to meet the 100-year storm event criteria; 5 miles of road graded and reshaped to reduce concentrated runoff; inboard ditches disconnected from stream crossings; and the prevention of fine sediment transport from road surface erosion. Additionally, if there are any funds left over, grading and recontouring will continue, on the p10 road in Pecwan until funds are exhausted.

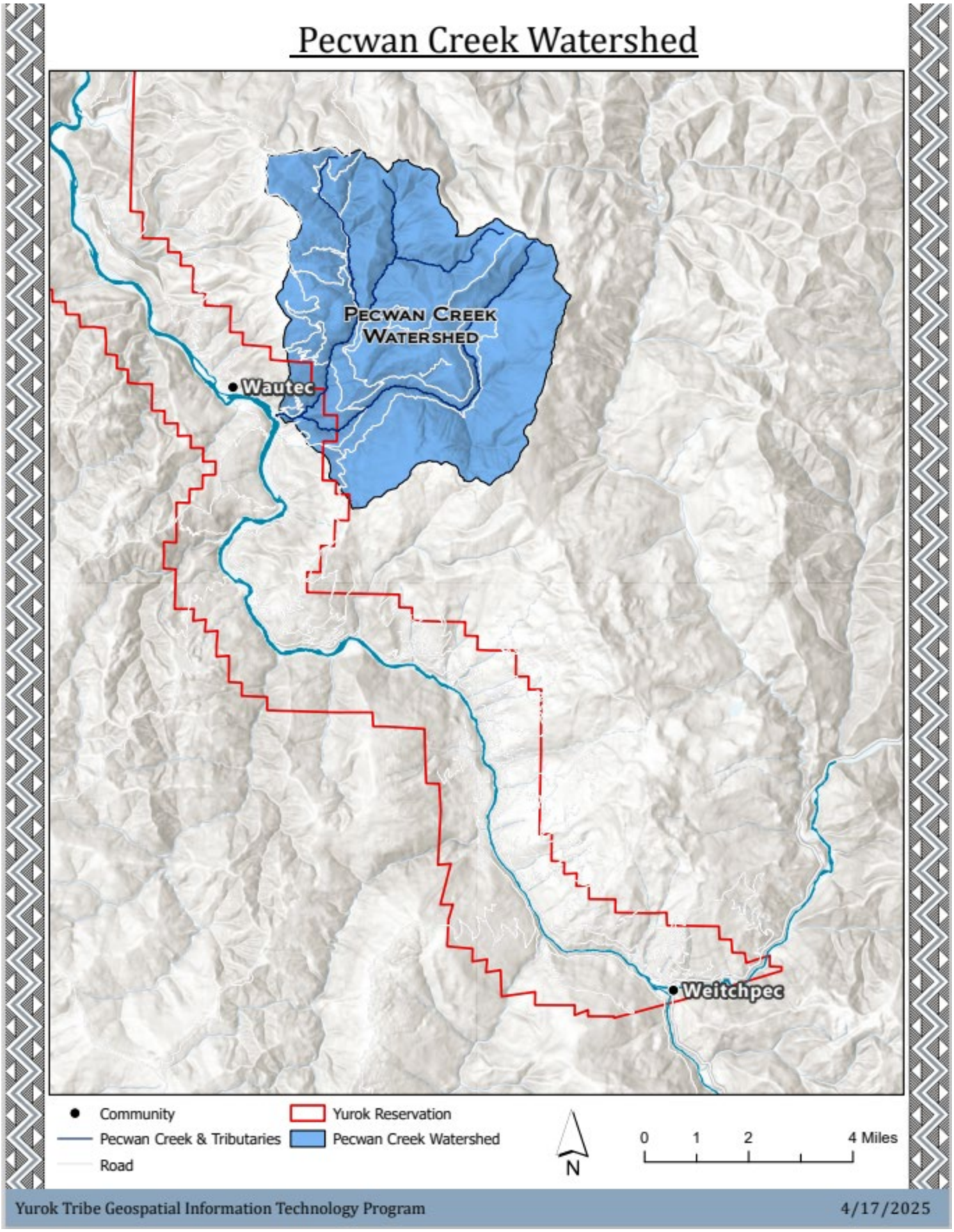
Schedule:

2026	Tasks & Milestones	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26
	Project Administration	Yurok / Agency Coordination			**Execute Agreement**		Project Administration (Reporting/Documenting/Invoicing/Site Visits)						
	Habitat Enhancement							**Year 1 Implementation**					
	Photo-Monitoring	→											
2027	**Tasks & Milestones**	**Jan-26**	**Feb-26**	**Mar-26**	**Apr-26**	**May-26**	**Jun-26**	**Jul-26**	**Aug-26**	**Sep-26**	**Oct-26**	**Nov-26**	**Dec-26**
	Project Administration	Project Administration (Reporting/Documenting/Invoicing/Site Visits)											
	Water Quality Enhancement							**Year 2 Implementation**					
	Photo-Monitoring	→											
2028	**Tasks & Milestones**	**Jan-26**	**Feb-26**	**Mar-26**	**Apr-26**	**May-26**	**Jun-26**	**Jul-26**	**Aug-26**	**Sep-26**	**Oct-26**	**Nov-26**	**Dec-26**
	Project Administration	Project Administration (Reporting/Documenting/Invoicing/Site Visits)										**Final Report/Invoice**	
	Water Quality Enhancement							**Year 3 Implementation** (If Deemed Necessary)					
	Photo-Monitoring	→											
	Habitat Mapping				Post-Project Survey					**Final Monitoring Report**			

Project Budget: Pecwan Creek Budget

Budget Class	Totals
Personnel	$245,883.20
Fringe 31%	$61,800.61
Travel (GSA)	$15,186.00
Equipment	$182,600.00
Supplies	$268,429.00
Contractual	$0.00
Total Direct	$773,898.81
Indirect 36.99%	$214,805.67
Total Request	$988,704.48

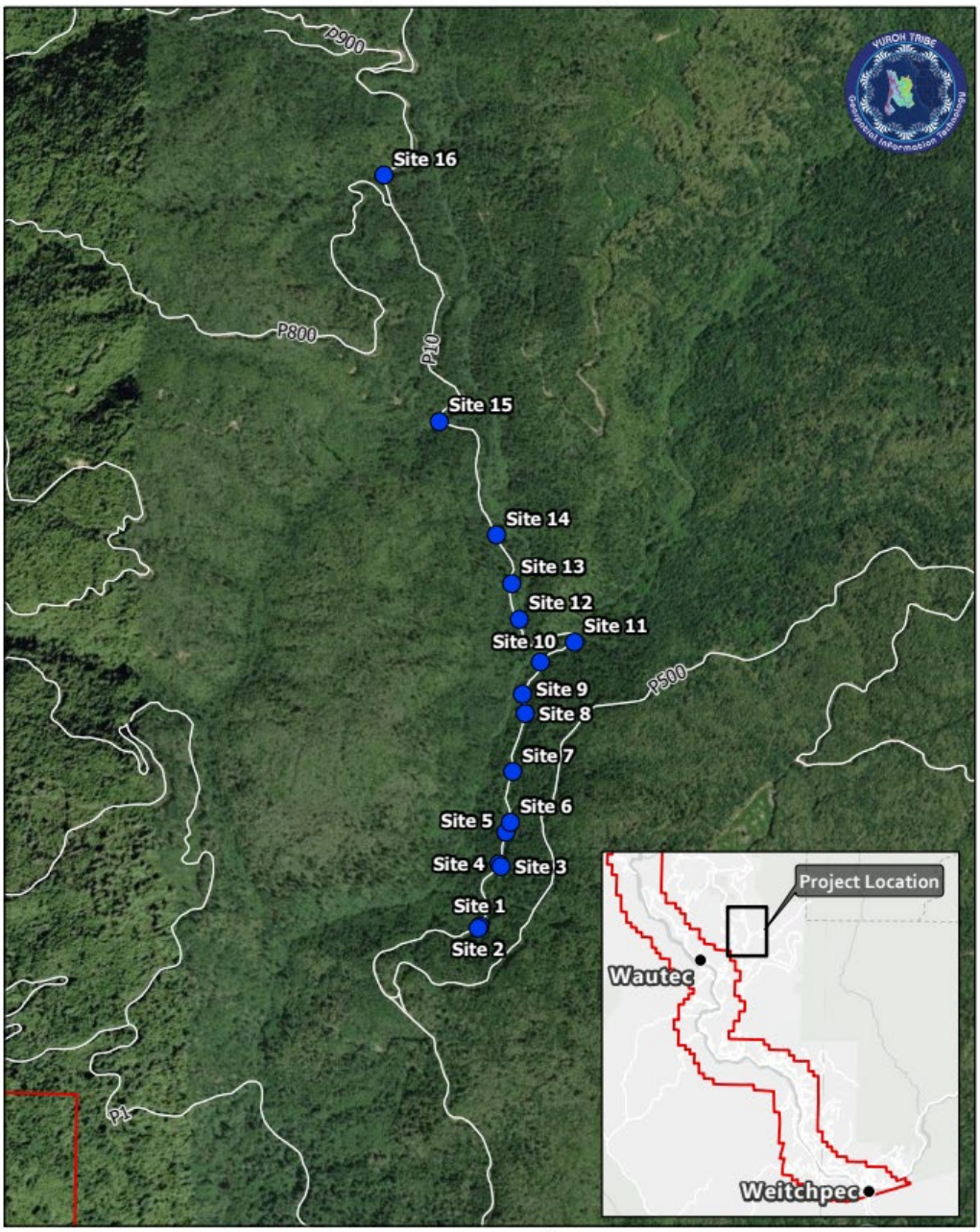
Pecwan Creek Watershed



Yurok Tribe Geospatial Information Technology Program

4/17/2025

Pecwan Sites



Yurok Tribe Geospatial Information Technology Program 4/17/2025

The Watershed Research and Training Center
Caltrans Mitigation Funding Proposal

Project Title: Rattlesnake Creek Sediment Reduction Project
Project Watershed: South Fork Trinity River
Target Pollutant: Sediment
Project Start and End: May 2026 - May 2029
Project Cost: $1,043,634.03 (scalable)

Project Overview

The Rattlesnake Creek Sediment Reduction Project (Project) will reduce road-related fine sediment delivery to Rattlesnake Creek and the South Fork Trinity River (SFTR). The Project will evaluate up to 211 miles of Shasta-Trinity National Forest system roads to identify and prioritize controllable sediment discharge sources on approximately 50 miles of the roads. Work plans will be developed and Category A road maintenance will be implemented to improve drainage function and reduce sediment delivery to creeks and streams at up to 75 stream crossings.

Project Location and Need

The Rattlesnake Creek watershed is a tributary to the South Fork Trinity River located near the communities of Forest Glen and Post Mountain in Trinity County. The Rattlesnake Creek watershed has a high sediment delivery rate due to the high road density and the proximity of roads to streams. The watershed has the highest road density of all of the watersheds in the South Fork Trinity River basin at about 5.2 mi/ sq. mi and a stream crossing density of 11.2 (crossing/sq. mi). It also has a riparian crossing rate of 4.7 (crossings/sq. mi). The watershed is inherently erosive due to its underlying geology causing landslides and mass wasting (USFS 2001).

Decades of forest harvest and associated roads have destabilized many of the slopes in the area. In 1965, a rain-on-snow event saturated the hillslopes destabilized by logging and road infrastructure, resulting in a significant amount of sediment entering into the SFTR. This single event filled in deep pools, raised the valley bottom of Hyampom, and significantly altered the geomorphology of the river. This drastic change also had a negative impact on the anadromous fishery in the area, nearly decimating the Spring Chinook population through elimination of the deep cold pools that offered summer refugia for the species.

The SFTR is 303(d) listed for sediment and temperature and has been identified as a key watershed for fisheries. A Total Maximum Daily Load (TMDL) for sediment was established in 1998 by the U.S. Environmental Protection Agency. Since 1998, hundreds of miles of road have been improved and/or decommissioned, and ongoing maintenance activities have occurred in most areas. However, with the continual decline of Forest Service road maintenance funding and staff, most routine maintenance is now being deferred and only immediate safety issues are addressed. With reduced maintenance activities, Forest System

roads are becoming inaccessible and the crossing features are going unchecked for damage or debris plugs.

An inventory of Rattlesnake Creek was completed in the late 90's that identified undersized culverts, sediment source issues and diversion problems, many of which have not been addressed. Recent wildfires have significantly impacted the landscape. Both the Blue Fire (2015) and August Complex Fire (2020) had moderate and high burn severity areas within the Rattlesnake watershed, further destabilizing the area. Wet winters combined with lack of routine maintenance, further exacerbates the potential for clogged culverts, filled ditches, and associated stream diversion down the road prisms.

This Project proposes to evaluate up to 211 miles of Shasta-Trinity National Forest system roads to identify and prioritize controllable sediment discharge sources. On approximately 50 miles of the roads, work plans will be developed for Category A (CRWQCB-NCR 2024) road maintenance and implemented to improve drainage function and reduce sediment delivery to creeks and streams at up to 75 stream crossings.

This Project can be broken into two distinct northern and southern areas, and scaled within the Rattlesnake watershed:

1) Roads south of Highway 36 within the Bone Gulch, Little Rattlesnake Creek and Rattlesnake Creek drainages (88 miles of road), and
2) Roads north and west of Highway 36, near the community of Trinity Pines down to Forest Glen, within the Post Creek, North Post Creek and North Rattlesnake Creek drainages (123 miles of road).

Each area has its own unique challenges. The southern area has heavy road density with many midslope roads crossing riparian areas, feeder tributaries and stacked culverts creating sedimentation to the streams. The largest and most frequently travelled road in this area is the FS 30N29 (Bramlet Road / FS 29), which is the only mainline access to the eastern side of the SFTR and has many level 2 and 3 spurs that lead to adjacent watersheds.

The northern area has steeper inner gorge terrain and has higher use in all weather conditions due to private land and utility access through the National Forest. It also has a south facing aspect giving it high runoff rates during the snow melt. Many of the spur roads in this area are inaccessible to vehicle traffic.

This Project will complement another project, funded by CDFW Cannabis Restoration Grant Program, being implemented by the environmental consulting firm Flowra to assess and prioritize issues on country roads around the community of Post Mountain in the Trinity Pines Subdivision. The Post Mountain community's population increased substantially during the Green Rush (2014-2019) resulting in increased numbers and frequency of vehicles utilizing the arterial roads during all conditions including the wet winter and dry summer seasons.

Project Description

Sites will be inventoried and cataloged using such techniques as laid out in the Handbook for Forest, Ranch & Rural Roads manual (Rural Roads Manual; Weaver et al. 2015). Each site will be given a GPS point, mile marker, and a unique ID that will correspond with the work plan. Also data such as culvert size, percent culvert plugged, diversion potential, and immediate road drainage maintenance needs will be collected to allow for road and site prioritization. Photographs for each site identified needing treatment will be acquired for pre-project baseline condition reporting.

Once the road inventory has been completed, Shasta-Trinity National Forest Engineering and Roads Department staff will be consulted and given the opportunity to review the inventory and work plans prior to implementation work. Sites identified with more complex issues such as undersized culverts, fish passage problems, and landslides or mass wasting would be outside the scope of this Project. These sites will be documented and provided to the Shasta Trinity National Forest Engineering and Roads Department due to treatments likely being considered Category B or requiring additional environmental compliance and engineering. The WRTC will assist the USFS as needed to complete the steps required to fix the identified issues outside of this road maintenance project.

All road maintenance work will be conducted to the Shasta-Trinity National Forest standards and guidelines. Road maintenance activities and techniques from the Rural Roads Manual will be used to treat each site. This will include drainage structure maintenance, such as cleaning inlets and outlets to allow water to drain freely. Undersized culverts, and crossings showing signs of past stream diversion, will have critical dips constructed to reduce stream diversions and erosion. Slides and slumps will be cleared and perched fill will be trimmed back to a stable angle.

Techniques such as cutting bevels, installing drop inlets, upgrading or replacing ditch relief culverts, and installing flared end sections will be used to increase flow capacity and reduce stream diversions. Ditches will be cleaned and rolling dips will be constructed to break up road surface runoff and direct discharge into streams and creeks. Roads will be cleared of vegetation to gain access to sites inaccessible due to brush and downed trees.

Rock armoring will be placed in areas of active erosion to stabilize banks, fill slopes, and cut slopes. Armoring will also be used to direct flow back into natural channels or drainage features. Where applicable, rocking of the road surfaces will be used to reduce controllable sediment delivery.

Any spoils generated during the road maintenance activities will be deposited in hydrologically safe areas and all disturbed sites will have native grass seed and certified weed free straw or wood straw spread to stabilize and revegetate the surface.

Blocked roads will be assessed for remaining piped stream crossings behind the road closure. If piped crossings are located, the site will be cataloged and brought to the USFS Engineering and Road Department staff's attention. We will conduct hand work on bermed or blocked roads to improve erosion control where practical.

Additional environmental compliance will not be required for the maintenance activities proposed in this Project. All treatments will fall within the Water Board General Order for Forest Roads Category A maintenance. Stream crossings identified as needing an upgrade will be documented and provided to the Shasta Trinity National Forest Engineering and Roads department for future replacement.

Project Tasks

1.0 Project Management and Administration

1.1 Grant administration: WRTC program managers and administrative staff will coordinate with grantors to develop and execute agreements.
1.2 Sub-contract administration: WRTC staff will develop and execute bidding and sub-contracting for construction.
1.3 Invoicing and Progress Reporting: WRTC staff will submit invoices and progress reports as determined by the Grantor.
1.4 Final Reporting: A final report will be submitted to the grantor, USFS, and other organizations as determined in the grant agreement.
1.5 Project Management: WRTC staff will manage work schedules for assigned staff, contractors, and coordination with Forest Service staff.

2.0 Road Inventory and Planning

2.1 Pre-field preparation: WRTC staff will create georeferenced maps of the project area and develop field forms for ESRI Field Maps and Avenza software for data collection.
2.2 Field Inventory: WRTC staff will collect georeferenced field data and photographs of inventoried sites. Sites identified for treatment will be staked on the ground with an identifying marker.
2.3 Planning: WRTC staff will develop construction/treatment plans for the roads inventoried to address the sediment sources and hydrologic connectivity of the road system. Plans will be shared with USFS hydrologists and/or engineers for approval.
2.4 Permitting: WRTC staff will coordinate with Forest Service staff and appropriate agencies on environmental compliance and permitting as needed to meet road maintenance objectives.

3.0 Implementation

3.1 Road Maintenance Activities: WRTC staff and contractors will coordinate and implement the work plans approved by the Forest Service staff.
3.2 Contracting oversight: WRTC staff will guide and oversee on the ground contractor work to verify implementation and appropriate BMPs are being utilized.
3.3 Erosion control: disturbed sites with exposed soils will be seeded and strawed immediately after implementation is completed.
3.3 As-Built Documentation: All maintenance activities will be documented in georeferenced data collection devices, photographs of post-implementation of each treatment site obtained, and data collaborated into a post-implementation As-built report.

4.0 Post implementation monitoring

4.1 Storm Patrol: all treated sites will be monitored during or soon after a triggering precipitation event (typically considered a precipitation event that approaches a 5-yr recurrence interval in burned areas) including “Atmospheric River Systems”.
4.2 Annual Monitoring: Treatment areas will be monitored for up to 3 years post implementation depending on available funding and weather conditions.
4.3 Monitoring Reporting: Documentation of monitoring events and treatment areas will be shared with Forest Service staff and appropriate agencies.
4.4 Adaptive Treatment: should a treatment show signs of failure during a monitoring event, WRTC staff will document the failure, perform any immediate remedial hand-work if possible, and share the results with Forest Service staff. If treatment requires more than hand-work, staff will coordinate with Forest Service staff to develop a treatment plan.

Deliverables:

- Miles of road inventoried
- Miles of road maintained
- Number of sites treated
- Photographs (before and after)
- GIS maps of maintenance completed
- List of sites needing future funding and/or NEPA compliance
- Project Reports (interim and final)

References

California Regional Water Quality Control Board North Coast Region, 2024. General Waste Discharge Requirements for Nonpoint Source Discharges Related to Certain Land Management Activities on Federal Lands in the North Coast Region Order No. R1-2024-0012.

U.S. Forest Service, 2001. Hidden Valley, Plummer Creek, and Rattlesnake Creek Watershed Analysis. Foster Wheeler Environmental Corporation, Sacramento, CA prepared for USDA Forest Service, Shasta-Trinity National Forest, Redding CA. 178pp.

Weaver, W.E., Weppner, E.M. and Hagens, D.K. 2015. Handbook for Forest, Ranch and Rural Roads: A Guide for Planning, Designing, Construction, Reconstructing, Upgrading, Maintaining and Closing Wildland Roads (Rev. 1st ed), Mendocino County Resource Conservation District, Ukiah, California.

The Watershed Research and Training Center

Caltrans Mitigation Proposal
Rattlesnake Creek Road Maintenance

Shasta-Trinity National Forest System Roads

Road Name / Number	Miles	Area/Road Name	Maintenance Level
1N02	3.49	NORTH POST CREEK	2 - HIGH CLEARANCE VEHICLES
1N03	4.55	N RATTLESNAKE	2 - HIGH CLEARANCE VEHICLES
1N03B	0.11	N RATTLESNAKE	1 - BASIC CUSTODIAL CARE (CLOSED)
1N04	2.80	COPPER HILL	1 - BASIC CUSTODIAL CARE (CLOSED)
1N04A	0.59	COPPER HILL	1 - BASIC CUSTODIAL CARE (CLOSED)
1N05	1.62	GROUSE PRAIRIE	2 - HIGH CLEARANCE VEHICLES
1N10	4.18	BEAR WALLOW MEA	2 - HIGH CLEARANCE VEHICLES
1N10B	0.80	BEAR WALLOW MEA	1 - BASIC CUSTODIAL CARE (CLOSED)
1N12	8.56	COPPER MINE	3 - SUITABLE FOR PASSENGER CARS
1N12	0.97	COPPER MINE	3 - SUITABLE FOR PASSENGER CARS
1N12D	1.20	COPPER MINE	1 - BASIC CUSTODIAL CARE (CLOSED)
1N13	5.40	POST FLUME	3 - SUITABLE FOR PASSENGER CARS
1N13A	1.33	POST FLUME	1 - BASIC CUSTODIAL CARE (CLOSED)
1N29	2.58	POST	2 - HIGH CLEARANCE VEHICLES
1N29A	0.27	POST	1 - BASIC CUSTODIAL CARE (CLOSED)
1N29B	1.00	POST	1 - BASIC CUSTODIAL CARE (CLOSED)
1N29C	0.35	POST	1 - BASIC CUSTODIAL CARE (CLOSED)
1N29D	0.29	POST	1 - BASIC CUSTODIAL CARE (CLOSED)
1N38	0.78	CONE	1 - BASIC CUSTODIAL CARE (CLOSED)
1N38A	1.39	CONE	1 - BASIC CUSTODIAL CARE (CLOSED)
1N39	1.59	NORTH POST	1 - BASIC CUSTODIAL CARE (CLOSED)
1N39B	0.52	NORTH POST	1 - BASIC CUSTODIAL CARE (CLOSED)
1N42	1.21	SLIPPERY	1 - BASIC CUSTODIAL CARE (CLOSED)
1N42A	0.52	SLIPPERY	1 - BASIC CUSTODIAL CARE (CLOSED)
1N47	0.57	CHUCKAR	1 - BASIC CUSTODIAL CARE (CLOSED)
1N47A	0.35	CHUCKAR	1 - BASIC CUSTODIAL CARE (CLOSED)
1N48	1.58	HUMM	1 - BASIC CUSTODIAL CARE (CLOSED)
1N48A	0.62	HUMM	1 - BASIC CUSTODIAL CARE (CLOSED)
1S08	0.49	RATTLE	1 - BASIC CUSTODIAL CARE (CLOSED)
1S08A	0.42	RATTLE	1 - BASIC CUSTODIAL CARE (CLOSED)
1S09	1.81	OLD BURN	1 - BASIC CUSTODIAL CARE (CLOSED)
1S09A	0.39	OLD BURN	1 - BASIC CUSTODIAL CARE (CLOSED)
1S09B	0.31	OLD BURN	1 - BASIC CUSTODIAL CARE (CLOSED)
1S09C	0.31	OLD BURN	1 - BASIC CUSTODIAL CARE (CLOSED)
1S14	11.70	BEAR WALLOW (FA14)	3 - SUITABLE FOR PASSENGER CARS
1S14	2.82	BEAR WALLOW (FA14)	3 - SUITABLE FOR PASSENGER CARS
1S14C	0.71	BEAR WALLOW	1 - BASIC CUSTODIAL CARE (CLOSED)
1S14D	2.24	FLUME GULCH	1 - BASIC CUSTODIAL CARE (CLOSED)
1S14E	1.32	BEAR WALLOW	1 - BASIC CUSTODIAL CARE (CLOSED)
1S14Q	0.21	BEAR WALLOW	1 - BASIC CUSTODIAL CARE (CLOSED)
1S22	0.18	HELLS GATE	4 - MODERATE DEGREE OF USER COMFORT
1S28	1.46	SURE SHOT	1 - BASIC CUSTODIAL CARE (CLOSED)
1S28A	0.80	SURE SHOT	1 - BASIC CUSTODIAL CARE (CLOSED)
1S28B	0.61	SURE SHOT	1 - BASIC CUSTODIAL CARE (CLOSED)
1S29	1.75	SOUTH LONG	1 - BASIC CUSTODIAL CARE (CLOSED)
1S32	0.90	POWERLINE	1 - BASIC CUSTODIAL CARE (CLOSED)
1S33	0.24	SKINNED PINE JP	2 - HIGH CLEARANCE VEHICLES
1S34	1.14	HIGH VOLTAGE	1 - BASIC CUSTODIAL CARE (CLOSED)
1S34A	0.34	HIGH VOLTAGE	1 - BASIC CUSTODIAL CARE (CLOSED)
1S35	0.66	MARBLE	1 - BASIC CUSTODIAL CARE (CLOSED)
1S38	0.81	JUNE	2 - HIGH CLEARANCE VEHICLES
1S38A	0.35	JUNE	1 - BASIC CUSTODIAL CARE (CLOSED)
1S39	3.17	MAY	2 - HIGH CLEARANCE VEHICLES
1S39	0.01	MAY	4 - MODERATE DEGREE OF USER COMFORT
1S39	0.16	MAY	4 - MODERATE DEGREE OF USER COMFORT
1S39B	0.23	MAY	2 - HIGH CLEARANCE VEHICLES
1S40	1.04	BUZZ TAIL	1 - BASIC CUSTODIAL CARE (CLOSED)
1S41	1.24	KELLY SPUR	1 - BASIC CUSTODIAL CARE (CLOSED)
29N08	1.34	SADDLE	2 - HIGH CLEARANCE VEHICLES

29N08A	0.81	SADDLE	1 - BASIC CUSTODIAL CARE (CLOSED)
29N08B	0.41	SADDLE	1 - BASIC CUSTODIAL CARE (CLOSED)
29N08C	0.71	SADDLE	1 - BASIC CUSTODIAL CARE (CLOSED)
29N08D	0.26	SADDLE	1 - BASIC CUSTODIAL CARE (CLOSED)
29N55	4.01	DUBIT KELLY	2 - HIGH CLEARANCE VEHICLES
29N57	8.89	CREEK	2 - HIGH CLEARANCE VEHICLES
29N57A	0.67	CREEK	1 - BASIC CUSTODIAL CARE (CLOSED)
29N57B	0.21	CREEK	1 - BASIC CUSTODIAL CARE (CLOSED)
29N57C	0.43	CREEK	1 - BASIC CUSTODIAL CARE (CLOSED)
29N58	0.10	RATTLESNAKE RG	3 - SUITABLE FOR PASSENGER CARS
29N58	8.94	RATTLESNAKE RG	3 - SUITABLE FOR PASSENGER CARS
29N58B	0.59	RATTLESNAKE RG	1 - BASIC CUSTODIAL CARE (CLOSED)
29N58C	0.88	RATTLESNAKE RG	1 - BASIC CUSTODIAL CARE (CLOSED)
29N58D	0.37	RATTLESNAKE RG	1 - BASIC CUSTODIAL CARE (CLOSED)
29N58G	0.63	RATTLESNAKE RG	1 - BASIC CUSTODIAL CARE (CLOSED)
29N58L	0.91	RATTLESNAKE RG	1 - BASIC CUSTODIAL CARE (CLOSED)
29N59	1.97	SEVEN UP CEDARS	2 - HIGH CLEARANCE VEHICLES
29N60	0.12	SEVEN CEDARS	2 - HIGH CLEARANCE VEHICLES
29N62	3.58	PEYTON CREEK	2 - HIGH CLEARANCE VEHICLES
29N66	4.71	SEVEN UP CREEK	2 - HIGH CLEARANCE VEHICLES
29N66A	0.89	SEVEN UP CREEK	1 - BASIC CUSTODIAL CARE (CLOSED)
29N66B	0.39	SEVEN UP CREEK	1 - BASIC CUSTODIAL CARE (CLOSED)
29N68	3.39	WEST DUBAKELLA	2 - HIGH CLEARANCE VEHICLES
29N69	1.28	CEDARS	2 - HIGH CLEARANCE VEHICLES
29N73	0.12	RED MTN MOTORWAY	1 - BASIC CUSTODIAL CARE (CLOSED)
29N73	5.81	RED MTN MOTORWAY	2 - HIGH CLEARANCE VEHICLES
29N73	6.34	RED MTN MOTORWAY	2 - HIGH CLEARANCE VEHICLES
29N73A	1.04	RED MTN MOTORWAY	1 - BASIC CUSTODIAL CARE (CLOSED)
29N73B	0.53	RED MTN MOTORWAY	1 - BASIC CUSTODIAL CARE (CLOSED)
29N73C	0.79	RED MTN MOTORWAY	1 - BASIC CUSTODIAL CARE (CLOSED)
29N77	2.56	SLIDE	2 - HIGH CLEARANCE VEHICLES
29N77A	2.77	SLIDE	2 - HIGH CLEARANCE VEHICLES
29N80	1.65	JULY	1 - BASIC CUSTODIAL CARE (CLOSED)
2N07	2.18	POST MTN (FA07)	3 - SUITABLE FOR PASSENGER CARS
2N07	3.37	POST MTN (FA07)	3 - SUITABLE FOR PASSENGER CARS
2N07B	0.37	POST MOUNTAIN	1 - BASIC CUSTODIAL CARE (CLOSED)
2N07C	0.69	POST MOUNTAIN	1 - BASIC CUSTODIAL CARE (CLOSED)
2N07F	0.80	POST MOUNTAIN	2 - HIGH CLEARANCE VEHICLES
30N17Y	1.65	PITS	2 - HIGH CLEARANCE VEHICLES
30N17YA	0.44	PITS	1 - BASIC CUSTODIAL CARE (CLOSED)
30N28	7.95	BLUE POINT RG	2 - HIGH CLEARANCE VEHICLES
30N29	1.94	BRAMLET (FA29)	3 - SUITABLE FOR PASSENGER CARS
30N29	3.67	BRAMLET (FA29)	3 - SUITABLE FOR PASSENGER CARS
30N29	1.90	BRAMLET (FA29)	3 - SUITABLE FOR PASSENGER CARS
30N29A	1.79	BRAMLET	2 - HIGH CLEARANCE VEHICLES
30N29N	0.52	BRAMLET	1 - BASIC CUSTODIAL CARE (CLOSED)
30N30	2.54	DOUBLE PLATE	3 - SUITABLE FOR PASSENGER CARS
30N33	1.88	OLD POND	1 - BASIC CUSTODIAL CARE (CLOSED)
30N33A	0.25	OLD POND	1 - BASIC CUSTODIAL CARE (CLOSED)
30N33B	0.71	POND SPUR	1 - BASIC CUSTODIAL CARE (CLOSED)
30N39	1.43	ROAD GULCH	2 - HIGH CLEARANCE VEHICLES
30N39A	0.10	ROAD GULCH	1 - BASIC CUSTODIAL CARE (CLOSED)
30N46	2.65	DITCH GULCH	2 - HIGH CLEARANCE VEHICLES
30N46A	0.46	DITCH GULCH	1 - BASIC CUSTODIAL CARE (CLOSED)
30N50	3.79	GLADE	2 - HIGH CLEARANCE VEHICLES
30N50B	0.58	BASIN TRAIL	1 - BASIC CUSTODIAL CARE (CLOSED)
30N50C	0.23	BASIN GULCH	1 - BASIC CUSTODIAL CARE (CLOSED)
30N50D	0.32	GLADE	1 - BASIC CUSTODIAL CARE (CLOSED)
30N53	1.93	WEST DUBA	2 - HIGH CLEARANCE VEHICLES
30N56	0.58	QUARRY	2 - HIGH CLEARANCE VEHICLES
30N56A	0.54	QUARRY	1 - BASIC CUSTODIAL CARE (CLOSED)
30N57	0.75	PIPE	2 - HIGH CLEARANCE VEHICLES
30N59	2.82	POST CREEK	2 - HIGH CLEARANCE VEHICLES
30N76B	0.61	SHOWER VIEW	1 - BASIC CUSTODIAL CARE (CLOSED)
31N32	6.39	PHILPOT	3 - SUITABLE FOR PASSENGER CARS
Total Miles	**210.90**		

Rattlesnake Creek Sediment Reduction Project Gantt Chart

START DATE

January 01, 2026

PROJECT NAMES + TASK TITLES	START DATE	END DATE	YEAR ONE												YEAR TWO												YEAR THREE												YEAR FOUR						
			01/26	02/26	03/26	04/26	05/26	06/26	07/26	08/26	09/26	10/26	11/26	12/26	01/27	02/27	03/27	04/27	05/27	06/27	07/27	08/27	09/27	10/27	11/27	12/27	01/28	02/28	03/28	04/28	05/28	06/28	07/28	08/28	09/28	10/28	11/28	12/28	01/29	02/29	03/29	04/29	05/29	06/29	07/29
2026 Tasks	**01/01/26**	**12/01/26**																																											
Identify Sediment Sources / Inventory	06/01/26	08/30/26																																											
Work Plan Development and Maps	07/01/26	08/30/26																																											
Contractor Implementation (20 Miles)	08/30/26	11/15/26																																											
Revegetation/Stabilization of Project Sites	08/30/26	11/15/26																																											
Monitoring/Storm Patrol of Sites	11/15/26	12/30/26																																											
2027 Tasks	**01/01/27**	**12/01/27**																																												
Identify Sediment Sources / Inventory	03/15/27	07/01/27																																											
Work Plan Development and Maps	07/01/27	07/30/27																																											
Contractor Implementation (20 Miles)	07/15/27	11/15/27																																											
Revegetation/Stabilization of Project Sites	07/15/27	11/15/27																																											
Monitoring/Storm Patrol of Sites	11/15/27	12/31/27																																											
2028 Tasks	**01/01/28**	**12/01/28**																																												
Identify Sediment Sources / Inventory	03/15/28	07/01/28																																											
Work Plan Development and Maps	07/01/28	07/30/28																																											
Contractor Implementation (10 Miles)	07/15/28	11/15/28																																											
Revegetation/Stabilization of Project Sites	07/15/28	11/15/28																																											
Monitoring/Storm Patrol of Sites	11/15/28	12/31/28																																											
2029 Tasks	**01/01/29**	**05/30/29**																																												
Final Reporting and Project Closeout	01/01/29	05/30/29																																											

Applicant	**The Watershed Research and Training Center**
Date	4/7/2025
Title	Rattlesnake Creek Sediment Reduction Project
Watershed	South Fork Trinity River/ Rattlesnake Creek
Target Pollutant	Sediment
Term	3 years, 4/1/2026 - 3/31/2029
Deliverables	
	50 mi Cat A Road Maintenance
	211 miles of road evaluation/ survey
	75 road crossings

Caltrans Mitigation Roads Proposal Budget

Personnel

Job title		Hourly Rate with Benefits	Project Hours		Total Cost	Budget Justification:
Watershed Stewardship Program Director		$ 79.61	280		$ 22,290.29	Responsible for overall Watershed Stewardship Program management, coordination, decision-making, and contracts and agreements
Watershed Stewardship Program Associate IV		$ 61.94	600		$ 37,166.57	Responsible for grant management, budget tracking, project coordination, Road Program staff oversight decision-making, reporting
Roads Division Manager / Program Associate II		$ 47.71	2100		$ 100,190.10	Responsible for road program management, office and field based, road inventory, work plan development, logistics, supplies and materials purchasing, photo documentation, GIS mapping, monitoring and in field construction oversight, reporting
Roads Division Field Technician		$ 38.44	1675		$ 64,389.79	In field, assists with road inventory, staking and layout, photo documentation, monitoring, seed and mulching of project sites
SUB TOTAL					**$ 224,036.76**	

Travel

TYPE	Purpose	Units	Unit Cost	Quantity	Total Cost	Budget Justification:
Travel- WRTC Truck #101	Road Program Mgr/ Tech	Hours	$40.51	1600	$ 64,816.00	WRTC-owned staff vehicles at Caltrans hourly rental rates travel to.from office and within project sites (source Caltrans Rental Rate book 4/1/2025)
Travel- WRTC Truck #50	Road Program Mgr/ Tech	Hours	$40.51	1200	$ 48,612.00	WRTC-owned staff vehicles at Caltrans hourly rental rates travel to.from office and within project sites (source Caltrans Rental Rate book 4/1/2025)
SUB TOTAL					**$ 113,428.00**	

Equipment

Item Name	Description		Quantity	Unit Cost	Total Cost	Budget Justification:
					$ -	
SUB TOTAL					**$ -**	

Materials and Supplies

Item Name	Description	Units	Quantity	Unit Cost	Total Cost	Budget Justification:
Field notebooks and paper	Project tracking and notes	Each	1	$ 15.00	$ 15.00	Supplies necessary to record field notes and data for stream monitoring and surveying
Native weed-free seed	1 pound per mile	Pounds	50	$ 30.00	$ 1,500.00	For revegetating disturbed surfaces to reduce erosion
Weed-free straw mulch	4 bales per mile	Bale	200	$ 15.00	$ 3,000.00	For mulching disturbed surfaces to reduce erosion
Avenza mapping app subscription	Field maps and inventory	Per Year	3	$ 120.00	$ 360.00	Track and inventory project data
Garmin inReach handheld device subscription	Crew and job safety	Per Month	9	$ 19.95	$ 179.55	Satellite communication device subscription for staff to use in project areas without cell service for safety
SUB TOTAL					**$ 5,054.55**	

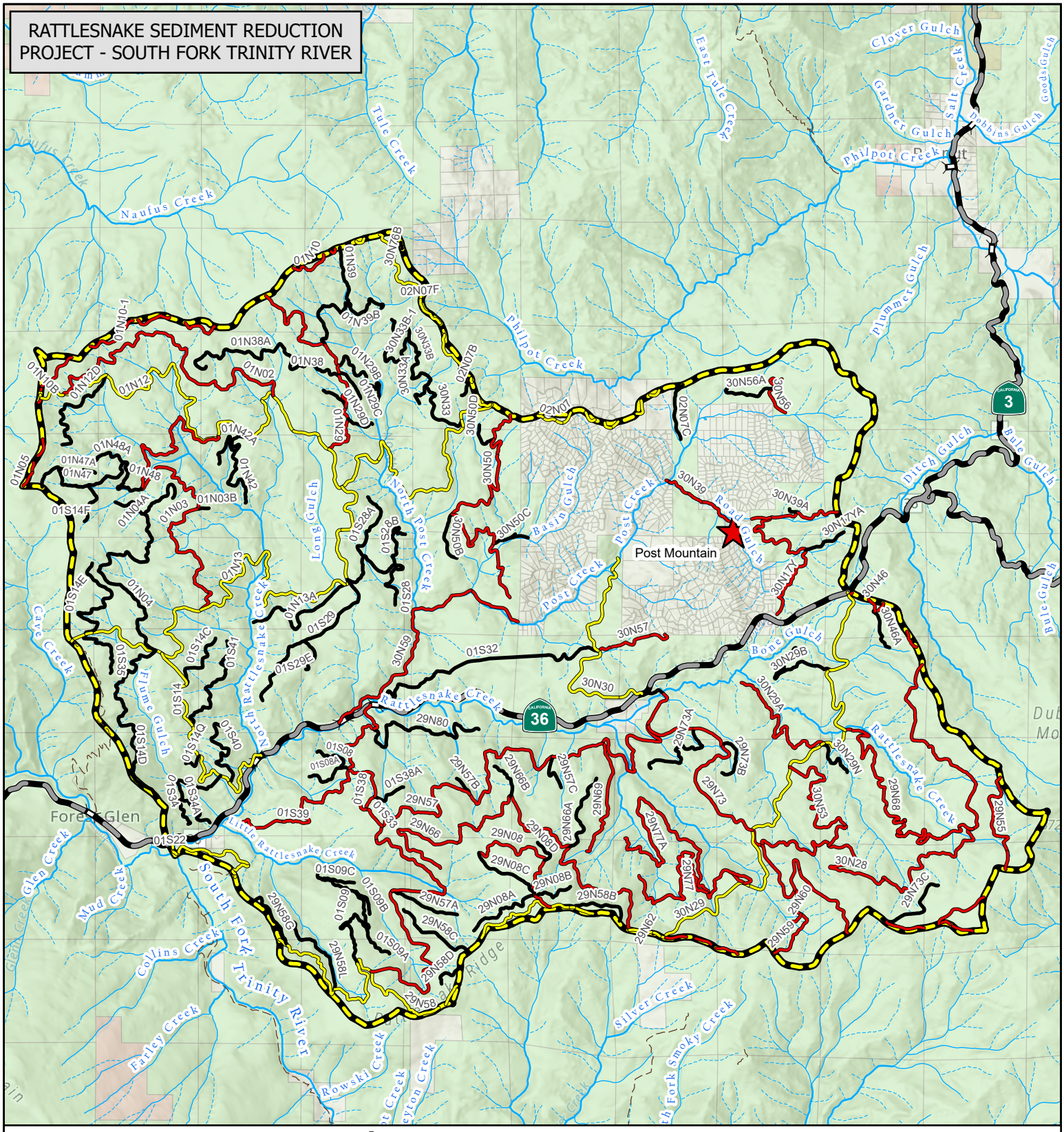
Contractual Services: Subcontract

Contractor Name	Description	Units	Quantity	Unit Cost	Total Cost	Budget Justification:
TBD Heavy Equipment/ Operator Year 1	20 miles of road maintenance	Each	1	$ 220,000.00	$ 220,000.00	Contractor costs for project implementation
TBD Heavy Equipment/ Operator Year 2	20 miles of road maintenance	Each	1	$ 220,000.00	$ 220,000.00	Contractor costs for project implementation
TBD Heavy Equipment/ Operator Year 3	10 miles of road maintenance	Each	1	$ 110,000.00	$ 110,000.00	Contractor costs for project implementation
TBD Rock and Delivery		Each	1	$ 60,000.00	$ 60,000.00	Rock purchase and deliveries to project sites for armoring slopes and bank protection
SUB TOTAL					**$ 610,000.00**	
			Total Direct Costs		**$ 952,519.31**	

Indirect Costs

Explanation of Indirect Costs	NICRA Expiration Date	NICRA Rate	Total Direct Costs eligible for Indirect	Total Indirect Costs
NICRA	3/31/2026	20.59%	$ 442,519.31	**$ 91,114.72**
		Total Project Costs		**$ 1,043,634.03**

RATTLESNAKE SEDIMENT REDUCTION PROJECT - SOUTH FORK TRINITY RIVER


Post Mountain
Forest Glen
Naufus Creek
Tule Creek
East Tule Creek
Philpot Creek
Clover Gulch
Gardner Gulch
Salt Creek
Goods Gulch
Dobbins Gulch
Plummer Gulch
Bule Gulch
Ditch Gulch
Basin Gulch
Post Creek
North Post Creek
Road Gulch
Long Gulch
Bone Gulch
Rattlesnake Creek
North Rattlesnake Creek
Little Rattlesnake Creek
Plume Gulch
Cave Creek
Glen Creek
Mud Creek
Collins Creek
South Fork Trinity River
Farley Creek
Rowski Creek
Silver Creek
Smoky Creek
Ridge
01N10
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01N10B
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01N38A
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01N02
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01N29C
01N29D
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01N48A
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30N38B
30N33A
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30N50C
30N50B
02N07C
30N56A
30N56
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30N39A
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30N17Y
30N46
30N46A
30N29B
30N29A
30N29N
30N30
30N57
30N59
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01S14Q
01S40

Forest Service

Shasta-Trinity National Forest
Supervisor's Office

3644 Avtech Parkway
Redding, CA 96002
530-226-2500
TDD: 530-226-2490

File Code: 2500
Date: March 17, 2025

Nick Goulette
Michelle Medley-Daniel
Executive Directors
Watershed Research and Training Center
PO Box 356
Hayfork, CA 96041

Letter of Support to Improve Roads in Impaired Watersheds of the North Coast Waterboard Region

Dear Mr. Goulette & Ms. Medley-Daniel,

The Shasta-Trinity National Forest promotes watershed restoration and road improvement work within our watersheds. We understand that WRTC is seeking funding from the Caltrans Sediment Reduction to complete the planned improvements which would be complimentary to the Forest's restoration objectives. Road improvement work proposed is in Rattlesnake Creek and Weaver Creek; both drain to the Trinity River Watershed of the Klamath River Basin.

These streams in these watersheds are on the impaired watershed 303d list in the North Coast Water Quality Control Board Region (Board). This work is required by the Board to reduce sedimentation and better meet Total Maximum Daily Loads Objectives and to meet direction of the Board under the Watershed Restoration Action Plan (WARP) of the North Coast Waterboards Order No. R1-2024-0021.

It is gratifying to have the opportunity to partner with our local WRTC cooperators that continually promote road improvement and watershed restoration within Forest boundaries. WRTC has successfully restored forest areas with diligent service over the last 30+ years.

Collaborative support is always stronger when we work together and connect our restoration efforts. We understand that WRTC is seeking funding from the Caltrans Sediment Reduction to complete the planned improvements and believe this type of a restoration effort would be complimentary to the Forest's restoration objectives.

We are hopeful that you will find this proposed work meaningful and important to protecting our many forest resources including water quality. If you have any questions or concerns, please contact Keli McElroy, Ecosystems Staff Officer at keli.mcelroy@usda.gov.

Sincerely,

RACHEL A. BIRKEY
Forest Supervisor

SHASTA VALLEY
RESOURCE CONSERVATION DISTRICT

11/10/2025

Shasta Valley Resource Conservation District
215 Executive Ct. Ste. A
Yreka, CA 96097
svrcd.org
(530) 572-3120

Elias Scott, Environmental Scientist
North Coast Water Quality Control Board

SHASTA RIVER WATER ASSOCIATION PLANNING PROJECT

Introduction: The Shasta River Water Association (SRWA) Planning Project (Project) will consist of two parts. One will be a new plan or plan update for the SRWA to map a long-term strategy for their infrastructure. The second component will be to implement at least one of the recommended projects that were planned under the original Forsgren Study in 2003 or are recommended in the new Plan. (See Scope of Work).

The original study evaluated ditch loss in all major delivery laterals and set in motion a series of projects to reduce these losses, starting with the leakiest one (Upper South Ditch). Other projects have been completed along the way including several to locate, quantify and reduce the volume and impact of selected high-volume tailwater return flows throughout the SRWA. Projects to measure and apply a higher level of management as well as proposed billing changes were also completed.

Water conservation in concert with tailwater reduction and recapture have a marked impact on temperature and dissolved oxygen levels, both of which are pollutants listed in the Shasta River Total Maximum Daily Load (TMDL).

The Shasta Valley Resource Conservation District (SVRCD) will coordinate this work in partnership with the private landowners, North Coast Regional Water Quality Control Board (NCRWQCB), and other state, federal, and local partners. Caltrans will receive compliance credits for TMDL reductions and provide project funding support, and aquatic and riparian habitat along the Shasta River will benefit from decreased temperature contributions within a critical salmonid bearing watershed.

Background: The Shasta River has been listed as being impaired for high temperature and low dissolved oxygen as part of the Shasta River TMDL process. The Shasta River TMDL Action Plan has identified agriculture as a probable contributor to these impairments.

Steps have been taken by the NCRWQCB and the SVRCD to inventory and address the sources of those inputs that can be ameliorated by the agricultural community through infrastructure improvements or changes to management practices. Planting of streamside vegetation, fencing, and off-channel stock water for livestock control and tailwater reduction are listed in the Shasta River TMDL Action Plan as key management steps.

The Shasta River has a series of surface water diversions that provide water to small ranches to irrigate pastures and croplands. Often these irrigated lands have uneven and/or sloped topography and located adjacent to streams and rivers. The soil is shallow and rocky, often irregular and challenging to farm, often Soil Class IV or V due to these characteristics. Therefore, the best and highest value of these areas is permanent grass pasture. This does not require any land smoothing or leveling and the fields are often protected from water erosion by permanent cover. Conservation and agricultural management of these pastures are multi-benefit, including flood control, groundwater recharge, wetland habitat for migratory birds, habitat and forage for elk, pronghorn and deer, and livestock benefits of late season grass. These areas are often best managed by utilizing all their inherent landscape benefits.

Project Description: The Shasta River Water Association (SRWA) is in a unique position to impact water quality and quantity in the Shasta River. They possess a very important large water right (42 cfs, 1912) with tremendous potential for long-term beneficial impacts or contributions to the system through improved management capabilities. With a new vision for their future, as a leader in water conservation and water quality, they can anchor the future for their irrigators and ranchers. The proposed plan and project implementation will improve the security and stability of the SRWA. Climate change, with its resulting ever-present droughts in the Shasta River, has led to increased awareness and interest among landowners, who need to make innovative and critical infrastructure upgrades to improve water and food security, improve climate resiliency, and remain viable for future generations of producers.

Monitoring will be conducted to provide field-based information needed to support the planning document and development of project alternatives. Data collection will focus on key delivery points, operational losses, and representative flow locations to inform crop water demand estimates, delivery efficiency analyses, and design assumptions. Monitoring activities will include installation and calibration of equipment, periodic field measurements, data downloads, quality assurance and quality control, and preparation of a summary of findings to be used in the planning analysis.

Projects completed to date include major improvements to the existing delivery system**.** These include new pumps, intake bay and fish screen as well as removal of the old diversion structure that blocked fish passage during irrigation season. Large diameter pipeline replaced the Upper South Ditch, new diversion splits measuring equipment was installed at 10 locations throughout the system. This has allowed for faster response when moving water around, which translates to better management and less water spillage.

Tailwater continues to be a challenge in some specific locations due to lack of landowner management, property size and poor coordination. Much of the tailwater developed from the Upper Ditch is captured in the Middle Ditch and reused, which is the way the system

was designed. SRWA is committed to improvement work for better management and control of valuable irrigation water, including lining the Middle Ditch, piping the Upper North Ditch and adding more SCADA or remote sensing measuring equipment. Additional projects as proposed in the new Plan will be incorporated as funds become available for future projects.

Snapshot of Project
SRWA Planning Project
TMDL Addressed – Temperature
Planning
Estimated Cost = $1,357,467
Estimated Start Date = July 2025
Estimated End Date = October 2028
Anticipated Deliverables

1. A planning document for the SRWA to guide their maintenance and management of existing and proposed new infrastructure. The document would include an analysis of crop water demands, analysis of deliveries and efficiency along with a suite of potential alternatives to improve operational goals and aquatic benefits. Alternatives would include assessment of long-term operations and maintenance, expected operational improvement and efficiency gained through infrastructure improvements. The outcomes of these assessments would serve as the basis of potential instream benefit.

2. Selection of a preferred alternative project and development of designs to the 60%-90% and assessment and/or completion of needed surveys and permits for environmental compliance.

Project Details:

- **Task 1:** SVRCD to hire consulting engineer to provide a big picture long term plan for the SRWA.
    1. Deliverable: An updated plan for the SRWA

- **Task 1.1** Monitoring to Support Planning and Design. The SVRCD will conduct monitoring that supports development of the updated SRWA plan and informs identification of operational and infrastructure improvement alternatives.
    1. Deliverable: A monitoring summary memo documenting data collection location, methods, QA/QC procedures, validated datasets, and key findings used to inform the planning analysis and development of project alternatives.

- **Task 2:** Development of a project or component to be constructed. SVRCD to seek cost estimates and hire an engineer to develop 60%-90% designs for the selected project. A tailwater recovery project is preferred.
    1. Deliverable: 60%-90% designs for the project.

- **Task 3:** Permits and Environmental Compliance – When ready, SVRCD will apply for necessary permits and explore environmental compliance procedures for all project

components.

1. Deliverables: All required permits including 1600 and/or 401 water quality certification permits; HREA or Small Habitat Restoration Permit
2. CEQA – Cultural Resources, Flora/Fauna Surveys

- **Task 4:** Coordination, Partnership Outreach, Development outreach
    1. Complete project coordination and partnership development.
    2. Develop additional implementation proposals and associated funding if time and funding are available
    3. Report Writing
    4. Financial and Progress Reporting

EXHIBIT A
BUDGET

Applicant: Shasta Valley RCD			
Project Title: Shasta River Water Association Planning Project			
APPLICANT BUDGET			
A. PERSONNEL SERVICES			
Project Role	**Hours**	**Rate**	**WB/CalTrans Requested Amount**
District Administrator	180	$85.00	$15,300.00
Project Manager	1800	$75.00	$135,000.00
Monitoring Specialist	940	$60.00	$56,400.00
SUBTOTAL A: PERSONNEL SERVICES			**$206,700.00**
B. GENERAL OPERATING EXPENSES			
General Expenses (postage, office supplies, office equipment)			$4,000.00
Monitoring Equipment			$20,400.00
Field Supplies			$1,000.00
Permit Fees			$3,000.00
Travel (See General Grant Provisions for applicable travel reimbursement rates)	3000	$0.67	$2,010.00
SUBTOTAL B: OPERATING EXPENSES: GENERAL			**$30,410.00**
C. SUBCONTRACTORS: First $25,000 of subaward C(i). Remaining costs of subaward C(ii). Total Subcontractor Cost C(iii)			
Subcontractor or Role	**First $25,000 C(i)**	**Remainder of Subcontractor Cost C(ii)**	**Total Subcontractor Cost C(iii)**
Consulting Engineer	$25,000.00	$1,022,900.00	$1,047,900.00
Special Studies, Cultural Resources	$12,000.00		$12,000.00
Special Studies, Biology and Botany	$12,000.00		$12,000.00
Bookkeeper	$4,800.00		$4,800.00
SUBTOTAL C: OPERATING EXPENSES: SUBCONTRACTORS	$53,800.00	$1,022,900.00	**$1,076,700.00**
	Subtotal C(i)	*Subtotal C(ii)*	*Subtotal C(iii)*
D. INDIRECT CHARGES			**Total MTDC**
Subtotal A + Subtotal B + Subtotal C(i)			$290,910.00
Indirect Rate			15%
SUBTOTAL D: INDIRECT COSTS = (Subtotal A + Subtotal B + Subtotal C(i) * (Indirect Rate)			**$43,636.50**
F. GRAND TOTAL (A + B + C(iii) + D)			**$1,357,466.50**

Attachment 1:

Draft Shasta River Safe Harbor Agreement

Flow Management Strategy

June, 2020

By:

National Marine Fisheries Service
Coastal California Office
Protected Resources Division

Klamath River Branch
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Shasta River Safe Harbor Agreement
Flow Management Strategy

Introduction

A Template Safe Harbor Agreement (Agreement) is in progress by the National Marine Fisheries Service (NMFS), the California Department of Fish and Wildlife (CDFW), the Shasta Watershed Conservation Group (SWCG), eleven landowners, two irrigation districts (Montague Water Conservation District and Grenada Irrigation District), and the Edson-Foulke Yreka Ditch Company (the Permittees). The purpose of the Agreement is to establish general requirements for NMFS, under authority of the Endangered Species Act (ESA) section 10(a)(1)(A) and implementing rule and policy, to issue Enhancement of Survival Permits to non-federal landowners in the Shasta River Basin for the purpose of promoting the conservation, enhancement of survival, and recovery of the Southern Oregon/Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) of coho salmon.

The Agreement Covered Area (Figure 1) includes about 20 miles of the Shasta River, the lower 1.6 miles of Big Springs Creek, and the lower 14 miles of Parks Creek. The Agreement will facilitate implementation of improved streamflow management, implementation of various land and stream restoration actions and is expected to improve water temperature, fish passage, and habitat diversity, across the Agreement Covered Area within the upper Shasta River watershed including Parks Creek and Big Springs Creek, tributary to the Klamath River in Siskiyou County, California. A desired outcome of this Flow Management Strategy is to provide a pathway for coordination between participating landowners and create an executable implementation strategy for improved management of the Shasta River within the Agreement Covered Area to maximize the benefits for the covered species.

NMFS and the CDFW in collaboration with the Technical Advisory Committee (TAC), consisting of landowner, agency, and non-governmental organization representatives, identified existing conditions (e.g., hydrology, water quality, substrate, riparian function) in the Covered Area that are known or assumed to be limiting factors for coho salmon. For planning purposes, the TAC identified the following six reaches within the Covered Area and described existing biological requirements and habitat conditions for Covered Species in each reach (Agreement Appendix 2).

Reaches are defined here using the concept of River Mile (RM), the linear distance in miles along a river or stream upstream from its mouth. The RM reach locations listed below were provided by AquaTerra Consulting using hydrography information.

- Upper Shasta River from Dwinnell Dam downstream to the confluence of Parks Creek (RM 40.6 to 35)
- Parks Creek
    - Upper Parks Creek (RM 14.5 to 8)
    - Mid-Parks Creek (RM 8 to 2)
    - Lower Parks Creek (RM 2 to 0)
- Mid-Shasta River from the confluence of Parks Creek downstream to the northern boundary of the Covered Area (RM 35 to 20)

- Big Springs Creek from the confluence with the Shasta River upstream to the water wheel crossing (RM 1.6 to 0)

The Agreement includes an Adaptive Management Program (Agreement Appendix 4) that describes various effectiveness monitoring requirements for hydrology and water temperature, including the installation and operation of fixed monitoring stations located throughout the reaches within the Covered Area (Figure 1). The monitoring stations will assist in determining whether any detectable spatial and temporal changes in water quantity and temperature have occurred at the reach scale following implementation of this Flow Management Strategy and Beneficial Management Activities (BMAs) under the Agreement and associated ranch site plans. The monitoring stations will also provide data to assist Permittees in implementing this Flow Management Strategy.

Flow Management Strategy: Goals, Objectives and Uncertainties

The following goals are intended to promote a successful Flow Management Strategy and help achieve the desired outcome of improved instream conditions for coho salmon:

- Build upon existing information to develop a strategy that encourages collaboration among the Agreement participants for the benefit of coho salmon.
- Preserve and enhance aquatic and riparian habitat, specifically habitat conditions supporting each life stage of coho salmon.
- Address regulatory responsibilities.
- Establish integrated and flexible flow management that aligns with other planning efforts.
- Foster a culture of shared stewardship of the Shasta River among landowners.

The Flow Management Strategy objectives are based on the biological requirements of coho salmon at each freshwater life stage. Coho salmon tolerances and habitat requirements change with season and life stage. Although most developmental changes and movements to different habitats are gradual, it is useful to delineate the freshwater life cycle into four distinct life stages and to specify factors assumed to affect habitat quality for each life stage. These life stages are defined herein as follows:

1. **Adult migration and spawning (October 1 to December 31)**
2. **Egg incubation and winter rearing juveniles (January 1 to February 28)**
3. **Spring rearing, redistribution and smolt emigration (March 1 to June 15)**
4. **Summer rearing (June 16 to September 30)**

Under the Agreement, instream flows will be measured via implementation and effectiveness monitoring procedures in the Adaptive Management Program. Permittees are developing a forbearance agreement in support of the Agreement and some permittees have submitted petitions pursuant to section 1707 of the California Water Code. NMFS understands the challenges of measuring and tracking flow commitments in the Shasta River, and thus recommends that forbearance and Section 1707 dedicated flows are measured and verified at or near the points of diversion or places where flows are released to the river using real-time flow measuring devices as stipulated in the Agreement.

It is anticipated that flow commitments via forbearance or 1707 dedication will be realized and measurable instream at the northern boundary of the covered area (RM 20) for all life stages as defined above. It is anticipated that a flow gage will be installed somewhere between the new point of diversion and riffle anticipated to be constructed on the Novy Ranch and the northern boundary of the Covered Area, wherever an accurate rating curve can be established. Until the Novy riffle is established, the SHA group will use the Grenada Irrigation District's riffle as the downstream most compliance point for the SHA.

There is a lack of long term hydrologic data describing flow characteristics for the stream reaches within and upstream of the Covered Area of the Agreement. Information describing historic management of diversions, including water use records maintained by Shasta Scott Water Master District (SSWMD), are generally lacking detail on diversion volumes and magnitude. Natural spring flow contributions to surface water also tend to fluctuate during the irrigation season and between water years and the mechanisms responsible for these fluctuations are poorly understood. Water conservation projects proposed under the Agreement are intended to reduce diversion volumes and improve irrigation management resulting in improved flow conditions in the Shasta River and Parks Creek. However, in some cases historic irrigation practices resulted in tailwater returns to the stream channel as surface flow or hyporheic (subsurface) flow. A more detailed analysis would be required to determine the actual volume of consumed water removed from the stream channel for each diversion. Although this analysis would help to better understand the effects of this Flow Management Strategy to net instream flows, it is beyond the scope of this document.

The Adaptive Management Program (Appendix 4 of the Agreement) includes an effectiveness monitoring element that provides for several water quality monitoring stations to document stream flow and water temperatures at critical locations within the Covered Area. The Agreement also required detailed monitoring and reporting of diversion volumes. Combined, these two sets of data will result in better understanding of the water budget, spring flow contributions, and irrigation demands that will inform future water management to benefit SONCC coho salmon. The first evaluation of these data will occur five years after the signing of the Agreement. In the meantime, contributions of spring flow and hyporheic flow to the stream channel are assumed to be fairly stable for the purposes of developing this Flow Management Strategy. Therefore, the flow schematics that are described in this Flow Management Strategy do not take into account the uncertainties associated with spring flows, hyporheic flows and tailwater contributions.

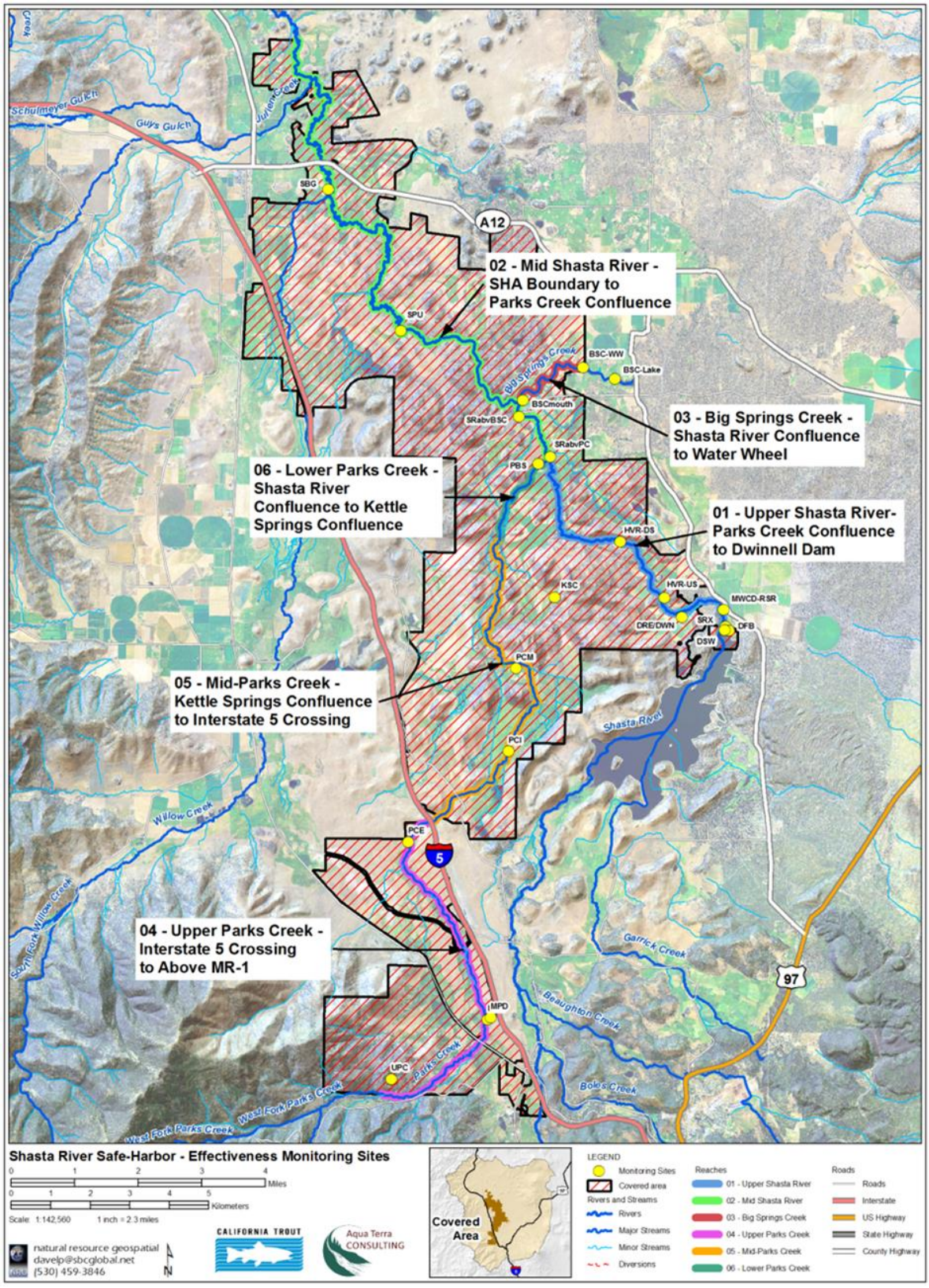


Figure 1. The location of 6 Stream reaches and water quality monitoring sites identified within the Covered Area for the Shasta River Template Safe Harbor Agreement.

The Flow Management Strategy considered recommendations from studies conducted by McBain & Trush, Inc. (2013) and McBain et al. (2014). These researchers conducted a Tier No. 1[1] i

McBain & Trush, Inc.	Agreement Covered Area Reaches
• Reach 3, TNC Study Site	Mid Shasta River Reach
• Reach 2A, UPC Study Site	Mid Parks Creek Reach (top of reach)
• Reach 2C, LPC Study Site	Lower Parks Creek Reach
• Reach 1C, HIG Study Site	Upper Shasta River Reach (bottom of reach)

Table 1. Interim minimum Tier No. 1 IFNs for priority reaches in the Big Springs Complex as recommended by McBain & Trush, Inc. (2013).

Salmonid Life Sage	REACH 3 TNC Study Site IFN Q_{MIN} (cfs)	REACH 2A UPC Study Site IFN Q_{MIN} (cfs)	REACH 2C LPC Study Site IFN Q_{MIN} (cfs)	REACH 1C HIG Study Site IFN Q_{MIN} (cfs)
September 7 to September 30: Early Adult Chinook Salmon Migration	20	11 to 15	11 to 15	10
October 1 to December 31: Chinook and coho Salmon Spawning Habitat and Adult Chinook Migration	20 to 22	11 to 15	11 to 15	10 to 13
January 1 to March 31: Winter Juvenile Salmonid Rearing Habitat	20	10	12	7 to 10
April 1 to June 15: Spring Pulse and Smolt Outmigration	40	20 to 25	20 to 25	20 to 25
June 16 to September 6*: Summer Juvenile Salmonid Rearing Habitat	13	2	7	6

[1] Moyle et al. (1998) developed metrics for fish condition by distinguishing three tiers of fish health: individual (Tier No. 1), population (Tier No. 2), and community (Tier No. 3). Under Tier No. 1, individual fish should (1) have a healthy body conformation; (2) be relatively free of diseases, parasites, and lesions; (3) have reasonable growth rates for the region; and (4) respond in an appropriate manner to stimuli (e.g., predator avoidance).

Table 2. Summary of IFN recommendations at USGS gage #11-5117500 by salmonid life stage in the lower Shasta River Canyon as developed by McBain and Trush, Inc. and Humboldt State University Department of Environmental Resource Engineering (2014).

Salmonid Life Sage	Streamflow Period	IFNs (cfs)	Dry Year IFNs (cfs)	Section Reference
Early Adult Chinook Salmon Migration	September 15: September 30:	≥ 70 ≥ 125	≥ 50 ≥ 125	8.1
Adult Salmon Spawning	October 1: October 15: October 31 to December 31:	≥ 125 ≥ 170 ≥ 195	≥ 125 ≥ 125 ≥ 150	8.2
Fry and Juvenile Salmonid Winter Rearing	January 1 to March 31:	≥ 170	≥ 135	8.3
Juvenile Salmonid Growth and Smolt Outmigration, Snowmelt Streamflows	April 1 to May 15: May 16 to June 15: June 16 to June 30:	≥ 200 ≥ 165 ≥ 125	≥ 170 ≥ 150 ≥ 70	8.4
Juvenile Salmonid Rearing Summer Baseflows	July 1 to September 14:	≥ 70	≥ 50	8.5

Utilizing relevant scientific information including McBain & Trush, Inc. (2013) and McBain et al. (2014), the Technical Advisory Committee developed reach-specific qualitative habitat improvement goals as well as quantitative flow objectives (Table 3).

Upper Shasta River

- Adult Migration and Spawning (October – December): increase the amount and extent of spawning gravel in this reach; provide adult passage flows during migration period; develop and implement a beaver dam management plan to reduce migration barriers, and implement channel maintenance flows to encourage sediment transport and aid recruitment of riparian vegetation. The flow objectives for this life stage ranges from 10 to 13 cfs (Table 1).

- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing (March – June 15): increase the extent, reliability, and connectivity of existing cool water refugia areas in this reach; install and maintain riparian fencing and manage riparian zones to encourage development of mature riparian communities; increase channel roughness and large wood through riparian planting and placement of in-channel LWD to improve rearing habitat where habitat diversity is currently lacking; and, improve the quality and abundance of preferred habitats for rearing coho salmon through creation of alcoves, side-channels, oxbows and off channel ponds in areas where cold water is present. The flow objectives for this life stage recommend peak flows between 20 to 25 cfs followed by declining flows to mimic the snow melt hydrograph until summer base flows

begin after June 15 (Table 1).

- Juvenile Over-Wintering (January – February): increase channel roughness and habitat complexity through riparian planting and placement of in-channel LWD; encourage development of beaver dam habitat and modify beaver dams to improve fish passage conditions and reduce impacts to ranch management when necessary; create off channel habitats to provide rearing coho salmon areas to seek refuge during high flow events. The types of off-channel habitats that may be considered include side channels, alcoves, oxbows, or secondary high flow channels within restored flood plains. The flow objectives identified by McBain & Trush, Inc. (2013) for winter rearing of juvenile salmonids is 7 to 10 cfs (Table 1).

Mid-Shasta River

- Adult Migration and Spawning: where appropriate (based on geomorphology), increase the extent and quality of spawning gravels; ensure that suitable migration and spawning flows are provided when adults are present; remove the existing flashboard dam to improve adult migration. Exclusionary riparian fencing has been constructed throughout nearly this entire reach and maintenance of fencing should continue.
- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: reduce spring/summer water temperature through flow/diversion management; encourage development of a healthy riparian vegetation corridor through fencing and development of riparian grazing strategies; implement strategic placement of large wood to improve instream cover and habitat diversity; ensure unimpeded fish passage for all life stages throughout this reach.
- Juvenile Over-Wintering: conduct monitoring to determine juvenile over-wintering use of this reach; re-establish areas of connectivity between the main channel and historic over-wintering habitat; encourage development of woody riparian vegetation communities where possible to provide a source of instream cover (large wood) and to create velocity refuge during high flow events; implement strategic placement of large wood in the channel.
- Flow objectives for the Mid Shasta Reach for each life stage should contribute towards meeting the flow objectives described for the Lower Shasta River Canyon (Table 2) downstream of nearly all of the agricultural diversions in the Shasta River.
- **Big Springs Creek**

- Adult Migration and Spawning: maintain the existing riparian fencing, which is protecting streambanks, increasing emergent vegetation and narrowing the channel morphology.
- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: Maintain the existing riparian fencing, which protects streambanks and the channel, allowing increased abundance of emergent vegetation and narrowing of the channel morphology; increase channel roughness and habitat complexity through targeted plantings of woody riparian species; implement placement of in-channel LWD to improve habitat diversity and cover for coho salmon during the late fall, winter and spring (Jeffres et al. 2010); remove passage obstacles and barriers on Little Springs

Creek.

- Juvenile Over-Wintering: maintain the existing riparian fencing, which protects streambanks and allows for increasing emergent vegetation and narrowing of the channel morphology; increase channel roughness and habitat complexity through targeted woody riparian planting and placement of in-channel LWD.
- Big Springs Creek is currently managed to optimize water temperature for coho salmon as priority over any diversions for agricultural beneficial use. Water can only be diverted if both water temperature objectives at the confluence with the Shasta River are met (< 18°C) and habitat flow criteria in the Shasta River Canyon (Table 2) are achieved. Therefore, management of the creek under the ownership of CDFW will optimize habitats for coho salmon when instream habitat restoration actions are implemented.

Upper Parks Creek

- Adult Migration and Spawning: conduct further flow studies to support a diversion management plan; develop and implement a coordinated diversion management plan to enhance fall and winter flows; evaluate potential geomorphic impediments to fish passage and develop a channel rehabilitation plan and implement projects to remediate fish passage obstacles and barriers to allow adult coho salmon access to upper Parks Creek reach; evaluate spawning habitat improvement opportunities and design and implement projects that are identified through the evaluation. The flow objective for adult migration of coho salmon in this reach is 10 cfs, 11 cfs for Chinook salmon (McBain &Trush, Inc. and Humboldt State University 2013; AquaTerra Consulting 2017).

- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: implement projects to remediate fish passage obstacles and barriers to juvenile coho salmon movement; develop and implement a coordinated diversion management plan to augment flow and water quality conditions; implement investigation of the hydrograph and hydrologic conditions (flow, temperature, groundwater/surface water interaction, surface/subsurface return flows, etc.) to evaluate the potential of sub-reaches to support rearing juvenile coho salmon; install riparian fencing and develop a riparian management plan to encourage development of a mature riparian vegetation community, to stabilize channel banks, and to improve floodplain connectivity and function. The flow objectives for this life stage seek to mimic the natural snow melt hydrology with a minimum peak flow of 20 cfs (Table 1, Reach 2A). Spring flows that mimic snowmelt hydrology are recommended to help restore natural ecological processes that favor riparian recruitment and provide natural ques for fish response as flows decrease to a summer base flow in Mid-June. Summer base flow objectives should attempt to maintain flow connectivity, optimize water temperatures, maintain suitable fish passage conditions, and provide conditions that inundate of food producing riffles.

- Juvenile Over-Wintering: similar to summer rearing habitat conditions described above, over-wintering habitat in Upper Parks Creek also varies by sub-reach, with the channel upstream of Old Highway 99 likely experiencing excessive velocities during high discharge events, the channel

between Old Highway 99 and the railroad bridge offering valuable instream habitat complexity and refuge, and the reach below the railroad lacking velocity refuge. Evaluate the feasibility and cost-benefit of channel rehabilitation below the railroad crossing; improve access and quality of off channel habitats present within the flood plain in the middle reach between old Highway 99 Bridge and the railroad crossing. McBain & Trush, Inc. (2013) recommended a flow of 10 cfs to provide favorable conditions for egg incubation and over wintering habitat. AquaTerra Consulting (2017) conducted a critical riffle study to determine flow levels needed to provide fish passage for all coho salmon life stages through Parks Creek. Results of the study showed that a flow of 5.6 cfs would provide adequate fish passage for smolt emigration at all riffles (0.4 ft. of depth) with one exception. Based on these results the Permitted proposed to provide a minimum flow 6.0 cfs which assumes that flows at this level will provide adequate coverage and water velocity to fully protect any redds and incubating eggs that may be present in this reach. The Permittees have agreed to conduct additional studies during the first five years of the Agreement to verify that 6.0 cfs does provide suitable conditions for egg incubation. Therefore, the Permittees have proposed a flow objective of 6.0 cfs for this life stage.

Mid-Parks Creek

- Adult Spawning and Migration: develop and implement a coordinated diversion management plan to provide access to and maintenance of spawning habitat; install and maintain riparian fencing and manage riparian zones to encourage development of mature riparian vegetation communities; increase channel roughness and large wood through woody riparian planting and placement of in-channel LWD to improve substrate sorting and reduce fines; conduct spawning gravel augmentation in select locations. The flow objective for adult migration of coho salmon in this reach is 10 cfs, 11 cfs for Chinook salmon (McBain &Trush, Inc. and Humboldt State University 2013).

- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: increase the extent, reliability, and connectivity of existing cool water refugia areas in this reach, guided by existing or yet-to-be developed temperature models; develop and implement a restoration strategy for Bridge Field and Black Meadow springs, creeks, and sloughs; install and maintain riparian fencing, encourage development of mature riparian communities, stabilize channel banks, improve floodplain connectivity and function; introduce large roughness elements to improve substrate sorting, reduce fines, and increase cover. The flow objectives for this life stage seek to mimic the natural snow melt hydrology with a minimum peak flow of 20 cfs (Table 1, Reach 2A). Spring flows that mimic snowmelt hydrology are recommended to help restore natural ecological processes that favor riparian recruitment and provide natural ques for fish response as flows decrease to a summer base flow in Mid-June. Summer base flow objectives should attempt to maintain flow connectivity, optimize water temperatures, maintain suitable fish passage conditions, and provide conditions that inundate of food producing riffles.

- Juvenile Over-Wintering: The alluvial channel immediately downstream of Interstate 5 contains alternate bar characteristics that may provide limited refuge from high velocities at intermediate flood flow events. Further downstream, near the confluence of the North Slough, the meander frequencies decrease and secondary off-channel features disappear. During large flood events,

sheet flows spread across adjacent pasture lands and juvenile salmonids may be vulnerable to standing as flows recede. However, the North Slough and the small spring-fed channels that feed into the slough may provide important over wintering habitats and areas of refuge during large flood events, though there is no data to support this hypothesis. In addition, these spring-fed channels and sloughs help moderate water temperatures downstream of the confluence with Parks Creek, and provide favorable rearing conditions. The flow objective for this life stage is 10 cfs (Table 1, Reach 2A)

Lower Parks Creek

- Adult Migration and Spawning: develop and implement a coordinated diversion management plan; install riparian fencing and encourage development of mature riparian vegetation communities; stabilize channel banks, improve floodplain connectivity and function; introduce large roughness elements to improve substrate sorting and reduce fines; remediate potential adult migration barrier at existing flashboard dam. The flow objective for adult migration and spawning is a minimum flow of 11 cfs (Table 1, Reach 2C).
- Juvenile Spring Redistribution, Smolt Emigration and Summer Rearing: develop and implement a coordinated diversion management plan; install riparian fencing and encourage development of mature riparian vegetation communities; stabilize channel banks, improve floodplain connectivity and function; introduce large roughness elements to improve substrate sorting and reduce fines; remediate potential adult migration barrier at existing flashboard dam. The flow objectives for this life stage seek to mimic the natural snow melt hydrology with a minimum peak flow of 20 cfs (Table 1, Reach 2C). Spring flows that mimic snowmelt hydrology are recommended to help restore natural ecological processes that favor riparian recruitment and provide natural ques for fish response as flows decrease to a summer base flow in Mid-June. Summer base flow objectives should attempt to maintain flow connectivity, optimize water temperatures, maintain suitable fish passage conditions, and provide conditions that inundate of food producing riffles.
- Juvenile Over-Wintering: install riparian fencing to encourage development of mature riparian vegetation communities, stabilize channel banks, investigate floodplain restoration incorporating off channel habitat features (i.e., side-channels, alcoves, backwaters), introduce large roughness elements to increase cover during high flow. The flow objective should provide a minimum flow of 12 cfs to support conditions for over wintering coho salmon (Table 1, Reach 2C).

As described above, the TAC developed reach descriptions and identified habitat improvements needed based on existing studies and reports, qualitative information and the need to balance beneficial actions for coho salmon with maintaining viable agricultural operations for enrolled properties. Table 3 lists the Flow Management Strategy objectives that resulted from the TAC's consideration of this information.

Table 3. Flow Management Strategy objectives and current instream flow conditions for each coho salmon life stage in the Agreement Covered Area.			
Reach	**Life Stage**	**Flow Objectives**	**Current conditions**
Upper Shasta River	Adult Migration and Spawning	10 - 13 cfs	5 - 11 cfs
	Incubation and Winter Rearing	7 - 10 cfs	3.5 - 10 cfs
	Spring Rearing, Redistribution, Emigration	20 - 25 cfs peak with declining flows to mimic snow melt hydrograph	25 - 3 cfs
	Summer Rearing	6 cfs	3 cfs
Upper Parks Creek	Adult Migration and Spawning	10 - 11 cfs	0.05 - 7.5 cfs
	Incubation and Winter Rearing	6 - 10 cfs	7.5
	Spring Rearing, Redistribution, Emigration	March-April 20 cfs; 5/16 - 5/23 = 12 cfs; 5/24 - 5/31 = 8 cfs; 6/1 - 6/10 = 4 cfs	March = 7.4 cfs April = 12.2 cfs May = 12.2 cfs June = 7.2 cfs
	Summer Rearing	1 cfs	1.45 - 0 cfs
Mid Parks Creek	Adult Migration and Spawning	10 - 11 cfs	0 - 5.4 cfs
	Incubation and Winter Rearing	10 cfs	11 - 12 cfs
	Spring Rearing, Redistribution, Emigration	3/1 - 5/15 = 20 cfs; 5/16 - 5/23 = 12 cfs; 5/24 - 5/31 = 8 cfs; 6/1 - 6/10 = 4 cfs,	Mar-4.1 cfs Apr- 8.9 cfs May - 8.4 cfs June - 2.1 cfs
	Summer Rearing	1 cfs	June = 2.1 cfs July= 0 cfs August= 0 cfs Sept = 0 cfs
Lower Parks Creek	Adult Migration and Spawning	Oct 1 - 14 = 6.85 cfs; Oct 15 - 31 = 9.85 cfs; Nov = 17 cfs; Dec = 17 cfs	Oct - 1 cfs Nov - 11.4 cfs Dec - 18.1
	Incubation and Winter Rearing	13 cfs	Jan = 17.9 cfs Feb = 18.2 cfs
	Spring Rearing, Redistribution, Emigration	March =25.85 cfs; April = 25.85 cfs; May 1-15 = 25.85 cfs; May 16-23 = 17.85 cfs; May 24-31 cfs = 13.85 cfs; June 1 - 10 = 9.85 cfs; June 11 - 15 = 6.85 cfs	March = 5.1 cfs April = 9.9 cfs May = 9.4 cfs June = 3.1 cfs
	Summer Rearing	6.85 cfs	1 cfs

Table 3. Continued.

Mid Shasta River	Adult Migration and Spawning	70 cfs	140 -170 cfs[1]
	Incubation and Winter Rearing	76 cfs to 95 cfs	257 cfs[2]
	Spring Rearing, Redistribution, Emigration	112 cfs decreasing to 39 cfs by summer	12 to 89 cfs
	Summer Rearing	28 cfs to 39 cfs	25 to 36 cfs less GID Diversion Rates

1: Average monthly flow at USGS Yreka gage for water years 2000 to 2016 for October and November.

2: Average flow at the USGS Yreka gage for water years 2000 to 2016 for December and January, combined.

Shasta River Flow Management Strategy Implementation

The following section describes each enrolled property and landowner contribution to the flow management strategy

Upper Shasta Reach

There are four enrolled properties within the Upper Shasta Reach:

- Montague Water Conservation District (MWCD)
- Seldom Seen Ranch
- Hidden Valley Ranch
- Hole in the Ground Ranch.

Montague Water Conservation District

MWCD is a public irrigation district that owns and operates Dwinnell Reservoir located in the southern portion of Shasta Valley and provides irrigation water to users within the district boundary, located in the northern portion of Shasta Valley. MWCD owns Dwinnell Reservoir, the property under the high water mark of Dwinnell Reservoir and the property along the Shasta River immediately below Dwinnell Reservoir where much of the water operations for the irrigation district occurs.

MWCD constructed Dwinnell Dam on the Upper Shasta River in 1928 with the purpose of storing water for irrigation use during the growing season. Irrigation water is released from Dwinnell Dam to the main canal where it is delivered to irrigation customers along the east side of Shasta Valley north of Dwinnell Dam between April 1st and September 30th. Lake Shastina, the reservoir pool behind Dwinnell Dam, has a storage capacity of approximately 50,000 acre-feet. MWCD holds appropriative water right permits (Permit Numbers 2452 and 2453) which give MWCD the right to divert and store a total of 49,000 acre-feet of water from the upper Shasta River (35,000 acre-feet) and Parks Creek (14,000 acre-feet) annually. The season of diversion under both of these permits begins on October 1 and ends on June 15.

The current and anticipated instream flow releases that MWCD will be releasing to the Shasta River to benefit instream habitat conditions for coho salmon are described here for background purposes.

In MWCD's application for a Corps 404 permit, MWCD proposed to implement and Conservation and Habitat Enhancement and Restoration Program (CHERP) which included a change to its operations for the delivery of water described as "CHERP flows" upon completion of main canal lining. Additionally, MWCD proposed interim increases to instream flows upon receiving section 404 permit. A key element of MWCD's proposed environmental water strategy (both interim and CHERP flows) includes the use of the Flying L groundwater pumps to provide a source of cold water (12.2°C) for fish immediately downstream of Dwinnell Dam. MWCD did not propose changes to its base operations which include diversion of water from Parks Creek, delivery of water to its customers via the main canal, or delivery of water to prior rights water users downstream in the Shasta River.

Due to the variability in storage at the onset of irrigation season, and variability in water releases for irrigation and prior rights holders, MWCD developed a water year type determination criteria and CHERP instream release volume and schedule for five water year types, very dry, dry, normal, wet and very wet. MWCD proposes to make the year type determination on, or around, March 1st and then updated on April 1st and again on May 1st. The criteria for year type determination are based on reservoir storage and snowpack, but vary between months. A process of examining changing year type within a year (from March 1 to May 1) is included to accommodate the potential changes in spring time conditions that may lead to more or less water available for the upcoming period. The method proposed to determine the water year types were developed by Watercourse Engineering, Inc. (2016) and a copy of the Technical Memorandum is included as Attachment B in the Addendum to the Biological Assessment and Essential Fish Habitat Assessment (ESA 2016). In summary, the first water year type designation decision occurs on March 1st and is based entirely on the storage volume present behind Dwinnell Dam in the reservoir as shown in Table 4. Updates to the water year type designation will occur on April 1st and then again on May 1st and both of these determinations will be based primarily on storage volume in Dwinnell Reservoir, with a secondary criteria based on the accumulated snow pack (snow water content) at Peterson Flat snow field.

Table 4. Proposed water year type designation criteria for determination of environmental flow volumes proposed under the CHERP.

Water Year Type	March 1st Storage Estimate for Dwinnell Reservoir
Very Dry	Less than 17,000 Acre Feet
Dry	Equal to 17,000 to less than 24,000 Acre Feet
Normal	Equal to 24,000 to less than 36,000 Acre Feet
Wet	Equal to 36,000 to less than 43,000 Acre Feet
Very Wet	Greater than or equal to 43,000 Acre Feet

MWCD Flow Management Strategy Contributions

The following section provides a description of the MWCD proposed flow environmental water releases to the Shasta River under the five different water year type designations. It's important to remember that summer releases under all five water year types include the use of cold water from the Flying L wells to reduce water temperatures downstream for coho salmon as the maximum water temperatures of the reservoir releases reach 18°C.

CHERP Flow Release Schedules by Water Year

Very Dry Water Year – 2662 Acre Feet:

Under a very dry water year MWCD proposes to release 2,662 Acre-Feet of environmental water between March 1st and February 28th. The schedule for environmental water releases proposed under a very dry water year is presented in Figure 2.

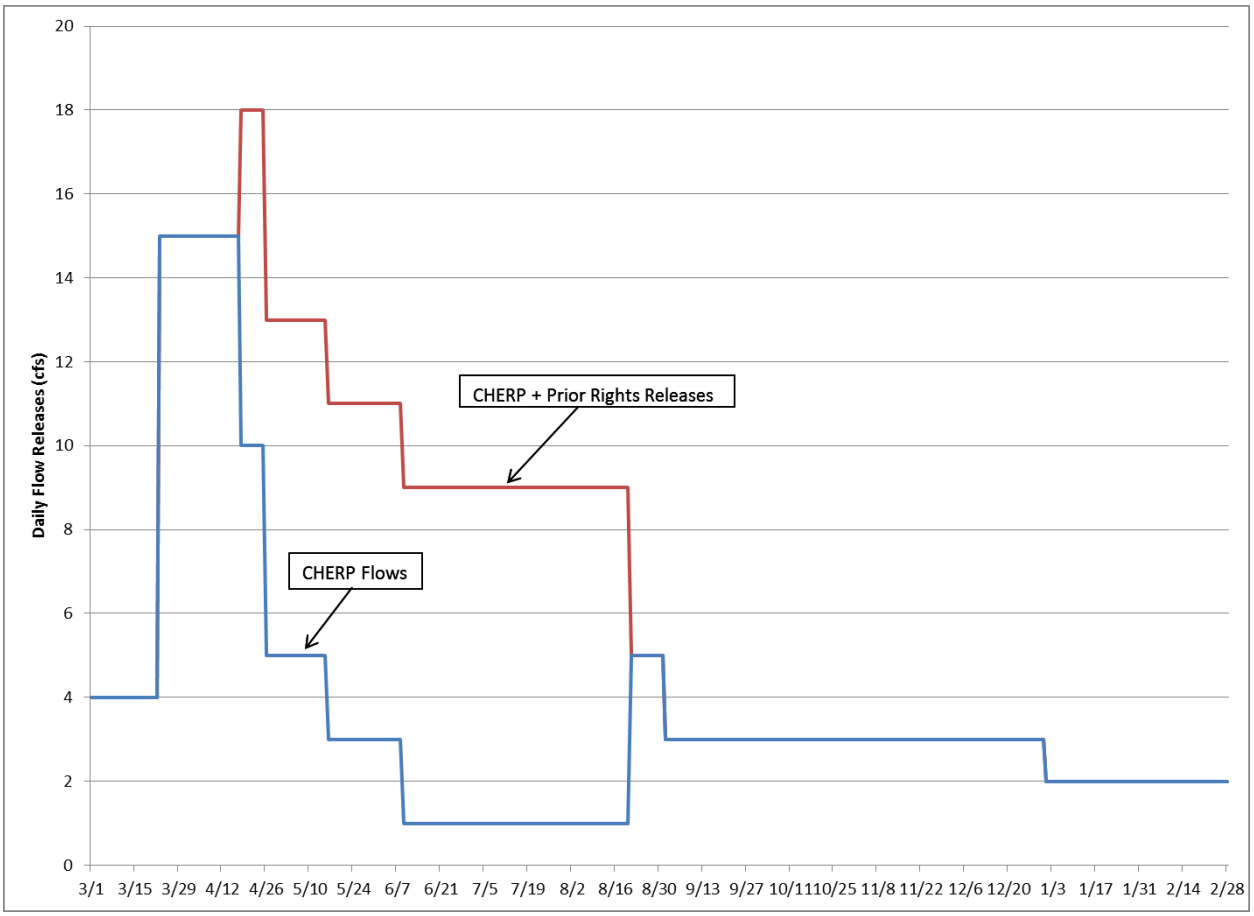


Figure 2. Total water releases below Dwinnell Dam under a very dry water year. The total releases includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season.

For the development of the Very Dry release schedule, the following information was considered:

- Spring pulse flow releases of 15 cfs will be released in late March and April to improve conditions for emigrating coho salmon smolts, and to improve conditions for movement (redistribution) of fry and juvenile coho salmon as they seek out preferred cold water habitats to rear in during the late spring and summer.
- Summer releases under the proposed CHERP will be maintained at a minimum of one cfs to help support coho summer rearing. These flows are based on the results of the temperature model and experimental flow study (AquaTerra Consulting, 2015). This one cfs release will be added to the eight cfs released for prior rights deliveries.
- When surface water releases from Dwinnell to the cross canal during the summer begin to approach 18°C the Flying L Pumps will be used to cool water temperatures by blending approximately 5.5 cfs of cold water (12.2°C) with the 0.5 cfs of cold water (12-13°C) from the Dwinnell seeps with three cfs of stored Dwinnell water. These releases are intended to maintain suitable water temperatures for coho salmon for an approximate distance of 1.2 kilometers downstream of Dwinnell Dam (AquaTerra Consulting 2015).

- In the rare event that both prior rights users on the Shasta River request temporary cessation of water deliveries during the summer of a Very Dry water year, MWCD will provide an additional 2.0 cfs (in addition to the proposed CHERP flow release of 1.0 cfs) from Flying L wells until prior rights deliveries are resumed. The purpose is to maintain cold water for coho rearing from the cold water wetland habitat near the base of Dwinnell Dam to the vicinity of the Hidden Valley springs inflows, about 2.4 river kilometers downstream (Figure 10).
- Fall releases under the proposed CHERP will be maintained at a minimum of 3 cfs during the months of November and December of Very Dry water years and would result in an estimated flow of approximately 9 cfs to 11 cfs at the Parks Creek confluence due to natural accretions (and absence of winter diversions) below Dwinnell Dam during the peak adult coho salmon migration period.
- Winter releases under the proposed CHERP will be maintained at a minimum of 2 cfs to support coho juvenile over-winter survival.

Dry Water Year – 3541 Acre Feet:
Under a dry water year MWCD proposes to release 3,541 Acre-Feet of environmental water between March 1st and February 28th. The schedule for environmental water releases proposed under a dry water year is presented in Figure 3.

The proposed Dry water year type schedule builds on the conditions provided under the Very Dry water year schedule as follows:

- The duration of spring pulse flows (15 cfs) will be extended under the Dry Water Year scenario for an additional 2 weeks to improve conditions for both emigrating smolts and for redistribution of fry and juvenile coho salmon to over- summering refugial habitats. The extended duration of the spring pulse flow seeks to mimic the natural snowmelt hydrograph under Dry Water Year conditions.
- Under Dry Water Years, summer base flows will be increased by 3 cfs for coho salmon juvenile summer rearing. The 3 cfs is based on the results of a temperature modelling and experimental flow study indicating that a maximum of 5 cfs of stored (warm) Dwinnell water can be added to the approximately 6 cfs of cold Flying L/Dwinnell seeps water (total 11 cfs for 8 cfs of prior rights and 3 cfs of instream flow) to achieve suitable downstream water temperatures.
- An additional 1 cfs will be released in November to further improve conditions for adult coho salmon migration upstream of the Parks Creek confluence with the Shasta River.

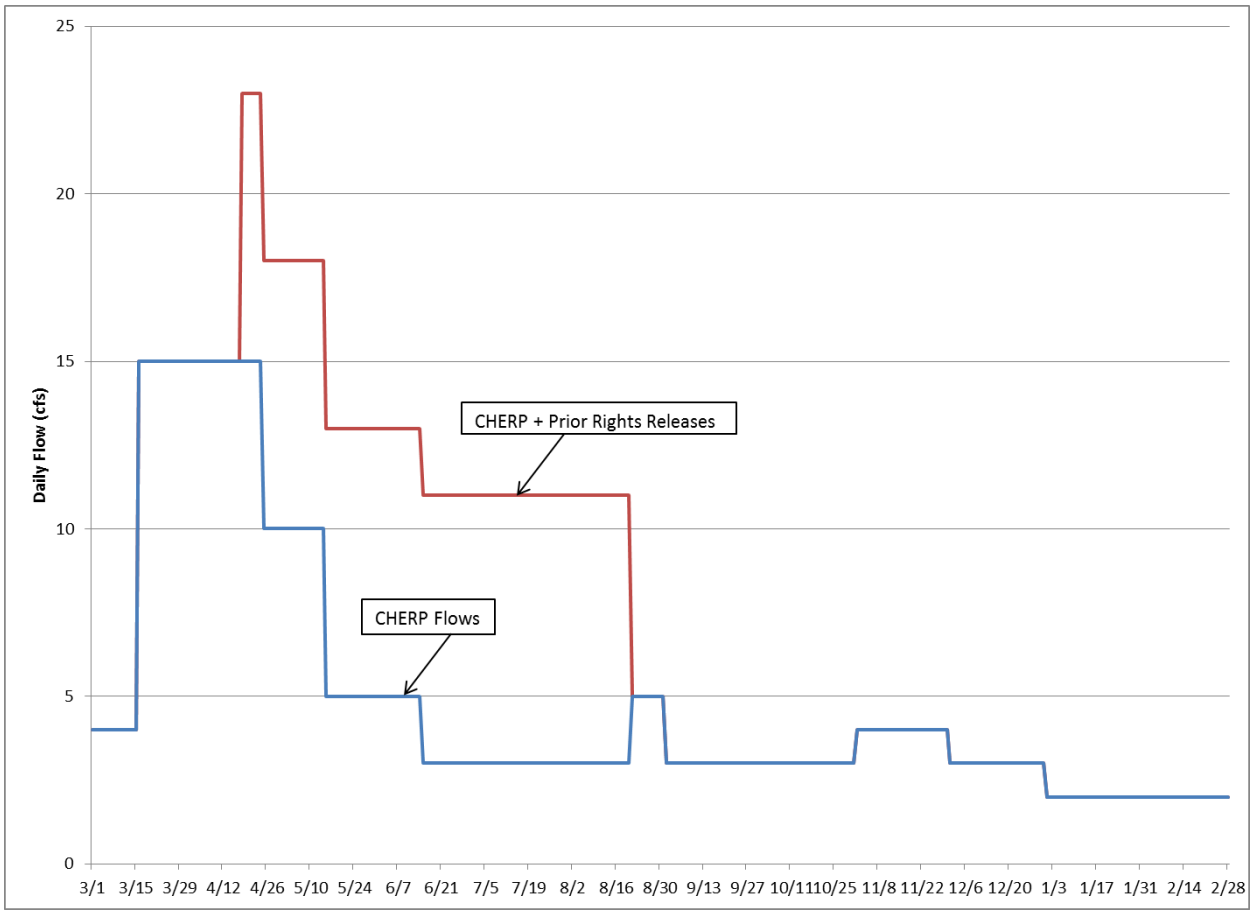


Figure 3. Total water releases below Dwinnell Dam under a dry water year. The total release includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season.

The above dry water year type schedule emphasizes spring smolt outmigration, but adds summer rearing flows consistent with the current understanding of temperature management optimization. The slight increase in November flows, combined with natural accretion in the Upper Shasta River, is intended to support adult coho salmon migration and spawning within the Hole in the Ground reach upstream of the Parks Creek confluence.

Normal Water Year – 4437 Acre Feet:

Under a normal water year MWCD proposes to release 4,437 Acre-Feet of environmental water between March 1st and February 28th. The schedule for environmental water releases proposed under a normal water year is presented in Figure 4.

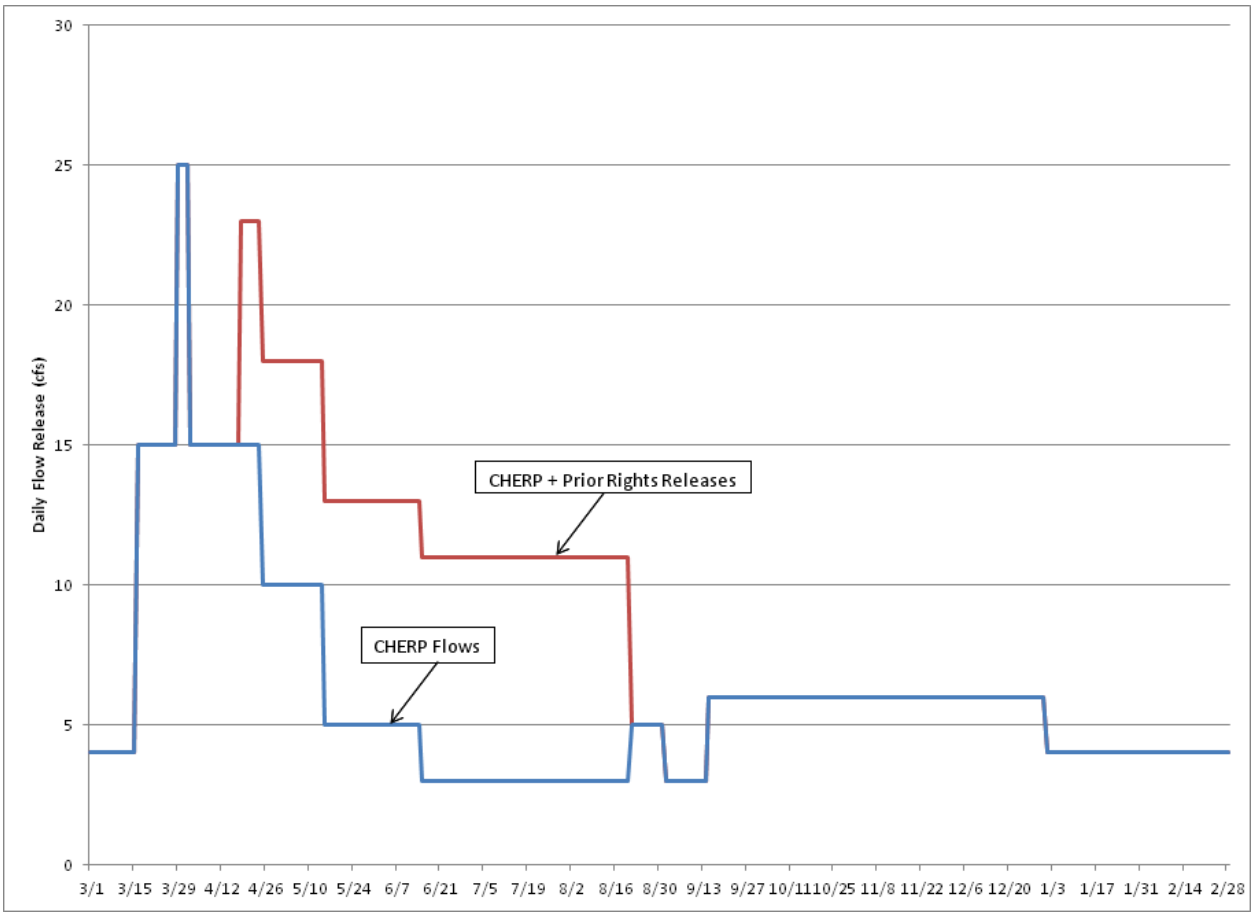


Figure 4. Total water releases below Dwinnell Dam under a normal water year. The total release includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season.

The Normal Water Year type schedule builds on the conditions provided in a Dry Water Year schedule as follows:

- Adds a 25 cfs (4 days) spring pulse at the end of March to provide smolt outmigration cue and encourage partial beaver dam breaching;

This increases flow releases to 6 cfs during adult migration and spawning seasons from mid-September through December. These releases will provide between 10 and 14 cfs of flow in the Shasta River upstream of Parks Creek where coho salmon are currently known to spawn. These improved flow releases are also intended to improve conditions for adult Chinook salmon migration and spawning in the same areas and downstream. In addition, winter base flows will be increased to 4 cfs in January through February to further enhance winter juvenile rearing conditions. These flow releases are also intended to provide stable base flow conditions for protection of incubating coho salmon embryos. In addition to providing smolt outmigration and summer rearing conditions similar to? consistent with the Dry Water Year schedule, the Normal Water Year schedule is intended to support adult migration and spawning for both coho and Chinook salmon, as well as coho salmon

juvenile winter rearing, at flow levels that, combined with natural accretion, will be within the range of flows recommended by McBain & Trush, Inc. and Humboldt State University (2013).

Wet Water Year – 6236 Acre Feet:
Under a Wet Water Year MWCD plans to release 6,236 Acre-Feet of environmental water between March 1st and February 28th. Included in the 6,236 Acre-Feet of environmental water is a block of 684 Acre-Feet of water which can be used adaptively during the year. Potential uses may include but are not limited to flushing flows for habitat maintenance or pulse flows to aid in migration, etc. The schedule for environmental water releases proposed under a wet water year is presented in Figure 5.

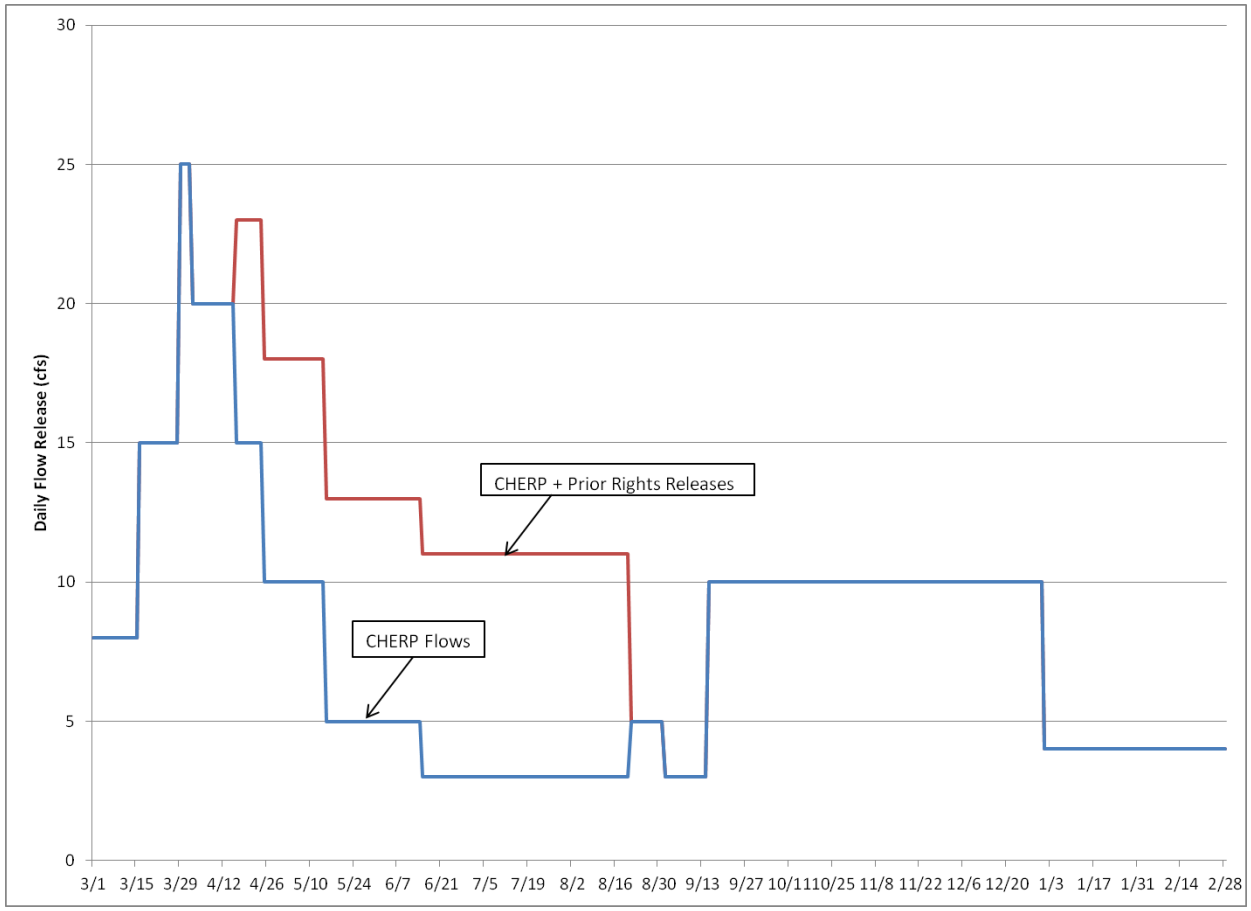


Figure 5. Total water releases below Dwinnell Dam under a Wet Water Year. The total release displayed includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season. The block water volume of 684 Acre-Feet is not included here as this water is anticipated to be used in an adaptive manner based on the hydrologic and biological needs present that year.

The proposed Wet water year type schedule builds on the conditions provided in a Normal Water Year schedule as follows:

- Flow releases are increased from 4 cfs to 8 cfs during the first two weeks of March to improve habitat and movement conditions for newly emerging coho salmon fry and for early emigration of coho salmon smolts downstream.

- The 25 cfs pulse flow at the end of March through April 1st is consistent with the Normal Water Year schedule, but the magnitude of spring pulse is increased to 20 cfs through April 15 to further improve conditions for smolt emigration and fry and juvenile redistribution. Flows at this level are also intended to improve rearing habitat through bench inundation of floodplain and alluvial habitat features downstream. Flows at this level are also intended to encourage flushing of fine sediments and organic material from the stream channel and numerous beaver dams present between Dwinnell Dam and the confluence of Parks Creek. The magnitude and duration of spring flows is increased over the normal year schedule to better simulate natural snowmelt runoff conditions under a wet water year type.
- Fall and winter flows from mid-September through December are increased to 10 cfs to further improve conditions for adult coho and Chinook salmon migration and spawning. Flow releases of 10 cfs from Dwinnell Dam are anticipated by MWCD to provide about 14 to18 cfs upstream of the Parks Creek confluence.
- The Wet Water Year schedule includes an addition block of 684 AF of water which is intended to be used adaptively based on current environmental conditions and expanding knowledge of coho salmon habitat use as conditions improve over time. Potential uses for this block of water are anticipated to include implementation of channel maintenance and/or sediment flushing flows to improve habitat quality and diversity, improve spring rearing and migration conditions, or to further improve adult migration and spawning habitat conditions in the fall/winter.

In summary the wet year schedule further increases flows throughout much of the year (except summer base and winter base) while also providing for a block of water to be managed adaptively to improve habitat quality and diversity under wet water year types. The schedule also attempts to mimic natural snowmelt runoff conditions under wet water types.

Very Wet WY – 8152 Acre Feet:
Under a very wet water year MWCD proposes to release 8,152 Acre-Feet of environmental water between March 1st and February 28th. Included in the 8,152 AF of environmental water is a block of 1,154 Acre-Feet of water to be used adaptively during the year. Potential uses may include but are not limited to flushing flows for habitat maintenance or pulse flows to aid in migration, etc. The schedule for environmental water releases proposed under a wet water year is presented in Figure 6.

The proposed Very Wet Water Year type schedule builds on the conditions provided under a Wet Water Year schedule as follows:

- Flow releases are increased to 10 cfs at the beginning of March to further improve habitat and movement conditions for newly emerging coho salmon fry and early emigration of coho salmon smolts downstream, which better mimics Spring hydrologic flow conditions under a Very Wet Water Year.
- The duration of increased flows through May are intended to mimic snowmelt flow conditions and further improve conditions for emigration of smolt coho salmon and for rearing and redistribution of fry of juvenile coho salmon. Specifically, under a Very Wet Water Year type the duration of the 25 cfs peak flow is extended through April 15 and the duration of the 20 cfs flow is extended through

April 30. The magnitude of flow releases also is increased from 10 cfs to 15 cfs between May 1 and May 15. The magnitude of flow releases from May 15 through May 31 is increased from 5 cfs to 10 cfs, and a release of 5 cfs is extended through June 14, provided that suitable water temperatures can be maintained downstream in this reach.

- Flow releases are increased from 10 cfs to 13 cfs between October 1 and November 30 to improve conditions further during the peak coho and Chinook salmon migration and spawning season. Flow releases of 13 cfs are anticipated to provide flows between 17 and 21 cfs upstream of the Parks Creek confluence.
- The very wet water year release includes an additional block of 1,154 AF of water to be used adaptively based on needs (environmental conditions and expanding coho salmon habitat use) as conditions improve in the future. Potential uses for this block of water are anticipated to include implementation of channel maintenance and/or sediment flushing flows to improve habitat quality and diversity, improve spring rearing and migration conditions, or to further improve coho and Chinook salmon adult migration and spawning habitat conditions in the fall and winter.

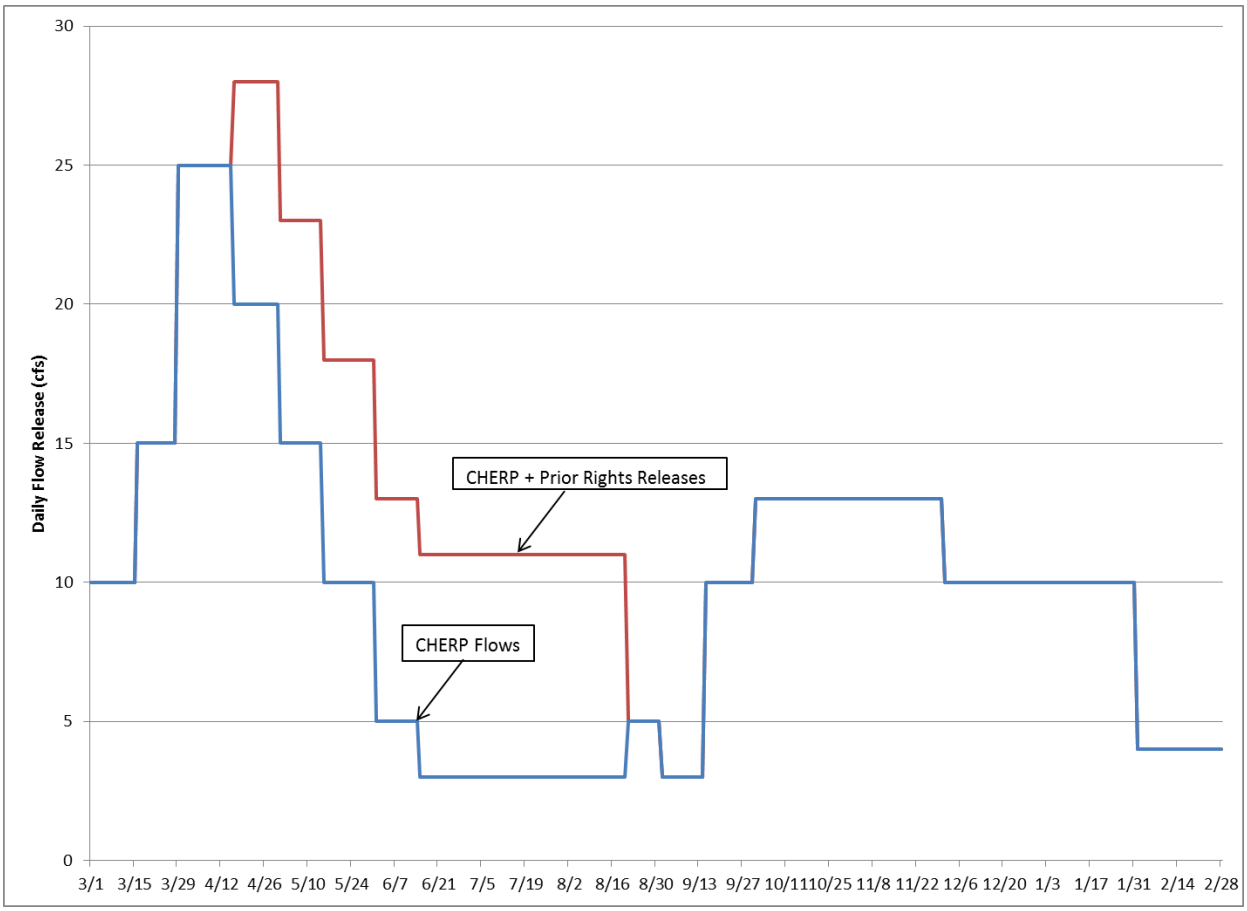


Figure 6. Total water releases below Dwinnell Dam under a Very Wet Water Year. The total release displayed includes both the proposed CHERP environmental water releases along with the assumed timing of prior rights water releases that typically occur during the irrigation season. The block water volume of 1,154 Acre-Feet is not included here as this water is anticipated to be used in an adaptive manner based on the hydrologic and biological needs present that year.

MWCDs' Interim Flow Schedule

Because the infrastructure modifications to the main canal may take several years to complete, water savings from this action would not be available to provide the full CHERP flow schedule immediately upon the issuance of the Section 404 permit and Section 7 permit under the ESA. Instead, MWCD has agreed to implement an interim flow schedule with conservation measures aimed at meeting the minimum needs of coho salmon. As facilities are upgraded, additional volumes of water can be delivered with the proposed CHERP flows fully implemented at the end of the five-year Corps permit. The interim flow plan includes ongoing flow releases that are consistent with a December, 2013, Settlement Agreement between MWCD, Klamath River Keeper, and the Karuk Tribe, along with two additional conservation measures that are intended to benefit coho salmon. First, MWCD proposes to release a total volume of 2,662 acre-feet in years when storage is less than 18,000 acre-feet on April 1 (consistent with a Very Dry Water Year type). This is a net increase of 412 acre-feet above the current baseline of Settlement Flow releases. Second, under Settlement Agreement flows, MWCD's summer environmental flow releases are constrained by the temperature of water stored in Dwinnell Reservoir. Under the interim flow plan, MWCD proposed to utilize discharges from its Flying L pumps in consultation with NMFS to improve the water quality (i.e., temperature) of flow releases consistent with proposed CHERP operations for all water year types. Utilization of the Flying L pumps will allow for greater summer release rates and/or cooler water releases than are currently possible under Settlement Agreement operations.

Prior Rights

Water rights that were established prior to the construction of the Dwinnell Dam are currently held by several owners downstream and are typically referred to as "prior rights." The total volume for these prior rights is 3,382 acre-feet. This volume of water is held in storage by MWCD behind Dwinnell Dam on behalf of the prior rights holders each year. MWCD is obligated to release these prior rights to users downstream during the irrigation season between March 1st and October 31st. When requested, prior rights water is delivered to water right holders either through releases to the main canal or to the Shasta River via the cross canal. Of the 3,382 acre-feet that comprise the total prior rights volume, 1,398 acre-feet are delivered through the main canal and the remaining 1,984 acre-feet are delivered through releases to the Shasta River. Prior rights releases to the Shasta River generally occur between April and September and release volumes are generally about 8 cfs; however, they may range between 2 to 10 cfs. When prior right releases of 8 cfs are provided by MWCD, prior right holders typically divert 2 cfs at Point of Diversion (POD) 158, 4 cfs at POD 165 and 2 cfs at POD 166. A more detailed description of these prior rights releases is provided for each POD in the following section for each Participant.

Seldom Seen Ranch

The Seldom Seen Ranch is approximately 1,421 acres and is located north of Lake Shastina and west of Big Springs Road. The Ranch shares an eastern and northeastern boundary with the Shadow Hills subdivision. To the north lie the Mallet Hidden Valley and Hole in the Ground ranches and to the west, the Shasta Springs Ranch. The ranch is used primarily for beef cattle production and is currently managed as an integrated unit with three other ranches owned and managed by the Permittee. The ranch is irrigated with groundwater or precipitation.

The Seldom Seen Ranch has a Prior Rights Agreement with the Montague Water Conservation District (MWCD) and is supplied from stored water, on demand and under the supervision of the Shasta Valley Water Master, released from Lake Shastina via the cross canal at the base of Dwinnell Dam in lieu of the natural flow of the river. This right is for up to 924 acre-feet.

There are four points of diversion on the Seldom Seen Ranch. One of these is currently the irrigation diversion for the neighboring Hidden Valley Ranch. The other three diversions historically diverted irrigation, stock, and domestic water for the Seldom Seen Ranch, but are currently non-active. The soils of the Seldom Seen are good but porous and the long, unlined ditches were inefficient, so the ranch converted to groundwater use for irrigation. The Seldom Seen Ranch has a production well with approximately a 1330 gpm flow rate, supplying about five-thousand feet of pressurized pipe for wheel-lines. The Seldom Seen Ranch uses their Summer Priority irrigation right at their other place of use with a similar "Prior Rights" agreement, i.e. downriver on the Hole in the Ground Ranch. The Seldom Seen Ranch is irrigated with groundwater. The stock watering right is used by the cattle at protected watering access lanes on the Shasta River.

Hidden Valley Ranch

Hidden Valley Ranch (HVR) is located along Big Springs Road and includes a total of 431± acres, with 150 ± acres under irrigation. The HVR is generally a cow/calf operation with a small segment of the operation producing sheep. Approximately 1.5 miles of the Shasta River is adjacent to the HVR.

The ranch's diversion 158 is a prior right with a storage right of 464 acre-feet, which is stored in Dwinnell Reservoir and released between March 1 and November 1. The delivery rate is generally 2 cfs during this period, however deliveries can be delayed or curtailed during part of the irrigation season. It is delivered by MWCD via the cross canal to the Shasta River, it is then diverted approximately 1,219 meters downstream from MWCD main canal, which is located on a neighboring property and conveyed to HVR by a combination of open ditch and pipeline. There are two springs sourced just adjacent to the Shasta River, near the south property boundary. These two springs are included in the Shasta River Decree, listed as diversion numbers 160 and 161 with a combined right of 0.25 cfs. These springs often produce water in excess of the adjudicated right and the ranch has historically used that excess under a riparian right. Hidden Valley Ranch also has a spring/seep located up gradient from the previously described adjudicated springs, which have also been used for irrigation under the ranch's riparian rights.

Hole in the Ground Ranch

The Hole in the Ground Ranch is approximately 3,120 acres and is located north of Lake Shastina, and west of Big Springs Road. Streams flowing through the Ranch include the Shasta River, Parks Creek, and Hole in the Ground Creek. The confluences of the creeks with the Shasta River are downstream of the property on what will soon be the Shasta Big Springs Wildlife Area. The Ranch is used primarily for beef cattle production and is currently managed with the Permittee's other ranches, also covered under the Agreement.

The Hole in the Ground Ranch has a Prior Rights Agreement with the MWCD for up to 1520 acre-feet, which include the Seldom Seen Prior Right. This water can be delivered at either one or both of two surface diversions on the ranch. The "Gravity Ditch/Diversion" (Shasta Decree Diversion #165) consists of a headgate on the river-right bank of the Shasta River just downstream of the south property line. Head is created by a

constructed roughened channel. The "Gravity Diversion" supplies about 4 cfs of water to irrigate pastures on the east side of the river.

The second POD (Shasta Decree Diversion #166), commonly referred to as the "Cone Screen" diversion, supplies a pumping station and sump located approximately 250 feet off-channel, approximately 0.8 mile downstream of the Gravity Diversion. There are two pumps, one with a capacity to divert about 2,000 gallons per minute (gpm) or 4.4 cfs, and the other has a capacity to divert about 2,200 gpm or 4.9 cfs. Depending on demand, one or the other pump is operated to deliver water to the head of a distribution ditch that is higher than the river. This and lateral ditches supply irrigation water to pastures on the west side of the river and the east side of Parks Creek.

The Hole in the Ground also receives irrigation from two springs. One of these, "Clear Spring", is diverted under License 4151 from the State Water Resources Control Board, Division of Water Rights. Clear Spring flows a few feet from its source into the Shasta River downstream of the Gravity Diversion and the river is used to convey the water right for re-diversion at the Cone Screen diversion 0.5 mile downstream. Clear Spring flow ranges from about 1.0 to 3.5 cfs. The license is for the purposes of irrigation and stockwater and is limited to the amount actually beneficially used for those purposes and shall not exceed 2.5 cfs to be diverted in the period from about March 1 to about November 1 of each year, for irrigation and throughout the year as needed for stockwater. The POD is under the supervision of the Watermaster and as a practice, diverts less than the permitted amount to accommodate spring fluctuation and water quality for fisheries.

The second unnamed spring originates on the Seldom Seen Ranch and is diverted at either POD on the Hole in the Ground under a riparian claim. The spring does not flow in every year, and is not necessarily used in every year it flows. In years when the spring flows, it appears as a small seep in Feb-April, but relatively quickly can increase to more than 2 cfs, sometimes to as much as 9 cfs. Anecdotal evidence suggests that spring flow does not emerge until Lake Shastina storage exceeds some undetermined amount (>30,000 AF). When available and use is anticipated, the flow is measured at its source on the Seldom Seen Ranch and the amount is offset by a corresponding amount of stored water *not* released from Lake Shastina, thereby making the stored water allotment available for use later in the irrigation season. Review of historic Watermaster records suggest this practice started soon after the reservoir came on-line, in the mid-1930s. Measurement records do not exist prior to 2003 and since diversion does not occur every year, the record since then is also sparse. The most recent recorded amount was for a maximum 1040 acre-feet annual use, as reported to the State Waterboard's Electronic Water Rights Information Management System (eWRIMS) under ID S023972.

Upper Shasta Reach Estimated Reach Accretions/Depletions

This reach includes MWCD and three downstream ranches. However, only Hidden Valley Ranch and Hole in the Ground Ranch have active surface diversions that affect surface flow management. There are three active points of diversion on the Upper Shasta reach, primarily delivered from MWCD as prior rights. Diversion amounts can vary depending upon how prior rights are being utilized by the ranches and at times during the irrigation season the ranches may call on MWCD to reduce prior rights deliveries from Dwinnell Dam. Thus, diversions (depletions) can vary from 0 to 10 cfs along this reach, some of which returns to the river (accretions) as fish screen bypass water and tailwater returns. It should be noted that many of the tailwater returns in this reach have been greatly reduced within the last several years due to improved management and

infrastructure. During the summer 2015, stream measurements indicated that the reach from MWCD cross canal through Hidden Valley Ranch is a losing reach with an unaccounted depletion of between 0.9 and 1.3 cfs. Stream measurements taken at the same time indicated that the reach from Hidden Valley's north property line to Hole in the Ground's north property line is a gaining reach, with accretions calculated to range between 5 cfs and 10 cfs. This accretion calculation includes the discharge from Clear Springs on the Hole in the Ground Ranch, which was measured to be around 2.2 cfs at the time of the assessment.

Development of more efficient water conservation practices will influence the accretion rates returning to the river that have been observed under current irrigation conditions. Therefore, it is uncertain how much these accretion rates will be affected as more efficient water conservation practices and facilities are implemented over time. In addition, spring flows that emerge at several locations downstream of Dwinnell Dam and along Parks Creek may also be influenced by storage elevations in the reservoir, while other spring sources appear to be influenced by other factors that including snow pack, groundwater pumping, and other factors which are not yet identified.

Existing Upper Shasta Flows

Since the CHERP flows will not be available until after the water conservation efforts are completed to the main canal, the following schematic (Figure 7) illustrates the diversions and accretions in the Upper Shasta reach without the CHERP flow commitments. This schematic also does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices and provides a simple illustration of the historic flow patterns primarily driven by irrigation management practices. MWCD's interim flow schedule is currently in place and in the future MWCD intends for the CHERP flow schedule to be included under the safe harbor agreement permit process once the existing Section 7 Permit expires in September of 2022 or sooner. MWCD also proposes additional water management actions as part of the SHA that are described in the Upper Shasta Flow Management Strategy section below. In addition, MWCD is seeking a State Water Code 1707 dedication for their CHERP flow to insure this environmental water remains instream and is protected from diversion by water right and riparian diverters downstream.

Upper Shasta River - Existing Flow Conditions
Irrigation Season: March 1 - November 1

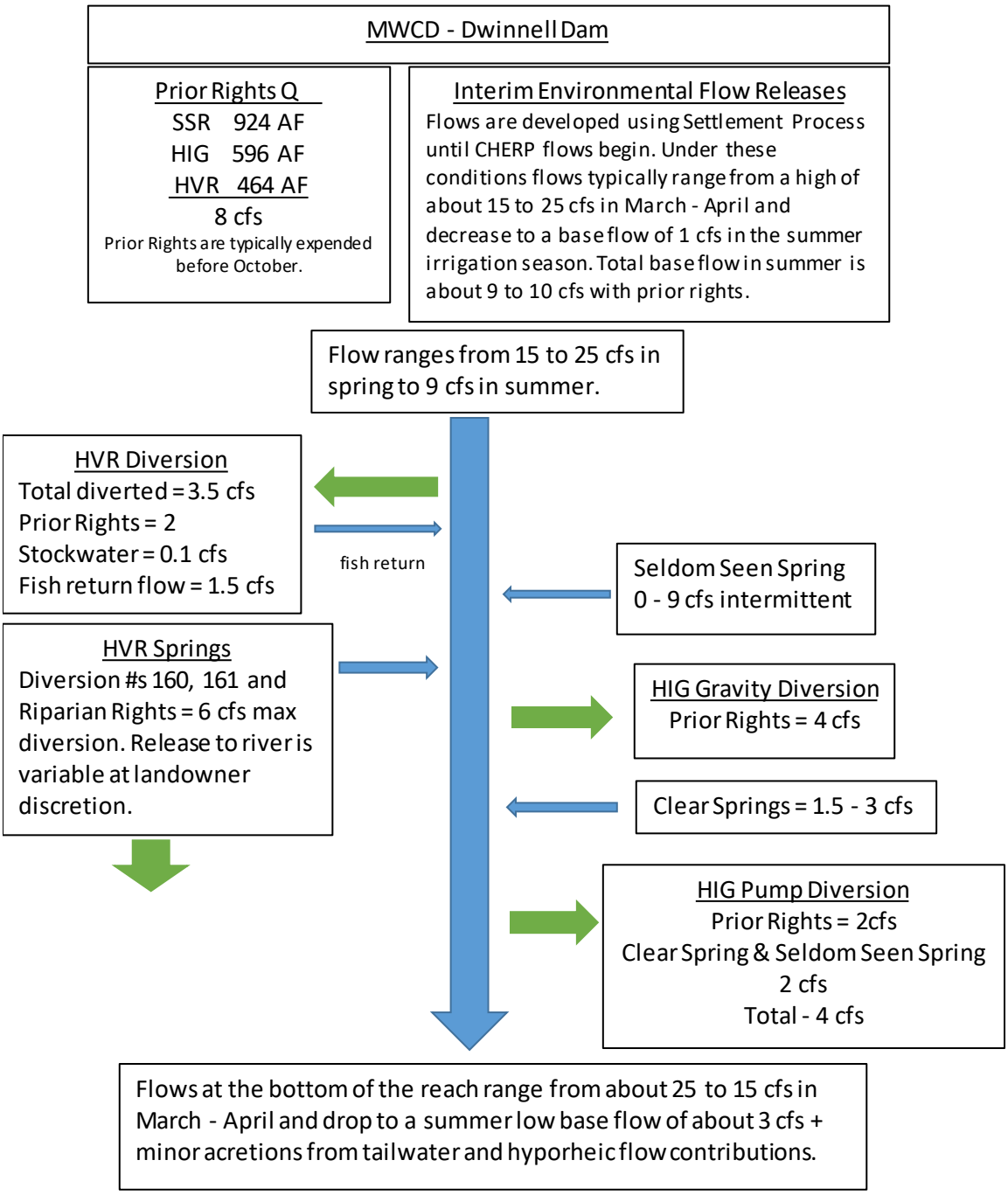


Figure 7. Flow schematic of the existing conditions in the upper Shasta River between Dwinnell Dam and the confluence with Parks Creek during the summer season (March 1 to October 31).

Upper Shasta Flow Management Strategy

The following section describes the TAC's life stage objective and each Permittee's flow commitment needed in order to collectively meet the outlined flow objectives for the reach. Since the flow available in the reach is highly dependent upon proposed MWCD CHERP releases, which in turn are dependent upon five water year types proposed by MWCD to guide its flow management, the following MWCD commitment is presented in terms of water years types.

Adult migration and spawning (October 1 to December 31) Flow Objectives:

A. Base Flows - Develop a flow strategy that ensures a minimum 10 cfs, October 1st - December 31st (Table 1, Reach 1C).

B. Pulse Flows - Short term pulse flows may be beneficial to assist movement of adult coho salmon through beaver dams and allow access to newly restored spawning habitats proposed to be created under the Agreement through gravel placement downstream of Dwinnell Dam. The magnitude of these pulse flows is uncertain and would need to be monitored during various flow release levels to determine the optimum range of flows that will provide adult passage over time.

Adult migration and spawning (October 1 to December 31) Permittee Commitments:

MWCD: Under the CHERP flow schedule winter releases will range between 3 and 13 cfs of streamflow in the Upper Shasta River beginning in October dependent upon water year classification as follows:

"Very Dry Year" = 3 cfs will be released October through December.

"Dry Year" = 3 cfs will be released in October, 4 cfs in November, 3 cfs in December.

"Normal Year" = 6 cfs will be released October through December.

"Wet Year" = 10 cfs will be released October through December. In addition, MWCD will provide a 684 acre-foot block of water to be used adaptively in fall/winter of Wet Years for flushing, habitat maintenance, or migration.

"Very Wet Year" = 13 cfs will be released October through November, 10 cfs in December. In addition, MWCD will provide a 1,154 acre-foot block of water to be used adaptively in fall/winter of Very Wet Years for flushing, habitat maintenance, or migration.

Hidden Valley Ranch: The spring production on the ranch is variable in the winter, but when producing, it will be continuously released to the river, could be between 0.5 and 3+ cfs. During very dry years, it is anticipated that the spring might dry completely and not be available for instream use. The spring flow will be measured in real-time to assist in management, releases to the river, and irrigation use will be reported annually.

Hole in the Ground Ranch: The ranch has up to a 2.5 cfs winter rights from Clear Spring, which is kept instream and used for stockwater accessed directly from water lanes on the river. Clear Spring's production is continuously released to the river, producing between 1.0 and 3.5 cfs.

Upper Shasta Reach Total Flow Contributions: Adult Migration and Spawning

Winter instream flows are expected to be between 5.0 and 20.5 cfs at the bottom of this reach depending on water year type. The following schematic (Figure 8) illustrates the diversions and accretions in the Upper

Shasta reach. Water temperatures are cooling during this time of the year and we anticipate that water exchanges (warm water for cold spring water) between MWCD, Hidden Valley Ranch and Hole in the Ground Ranch will cease to occur. This does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

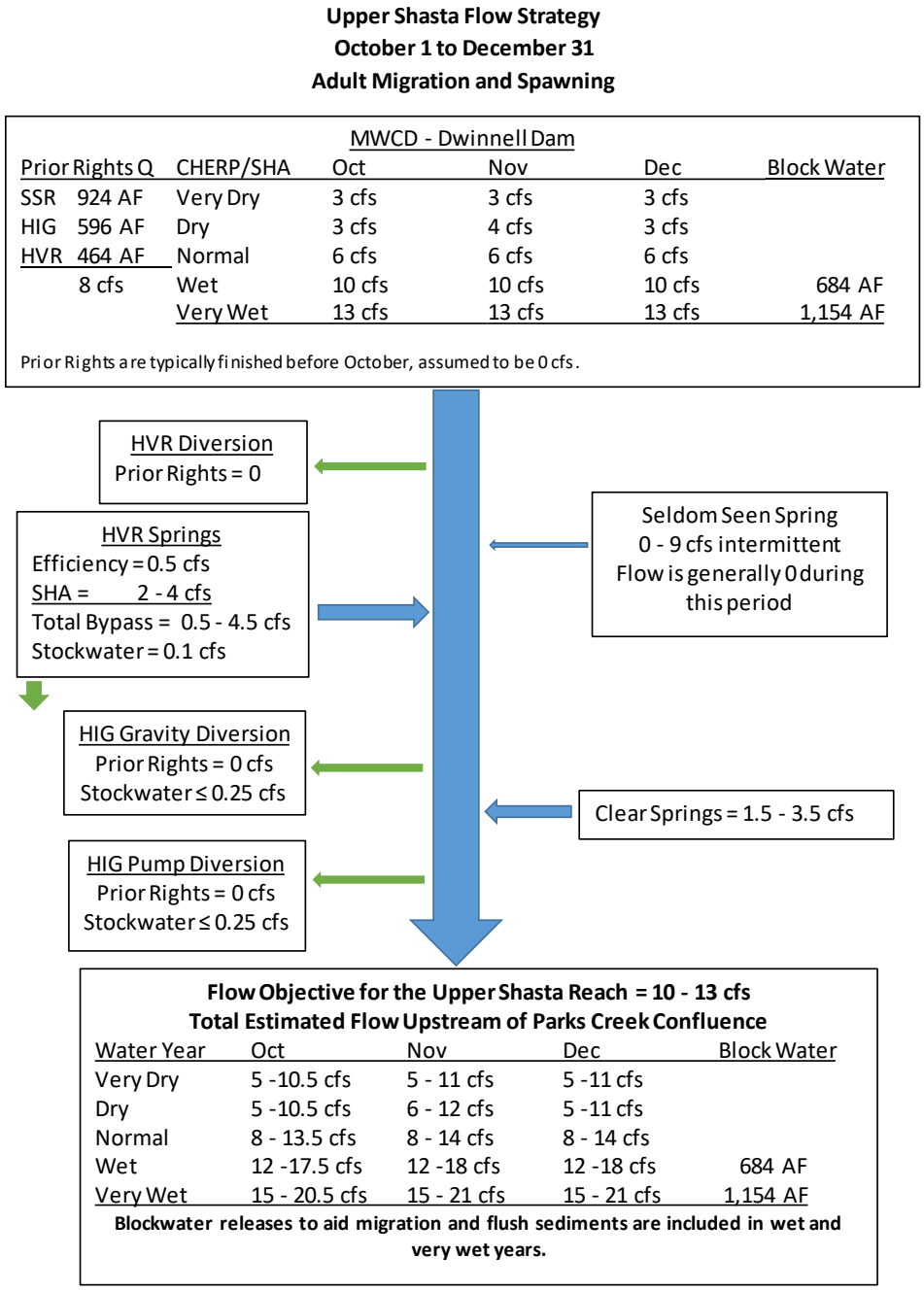


Figure 8. Estimated flow schematic for the Upper Shasta River under future conditions with CHERP and SHA proposed flow management during the adult migration and spawning season after all conservation measures have been implemented.

Egg incubation and winter rearing juveniles (January 1 to February 28) Flow Objectives:

This reach is protected from intermediate flood flows by the presence of Dwinnell Dam. However, large flood events can cause Dwinnell to spill high flows on rare occasions. Development of alcoves along with placement of large wood is intended to increase hydraulic and habitat diversity, improve cover, and provide juvenile coho salmon with areas to seek refuge during rare spill events. In MWCD's Site Plan they have also proposed to investigate installing a retrofit of trash racks and gate adjustment infrastructure to the mid-level spill gates on the spill tower. If feasible this will allow MWCD the flexibility to provide flushing flows to enhance habitat and trigger sediment transport below Dwinnell Reservoir during wet and very wet years. These modifications would also allow some relief during large floods by increasing the duration of intermediate flows and reducing the magnitude of peak flows.

A. Base Flows - The minimum flow objectives for over wintering coho salmon at the lower end of this reach as defined by McBain and Trush, Inc. and Humboldt State University (2013) range from 7 cfs to 10 cfs (Table 1, Reach 1C).

Egg incubation and winter rearing juveniles (January 1 to February 28) Permittee Commitments:

MWCD: Winter releases of between 2 and 10 cfs of streamflow in the Upper Shasta River beginning in January will be dependent upon water year classification as follows:

"Very Dry Year" = 2 cfs will be released January and February.

"Dry Year" = 2 cfs will be released January and February,.

"Normal Year" = 4 cfs will be released until the end of February.

"Wet Year" = 4 cfs will be released through January and February.

"Very Wet Year" = 10 cfs and 4 cfs will be released in January and February, respectively.

Hidden Valley Ranch: The spring production on the ranch is variable in the winter, but when producing, it will be continuously released to the river, could be between 0.5 and 4.5 cfs. During very dry years, it is anticipated that the spring might dry completely and not be available for instream use.

Hole in the Ground Ranch: The ranch has up to a 2.5 cfs winter rights from Clear Spring, which is kept instream and used for stockwater. Clear Spring discharge is continuously released to the river, producing between 1.0 and 3.5 cfs.

Upper Shasta Reach Total Flow Contributions: Egg Incubation and Winter Rearing

Winter instream flows are expected to be between 3.5 and 18 cfs at the bottom of this reach depending on water year type. The following schematic (Figure 9) illustrates the diversions and accretions in the Upper Shasta reach without the SHA flow commitments. This does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

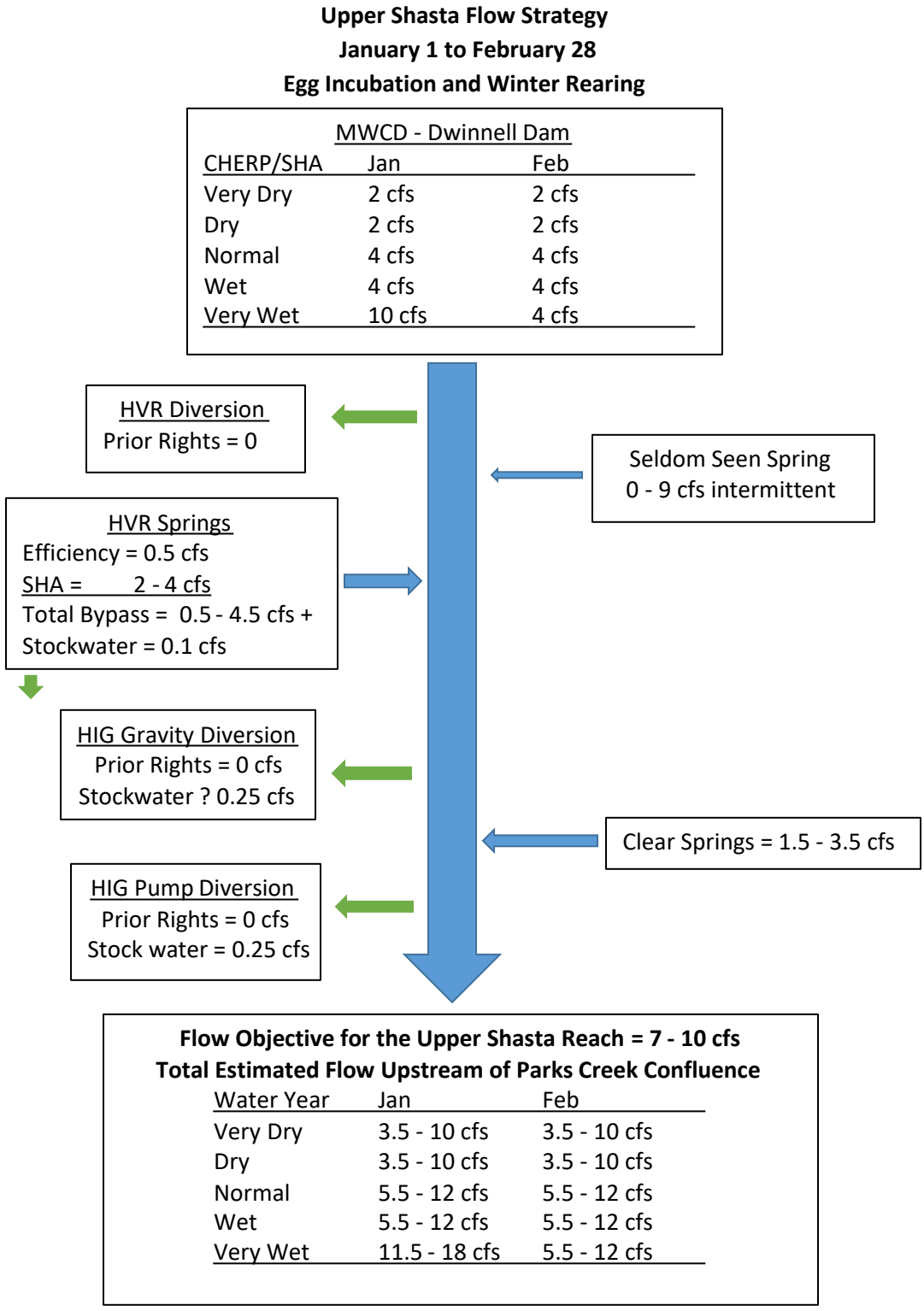


Figure 9. Estimated flow schematic for the Upper Shasta River under future conditions with CHERP and SHA proposed flow management during the winter incubation and rearing season after all conservation measures have been implemented.

Upper Shasta Reach Flow Objectives: Spring rearing, redistribution and smolt emigration (March 1 to June 15):

A. Base Flows – To the extent practicable, develop a flow strategy that ensures a minimum flow of 20 cfs (Table 1, Reach 1C). In the event that these flows cannot be achieved, ensure minimum depth of riffle crests to allow unimpeded fish passage. Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment throughout this reach. To accomplish this objective a gradual drawdown of spring flows to summer base flow levels would be desired. However, water temperature maintenance during the late spring may override this objective.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage through the numerous beaver dams that exist in this reach. A flow management strategy that includes pulse flows will help support a net conservation finding.

C. Temperature Considerations - As ambient air temperatures rise in the late spring, flow management should optimize cold water releases from spring sources and the Flying L pumps to prevent water temperatures from exceeding 18°C for as long as is possible. The primary goal is to maintain cold water (<18°C) connectivity for as long as possible. This will help to delay triggering temperature avoidance behavior by juvenile coho salmon and will help to maximize the distribution and connectivity of suitable rearing habitat within this reach.

Upper Shasta Reach Permittee Commitments: Spring rearing, redistribution and smolt emigration (March 1 to June 15):

MWCD: Spring releases of between 3.0 and 25 cfs of streamflow in the Upper Shasta River beginning in April will be dependent upon water year type as follows. For simplicity, the following release schedules do not include the 8 cfs (on average) of prior rights releases from Dwinnell Dam that will be occurring concurrently when requested by water right holders downstream. In addition to the flows below MWCD will deliver an additional 3 cfs of exchange water downstream to HVR and HIG Ranch when temperature triggers are met.

" Very Dry Year" = 4 cfs at the beginning of March, 15 cfs released in late March until mid-April, 10 cfs at the end of April and tapering down to 5 cfs until mid-May and then down to 3 cfs for the remaining period.

" Dry Year" = 4 cfs until mid-March, then 15 cfs will be released through the end of until end of April, 10 cfs until mid-May, and 5 cfs until mid-June.

" Normal Year" = 4 cfs will be released until Mid- March, then 15 cfs will be released, with a 4 day period of 25 cfs for pulse flows at the end of March 15 cfs will be released until end of April, 10 cfs until mid-May, 5 cfs until mid-June.

" Wet Year" = 8 cfs is released until mid- March, then 15 cfs will be released, with 25 cfs for pulse flows at the end of March 20 cfs will be released until mid-April, 15 cfs until end of April, 10 cfs until mid-May and 5 cfs until mid-June.

" Very Wet Year" = 10 cfs is released until mid- March, then 15 cfs will be released, with 25 cfs for pulse flows at the end of March until mid-April, 20 cfs until end of April, 15 cfs mid-May, 10 cfs until end of May and 5 cfs until mid-June.

Hidden Valley Ranch: The ranch's prior rights can be diverted at a rate up to 2 cfs at its point of diversion. The spring production on the ranch is variable in the spring, but generally starts in March and will be used primarily for irrigation during this life stage. However, efficiency improvements on the prior rights ditch will allow the ranch to provide 0.5 cfs of spring flow for instream use during this life stage.

Hole in the Ground Ranch: The ranch's prior rights will be diverted at the gravity diversion (upstream) and/or the cone screen diversion (downstream) during this life stage and will be diverted at a maximum rate of 6 cfs. Clear spring production is continuously released to the river, producing between 1.0 and 3.5 cfs, 2 of which is diverted at the cone screen diversion. It is currently estimated that efficiency improvements on the gravity diversion will allow the ranch to provide 0.7 cfs of Clear Spring for instream use during this life stage.

Upper Shasta Reach Total Flow Contributions: Spring Rearing, Redistribution and Smolt Emigration

Spring flow management seeks to mimic the natural snowmelt hydrology by providing peak flows in March and April followed by the declining limb until base summer flow management begins in June depending on water temperatures. Instream flows vary by month and water year type. Peak flow contributions from the Upper Shasta River reach will range between 17 and 33.5 cfs in March and April, 7 and 23.5 cfs in May. Base flows in June will range between 5 and 11.5 cfs in June. When water temperatures reach 18°C flow management will shift to optimize cold water habitats. The following schematic (Figure 10) illustrates the diversions and accretions in the Upper Shasta reach with proposed Permittee flow commitments after water conservation infrastructure projects are implemented under the Agreement. This does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

Upper Shasta Flow Strategy
March 1 and June 15
Juvenile Rearing, Redistribution and Smolt Emmigration

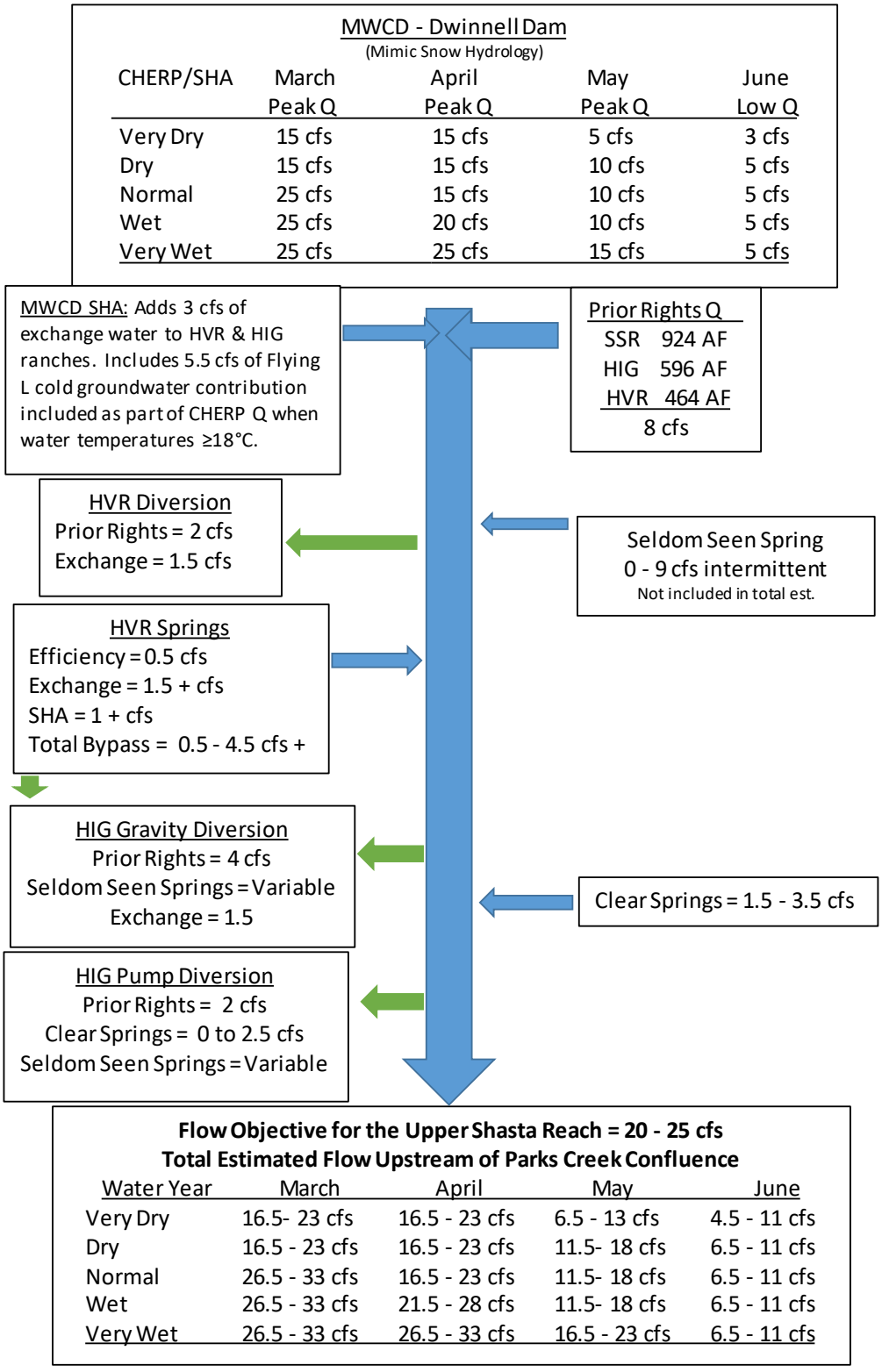


Figure 10. Estimated flow schematic for the Upper Shasta River under future conditions with proposed flow management during the spring rearing season after all conservation measures have been implemented.

Upper Shasta Reach Flow Objectives: Coho Salmon Juvenile Summer Rearing (June 15 to September 30):

The primary objective is to optimize cold water resources and flow connectivity throughout this reach. This may be possible by maximizing cold water releases, entering into water exchange agreements, relocating/combining points of diversion, and changes in irrigation management and/or use of groundwater pumps (Flying L Pumps). Flow connectivity objectives should seek to provide fish passage for juvenile salmon over critical riffles and beaver dams.

A. Base Flows – To the extent practicable, develop a flow strategy that ensures a minimum flow of 6 cfs (Table 1, Reach 1C).

Upper Shasta Reach Permittee Commitments: Juvenile Summer Rearing (June 16 to September 30):

MWCD: Summer flow releases (including prior rights releases) from Dwinnell Dam will be optimized by releasing up to 5.5. cfs of Flying L water into the channel to provide temperature benefits. Three (3) cfs of water will be designated as exchange water or environmental water. This water can be diverted by both downstream diverters (HVR and HIG) in equal exchange for spring water staying/released instream for water quality purposes throughout the reach. Water exchanges will occur when water temperatures reach 18°C at monitoring stations downstream. Whatever portion is not exchanged due to inadequate spring production will bypass downstream PODs. MWCD will release 3 cfs in addition to the 2-10 cfs of prior rights releases during this period under all water year types. MWCD will also provide an additional 2 cfs to instream flows when prior rights deliveries end for the season to gradually ramp down to a 3 cfs base flow.

Hidden Valley Ranch: The ranch's prior rights can be diverted at a rate up to 2 cfs at its point of diversion. The landowner commits to keeping the prior right delivery on during very dry and dry years and intends to fluctuate operations on normal to wet years. The spring production on the ranch is variable in the summer, but the ranch will optimize cold water releases by exchanging up to 1.5 cfs of cold spring water with 1.5 cfs of additional water provided by MWCD through releases from Dwinnell Dam when water temperatures reach 18°C at the Hidden Valley Ranch water quality monitoring station (HVR-US see Figure 1) upstream. Hidden Valley Ranch will also provide 0.5 cfs of spring water resulting from efficiency improvements and 1.0 cfs of spring water for the ranch's contribution to conservation. It should be noted that the spring flow is highly variable year to year and throughout the season and can drop down to 0.5 cfs. Hidden Valley Ranch will release between 0.5 and 3 cfs of cold spring water during this life stage. However, in normal to very wet years when spring production is in excess, the ranch could release up to 8 cfs at times. All exchanges will be in direct proportion to spring production, up to 1.5 cfs, and will be verified with real-time gaging.

Hole in the Ground Ranch: The ranch's entire prior rights delivery (6 cfs) will be diverted at the gravity diversion (upstream) during this life stage. The landowner commits to only turning down prior right deliver to 50-percent of normal delivery (3 cfs) during conditional events (rain events, maintenance) and will coordinate this with MWCD and HVR. The ranch will also divert an additional 1.5 cfs at the gravity diversion of the MWCD exchange water, with an equal portion of Clear Spring being kept instream when river temperatures at HVR-DS monitoring station (See Figure 1) reach 18°C. An additional 0.7 cfs from Clear Spring will remain instream due to conservation from efficiency improvements. Hole in the Ground will provide between 1 and

3.5 cfs of Clear Spring water during this life stage. All exchanges will be in direct proportion to spring production and will be verified with real-time gaging.

Upper Shasta Reach Total Flow Contributions: Juvenile Summer Rearing (June 16 to September 30):

Summer base flow management seeks to optimize cool water habitats throughout the reach through the use of cold groundwater and spring water contributions. These contributions would be possible through the use of groundwater pumping and exchanges of warm river water to irrigate fields for cold spring water contributions to the river. Summer instream flows are expected to be between 5 -17 cfs at the bottom of this reach. The objective is also to maintain flow connectivity throughout the reach. Landowners will commit to coordinating management of prior right releases to eliminate unexpected drop in flows downstream of Dwinnell Dam. This flow strategy will be temperature driven using 18 °C as the management trigger. Water exchanges will go into effect on both Hidden Valley Ranch and Hole in the Ground Ranch once 18°C is measured at real-time monitoring stations downstream. MWCD will also begin to operate the Flying L groundwater pumps, which release groundwater to the Upper Shasta River below Dwinnell Dam, water temperatures in the main canal reach 18°C. These shifts in flow management is anticipated to occur in June and will likely continue into September or October depending on environmental conditions. Accretions within the Hole in the Ground reach have been measured to be between 3 to 4.9 cfs in the summer depending on irrigation practices. The following schematic (Figure 11) illustrates the diversions and accretions that are anticipated to occur in the Upper Shasta reach under CHERP and SHA flow commitments. This does not account for yearly or seasonal variation due to snow pack, spring flow, storage capacity or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

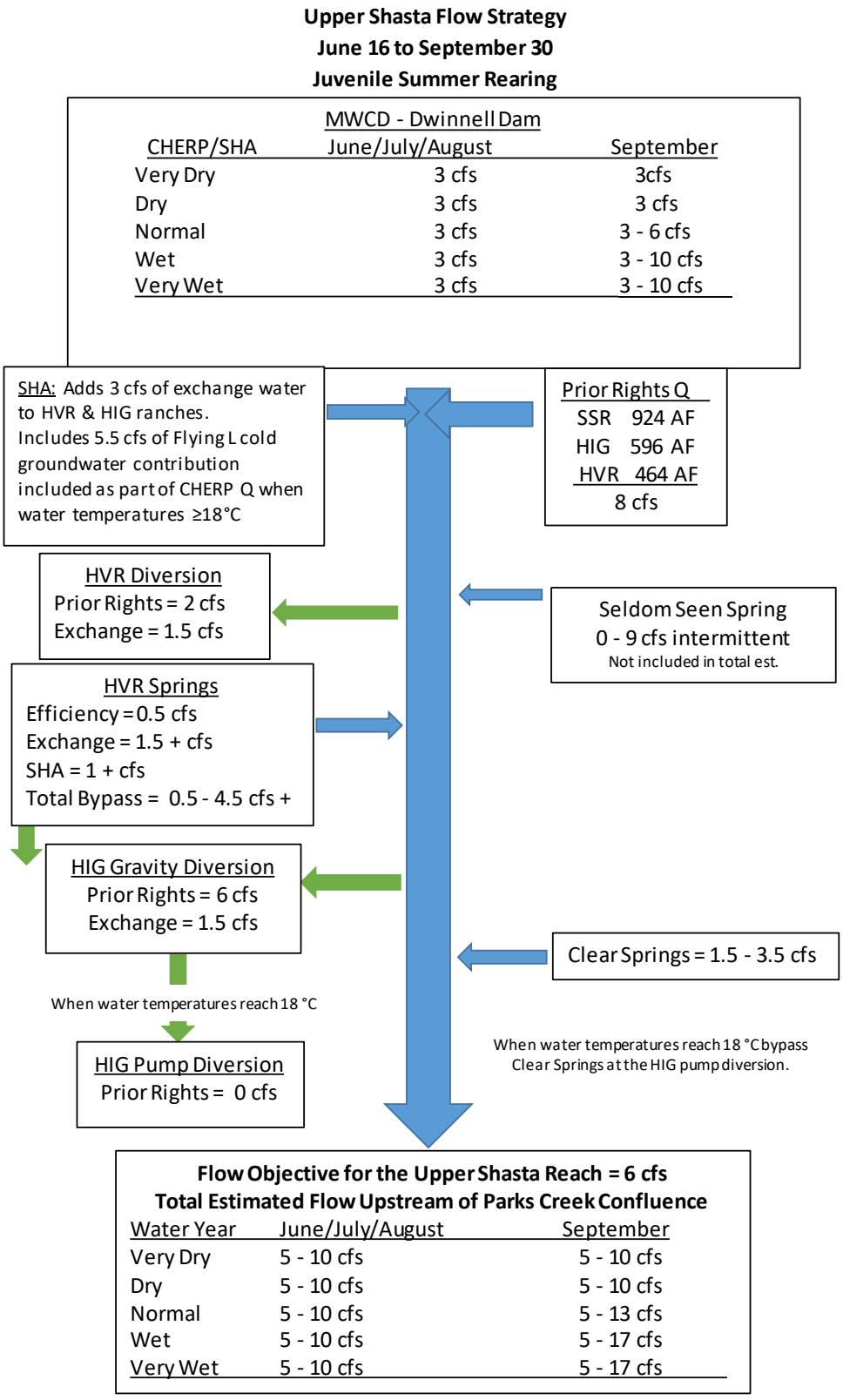


Figure 11. Estimated flow schematic for the Upper Shasta River under future conditions with CHERP and SHA proposed flow management during the spring rearing season after all conservation measures have been implemented.

Upper Shasta River Flow Management Strategy Summary

Table 5 summarizes the above described landowner commitments by water type, with estimated flows at the bottom of the Upper Shasta reach and the flow objectives for each life stage.

Table 5. Summary of the flow management strategy for the Upper Shasta Reach by life stage and water year.

Life Stage	Time Period	Water Year Type	Instream Flow Conservation Benefit in cfs				Flow Objective*
			MWCD	HVR (Springs)	HIG (Clear Spg)	Total Reach	
Adult Migration and Spawning	October 1- December 31	Very Dry	3 (Oct-Dec)	0.5 to 4.5	1 to 3.5	5-11 cfs	Base Flow= 10 cfs (Oct 1- Dec 31)
		Dry	3 (Oct), 4 (Nov), 3 (Dec)			5-12 cfs	
		Normal	6 (Oct- Dec)			8-14 cfs	
		Wet	10 (Oct-Dec) + 684 AF			12-18 cfs+ 684AF	Pulse Flows= 15-25 cfs on wet and very wet years
		Very wet	13 (Oct-Dec)+1,154 AF			15-21 cfs+1514AF	
Inclubation and Winter rearing juveniles	January 1- February 28	Very Dry	2 (Jan-Feb)	0.5 to 4.5	1 to 3.5	3.5-10 cfs	Base Flow= 7- 10 cfs
		Dry	2 (Jan-Feb)			3.5-10 cfs	
		Normal	4 (Jan-Feb)			5.5-12 cfs	
		Wet	4 (Jan-Feb)			5.5-12 cfs	
		Very wet	10 (Jan), 4(Feb)			11.5-18.5 cfs (Jan) 5.5-12 cfs (Feb)	
Juvenile redistribution and Smolt emigration	March 1 - June 15	Very Dry	15(March/April), 5 (May), 3 (June)	0.5 to 4.5	1 to 3.5	17-23 (March/April), 7-13.5 (May), 5-11.5 (June)	Base Flow= 20 cfs or min depth of CRA
		Dry	15 (March/April), 10 (May), 5 (June)			17-23 (March/April), 12-18.5 (May), 7-11.5 (June)	
		Normal	25 (March),15 (April), 10 (May), 5 (June)			27-33.5 (March), 17-23.5 (April), 12-18.5 (May), 7-11.5 (June)	Pulse Flow= 15-25 Cfs
		Wet	25 (March), 20 (April), 10 (May), 5 (June)			27-33.5 (March), 22-28.5 (April), 12-18.5 (May), 7-11.5 (June)	Temp Consideration < 18° C
		Very wet	25(March/April), 15 (May), 5 (June)			27-33.5 (March), 27-33.5 (April), 12-18.5 (May), 7-11.5 (June)	
Juvenile rearing	June 15- September 30	Very Dry	3 to 11 (8= prior rt, 3=June -August exchange/enviro) 3 to 18 (8=prior rt + 3-10=Sept Enviro)	0.5 to 4.5	1 to 3.5	5-17 cfs	Base Flow= 6 cfs
		Dry					
		Normal					
		Wet					
		Very wet					

*Note: * This target was established at the bottom of the reach on HIG Ranch.*

Parks Creek Overview

Parks Creek has been split into three sub-reaches, Upper Parks, Mid Parks and Lower Parks and described as follows:

- Upper Parks Creek – Interstate 5 Crossing to Upstream Boundary of Agreement Area (RM 8 to RM 14.5)
- Mid Parks Creek – Upstream of Kettle Springs Confluence to Interstate 5 Crossing (RM 2 to RM 8)
- Lower Parks Creek – Shasta River Confluence to Kettle Springs Confluence (RM 0 to RM 2)

There are six participants with five enrolled properties along Parks Creek:
Upper Parks Creek

- MWCD
- Edson-Foulke Ditch Company
- Parks Creek Ranch

Mid-Parks Creek

- Shasta Springs Ranch

Lower Parks Creek

- Hole in the Ground Ranch
- Cardoza

The Parks Creek irrigation season begins on March 1 and continues through October 31. Parks Creek is a snowmelt driven stream with peak sustained flows occurring during the snowmelt period of April and May, with periodic higher winter flows. Natural flow levels in Parks Creek typically begin to decline as snow fields at higher elevations melt in later May through June. As snowmelt driven flows tail off, natural flow levels in Parks Creek during this period are typically less than the total volumes of water currently adjudicated for beneficial agricultural uses along upper Parks Creek.

The annual water year varies significantly depending upon winter precipitation volume, snow pack conditions and snow-melt variability. Snow melt duration is variable dependent upon ambient temperatures and precipitation events during April and May. Regardless, a long period of base flows typically occurs in the upper reaches of Parks Creek from late-July until October. Late August-early September base flow conditions in Parks Creek reduce to approximately 3-4 cfs (normal water year) entering the upper boundary Parks Creek. Parks Creek often disconnects through an alluvial fan reach located above Old Hwy 99. Continuous and varied small accretions occur throughout all three Parks Creek reaches, which occur from either spring accretion, subsurface returns from flood irrigation or surface tailwater returns.

Upper Parks Creek Reach

Montague Water Conservation District:

MWCD has a storage right to divert 14,000 acre-feet of water from Parks Creek from October 1 to June 15th annually. MWCD diverts water from Parks Creek at a POD just downstream from the Old Highway 99 Bridge,

which is the beginning of the "Parks Creek Cross Canal". This water travels about 4,300 feet from the Parks Creek POD to the Shasta River, which then flows directly into Dwinnell Reservoir. MWCD storage right on Parks is a low priority right and their 1600 permit to divert water has established bypass requirements. Currently MWCD is required to bypass 6 cfs from November 1 through February 28 and must bypass 15.85 cfs from March 1st through June 15th when their diversion season ends. Under CHERP, MWCD proposes to increase its bypass flows from 6 cfs to 15 cfs from October 1 through December 15 to facilitate adult coho salmon migration. MWCD has a gaging station (PME) that is currently included in the California Data Exchange Center (CDEC) web site for public access. The gaging station measures bypass flows in Parks Creek immediately below MWCD's diversion point and is used to monitor minimum bypass flow requirements.

Edson-Foulke Yreka Ditch Company:

The Edson-Foulke Yreka Ditch (aka the China Ditch or Yreka Ditch) consists of 15.45 miles of open ditch delivering water to six users. Water rights held by Edson-Foulke Yreka Ditch Company (Edson-Foulke) are described in the Shasta River Decree under paragraphs 33, 116, 117, 118, 119, 120, 121, 122, 123, 124, and 324. These water rights include diversions from the Shasta River, upstream of Dwinnell Dam, Parks Creek, Willow Creek, Garden Springs, Kiernan Slough, McCloud Slough, and Whites Slough. The total amount of water adjudicated from these sources to the Edson-Foulke Ditch during the summer irrigation season is 59 cfs and during the winter the total is 27.15 cfs. Some of these water rights allow for in lieu use or combined use from multiple points of diversion. For example, Edson-Foulke has winter stockwater rights that can be diverted from either their Shasta River or their Parks Creek Diversion or can be diverted in part from both locations. These winter stockwater rights are described in paragraphs 33 (1.25 cfs), 116 (7.45 cfs), 117 (0.60 cfs), and 324 (0.60 cfs) for a total of 9.9 cfs. Edson-Foulke diverts their Parks Creek/Shasta River winter stockwater right of 9.9 cfs from their Parks Creek Diversion. Edson-Foulke has summer irrigation water rights totaling 59 cfs from all sources, which includes an adjudicated volume of 9.9 cfs for their Parks Creek Diversion. The Parks Creek summer irrigation water rights are described in paragraphs 33 (1.25 cfs), 116 (7.45 cfs), 117 (0.6 cfs), and 324 (0.6 cfs). Edson-Foulke also has a storage water right to divert 228 acre-feet to Edson and Foulke Reservoir between November 1 and March 1 annually. The locations from which this water may be diverted are described in the Shasta River Decree. The locations include Parks Creek and the Shasta River as described in paragraph 116, and Willow Creek as described in paragraph 119. Edson-Foulke intends to limit daily diversion volumes for this storage right to 5 cfs per day. Under this strategy, the storage diversion would be satisfied in about 23 days if the diversion rate is maintained at 5 cfs per day.

In summary, Edson-Foulke has adjudicated water rights for summer irrigation use from Parks Creek of 9.9 cfs and they have adjudicated water rights for stockwater use that total 9.9 cfs which Edson-Foulke plans to divert from Parks Creek and they have a storage right to 228 acre-feet which is also anticipated to be diverted from Parks Creek at maximum rate of 5 cfs per day between November 1 and March 1.

Parks Creek Ranch also has an agreement that enables them to use the Edson-Foulke Ditch infrastructure to convey 5.3 cfs of water from the Parks Creek POD from March 1 to July 10. This 5.3 cfs is a separate right from the 9.9 cfs adjudicated right of Edson-Foulke's Parks Creek diversion.

Parks Creek Ranch:

The Parks Creek Ranch uses a combination of water sources for irrigation. The ranch has a total of 28 distinct water rights identified in the Shasta River Decree that either divert from Parks Creek or a tributary to Parks Creek. Over time, points of diversion were combined into seven points of diversion on Parks Creek and six diversions on small tributary streams (Wells Creek, Spring Creek and Unnamed Fork of Parks Creek). The livestock watering rights for the ranch total 5.65 cfs. Specific to Parks Creek there are currently 18.65 cfs of irrigation rights from seven active points of diversion including 16 identified water rights. 2.0 cfs of additional rights are identified for Spring Creek. Parks Creek Ranch also has an agreement that enables them to use the Edson-Foulke Ditch infrastructure to convey 5.3 cfs of water from the Parks Creek POD from March 1 to July 10. This 5.3 cfs is a separate right from the 9.9 cfs adjudicated right of Edson-Foulke's Parks Creek diversion.

Due to available flows, as summarized above, Parks Creek Ranch operates under deficit irrigation conditions for several months including reducing the volume of acreage irrigated. As flows decline and adjudicated diversion volumes are no longer available, the Scott and Shasta Watermaster District implements a water rights priority system identified in the Shasta River Decree under authority of the Superior Court of Siskiyou County. Lower priority water rights are curtailed to assure delivery to higher priority rights. As the season progresses, the Parks Creek Ranch reduces the number of operating diversions to just 2-3 active diversions during base flows (typically diversions #1, #3 and #6), with diversion #1 being the highest priority right in Parks Creek and most important point of diversion related to irrigation value.

Parks Creek flow volumes of less than 10 cfs enter the Ranch's upstream boundary for prolonged periods during the summer and early fall. Regardless of water year type, flow volumes of less than 6.0 cfs may exist for approximately 80-100 days. Flow conditions typically increase slowly during the month of October. The Ranch currently uses the increased flows to expand irrigation at diversions #1 and #3 for a final irrigation set until the irrigation season ends on October 31, or earlier if cold weather ends the growing season..

Parks Creek Ranch has a winter right to divert 5.65 cfs to water livestock between November 1 and February 28.

Mid-Parks Creek Reach

Shasta Springs Ranch:

Shasta Springs Ranch has adjudicated rights on Parks Creek totaling 16.35 cfs, which can be taken between the five Parks Creek diversions. They also have an adjudicated right on Kettle Springs totaling 1.15 cfs and two other adjudicated rights on spring sources totaling 0.5 cfs. Bridge Field and Black Meadow springs are utilized under a Riparian Claim and water use statements are filed through the eWRIMS. All the diversions use gravity fed ditches and flood irrigation on pastures along the river. Flows coming from Bridge Field Slough were measured during the 2016 assessment and were found to have varying discharge. Bridge Field Slough receives water from several different sources that include tailwater from the Bridge Field pastures, several seeps, Duke Spring and most significantly Bridge Field and Black Meadow springs.

The spring production was monitored during the 2016 assessment; approximately 10.5 cfs was measured coming from Bridge Field Slough during May, with July contributions dropping to 4.26 cfs and November

contributions dropping to 2.3 cfs. With further review, it appears that flow from Black Meadow Springs is fairly consistent, staying around 1.5 to 2cfs and Bridge Field springs gradually curtailing production throughout the season. Kettle Springs had flows around 5 cfs in May, increasing in July to 7.5 cfs and then dropping slightly to 6.73 cfs in November.

Lower Parks Creek Reach

Cardoza Ranch:

The Cardoza Ranch has a 2.98 cubic feet per second (cfs) water right, which is included in the Shasta River Decree. The diversion is water mastered by the Scott Valley and Shasta Valley Water Master District. The water master does allow for periodic "combine and rotate" management of the diversion, where the diversion amount is increased for a shorter period of time, as long as no other user is harmed (personal communication, Tim Beck, Siskiyou County Water Master, deceased). This diversion has been measured to be between 6-9 cfs for shorter periods of time. The water master schedule does not indicate a winter stock water right for this ranch.

The current point of diversion is located on Lower Parks Creek, 1.5-miles upstream from the confluence with the Shasta River. The existing diversion structure consists of an earthen dam with two corrugated metal pipes, which are blocked with flashboards during the irrigation season. The water is backed up behind the levee to gain the elevation needed to convey diverted water down approximately 7,000 feet of open, unlined diversion ditch. This ditch goes to a concrete lined ditch, to the place of use. The water is then distributed throughout the ranch via a series of open, unlined ditches and conveyed by flood irrigation to the pastures. There is also a small pump that lifts the water from the main ditch to the upper pasture, where water is once again distributed via a series of open ditches. The ranch has identified an elevated baseline of moving the point of diversion from Parks Creek to the Shasta River near the Louie Road Bridge (Mid-Shasta reach), which will change the management reach they will be located within. However, since relocating the diversion may not occur until 3-5 years from the signing of the SHA, they are included in the Parks Creek Flow Management strategy to establish interim management commitments.

Estimated Reach Accretions/Depletions

There are fourteen points of diversion on Parks Creek split between the five participants, there are several other small tributaries where water is diverted and used for irrigation purposes. Diversion amounts can vary depending on time of year and the amount of available water available in the channel. The total of the adjudicated irrigation water rights is approximately 56.98 cfs and the season of use is from March 1 to October 31. This excludes the storage rights available to MWCD and any riparian rights that might be claimed during the year. Diversions (depletions) can vary greatly depending on season and more water tends to be diverted during the spring months, when instream flows are higher, and then taper off through the summer as instream flow declines with the declining snow pack. The lowest instream flows occur during the late summer and early fall from August through October. Fall base flows generally increase in November with some periodic large events occurring throughout the winter months. Diversions after November 1 through March 1 satisfy storage rights and livestock watering rights. Table 6 provides a summary of annual flows measurements observed in Parks Creek upstream of the Edson-Foulke diversion taken from 1959 to 1996.

Table 6. Monthly flows observed on Parks Creek upstream of the Agreement's Covered Area, above the Edson-Foulke Yreka Ditch (1959 to 1996).

Month	Percent of Annual Flow (%)	Mean Monthly Flow (cfs)	Mean Monthly Flow (Acre-Feet)
January	9.0	26.5	1,600
February	10.5	34.2	1,900
March	11.0	32.4	2,000
April	17.0	51.7	3,100
May	21.0	61.8	3,800
June	10.0	30.4	1,800
July	3.0	8.8	540
August	1.8	5.3	330
September	1.7	5.2	310
October	2.0	5.9	360
November	5.0	15.2	910
December	8.0	23.5	1,400

The following depletions and accretions were measured in 2016:

Spring (May 2016):

A total of 49 cfs was being diverted, which did not include diversions from Spring Creek or Wells Creek on Parks Creek Ranch. Between 20 and 40 cfs of accretions were measured and calculated throughout Parks Creek. The accretions were from all sources including tailwater and springs, with approximately 10 cfs contributed from Bridge Field Slough and 5 cfs from Kettle Springs Creek.

Summer (July 2016):

A total of 17.33 cfs was being diverted, which included water diverted from Bridge Field and Kettle, but did not include diversions from Spring Creek or Wells Creek on Parks Creek Ranch. Approximately 16 cfs of accretions were measured and calculated throughout Parks Creek. The accretions were from all sources including tailwater and springs, with approximately 4.25 cfs contributed from Bridge Field Slough and 7.5 cfs from Kettle Springs Creek.

Fall (November 2016):

A total of 15.9 cfs was being diverted by MWCD, no other points of diversion were in operation during this assessment period. Approximately 22 cfs of accretions were measured and calculated throughout Parks Creek. The accretions were from all sources, with approximately 3.24 cfs contributed from Bridge Field Slough and 6.73 cfs from Kettle Springs Creek.

Parks Creek Existing Flows

The following schematic (Figure 12) illustrates the diversions in the Parks Creek reach without the SHA flow commitments. This does not account for yearly or seasonal variation due to snow pack, spring flow or tailwater or subsurface accretion that can be attributed to flood irrigation practices.

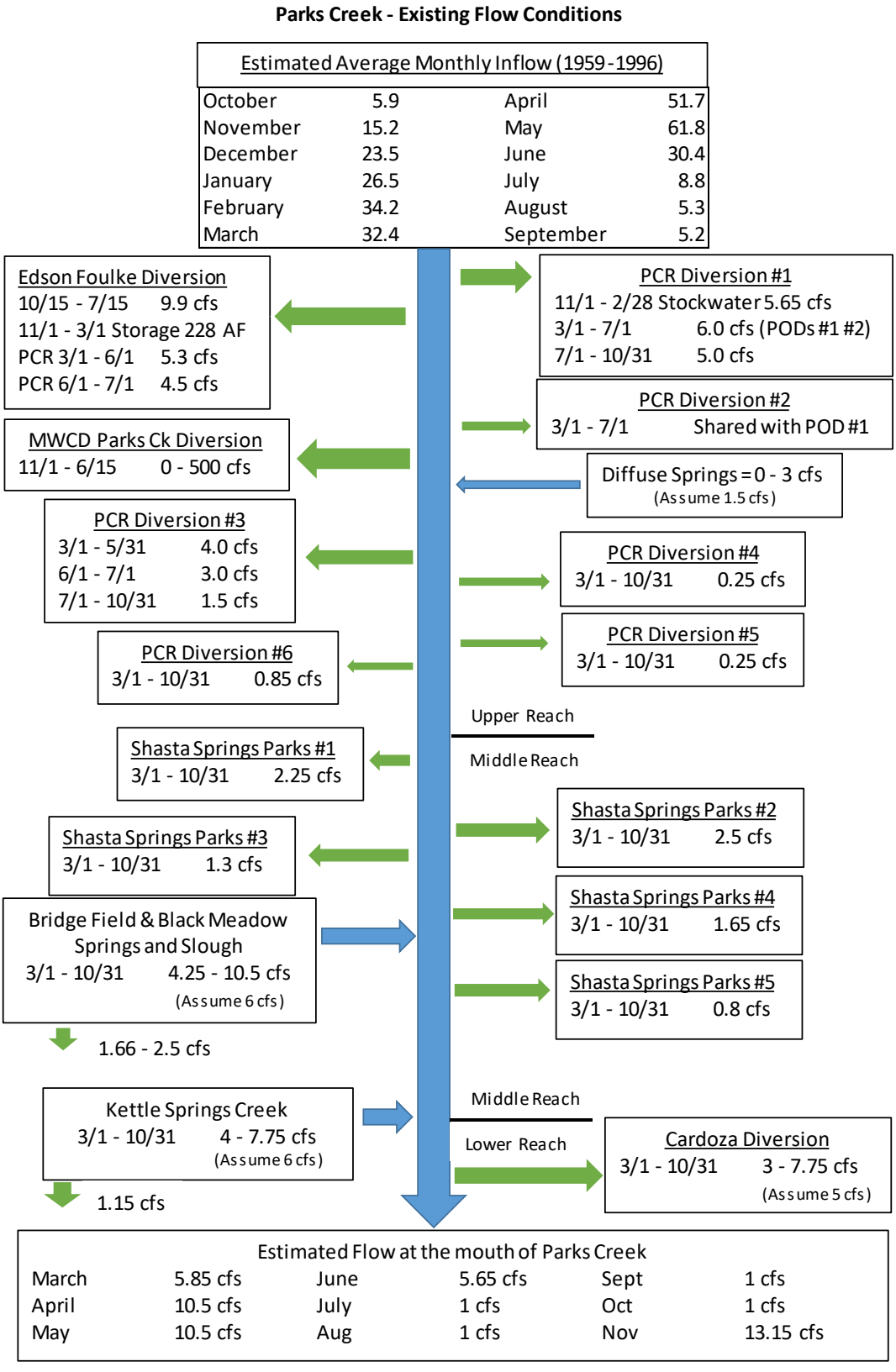


Figure 12. Current estimated flow schematic for Parks Creek based on inflow data from 1959 to 1996 and diversion rates for each water right by season.

Upper Parks Creek Flow Management Strategy

This reach includes Parks Creek from Interstate 5 crossing to the upstream boundary of Covered Area. Unlike the other reaches, coho salmon are not known to currently use habitats in this reach. This reach has three sub-reaches that each contain different habitat characteristics. Of the three sub-reaches, the middle sub-reach located upstream of the railroad crossing and downstream of the MWCD's Parks Creek diversion, has the potential to support spawning and rearing of coho salmon if adequate flow and water quality can be maintained during critical times. Habitat in this reach is generally of good quality with a healthy riparian plant community; however, water temperatures during the summer are of concern and are often in the detrimental range for rearing coho salmon based on Stenhouse et al. (2012). The following section describes the TAC's flow objectives and each landowners flow commitment in order to collectively meet the outlined flow objectives for the reach. Since the flow available in the reach is highly dependent upon available flow coming from rain/snow events, how the contribution will be managed will be on a real-time basis, using new or existing real-time monitoring equipment. The stations identified in the Adaptive Management and Monitoring Plan that will be utilized in managing this flow strategy are as follows:

- UPC, which will measure the amount of water entering the agreement area;
- PME, which measures flow in the Parks Creek downstream of MWCD's diversion, and;
- PCE, which measures flow upstream of Interstate 5 crossing.

Edson-Foulke and Parks Creek Ranch collaborated to develop a joint flow strategy for the Upper Parks Creek reach. Flow objectives will be meet through collaborative management of their diversions, some of which share the same infrastructure, completion of water conservation projects, and reductions in diversion during times when existing flows would fall short in meeting stated biological objectives.

Adult migration and spawning (October 1 to December 31) Flow Objectives:

Suitable spawning habitat for adult coho salmon is present in this reach. However, coho salmon presence is this reach has not been documented. Restoration actions should consider improving flows in this section to a level that would provide upstream passage and suitable spawning habitat when natural flow levels allow. Priority should be given to manage flows to enhance downstream conditions for adult coho salmon (ie. Mid-Parks Creek).

A. Base Flows - To the extent practicable; develop a flow strategy that ensures a minimum flow 11 cfs to provide suitable spawning and migration conditions for coho salmon in the Mid Parks Creek reach downstream (Table 1, Reach 2A).

Adult migration and spawning (October 1 to December 31) Permittee Commitments:

MWCD: Currently MWCD has an agreed upon minimum bypass of 6 cfs at the Parks Creek diversion during this time period. However, after the infrastructure projects to improve the Parks Creek Diversion of completed MWCD has proposed an increase of this bypass to 21 cfs from October 1 to December 31st.

Parks Creek Ranch and Edson-Foulke: October 1st to November 1st: Parks Creek Ranch's water rights for irrigation purposes are utilized until November 1 and they have agreed to contribute to meeting the minimum flow objective of 1 cfs from October 1st to October 14th at PCE and 2 cfs immediately upstream of the Parks Creek Ranch #3 POD. From October 16th to November 1st 4 cfs should be provided from at lower end of the property at the Parks Creek gage near Edgewood (PCE). Meeting this objective would be achieved through

water conservation projects described in the site plan for the ranch. Edson-Foulke has a water right of 9.9 cfs for irrigation use that is utilized until November 1st and they have agreed to contribute to meeting the minimum flow objective of 1 cfs from October 1st to October 14th and 4 cfs from October 16th to November 1st at PCE. Pending the results of a ditch loss study, Edson-Foulke anticipates that water conservation projects in the Edson-Foulke Ditch will provide a minimum of 3 cfs of conserved water for instream beneficial uses. Edson-Foulke has committed to provide 3 cfs of water instream to help meet the flow objectives during this time period.

November 1st to January 15th: Parks Creek Ranch proposes to reduce their stock water rights from 5.6 cfs to 1.2 cfs which would allow the ranch to contribute an additional 4.4 cfs to the 10 cfs minimum flow objective at PCE. Edson-Foulke proposes to contribute 3 cfs from stockwater rights for instream benefit to meet the 10 cfs minimum flow objective at PCE. In addition, Edson-Foulke also has a 228 acre-feet storage right that they historically diverted when flows were available, but their site plan developed under the Agreement stipulates that that storage right will not be exercised until the minimum flow objective of 10 cfs has been met and the diverted volume will not exceed 5 cfs.

Upper Parks Creek Reach Total Flow Contributions: Adult Migration and Spawning

Winter instream flows are expected to be between 1 and 12 cfs at the bottom of this reach depending on water year type. Unimpaired flows at I-5 during this life stage if using the DWR data collected between 1959-1996, which summarized average discharges entering the reach, would be between 5.9 cfs and 26.5 cfs. The estimates do not assume additional accretion, as these can change from year to year and could also change after pipeline projects are implemented.

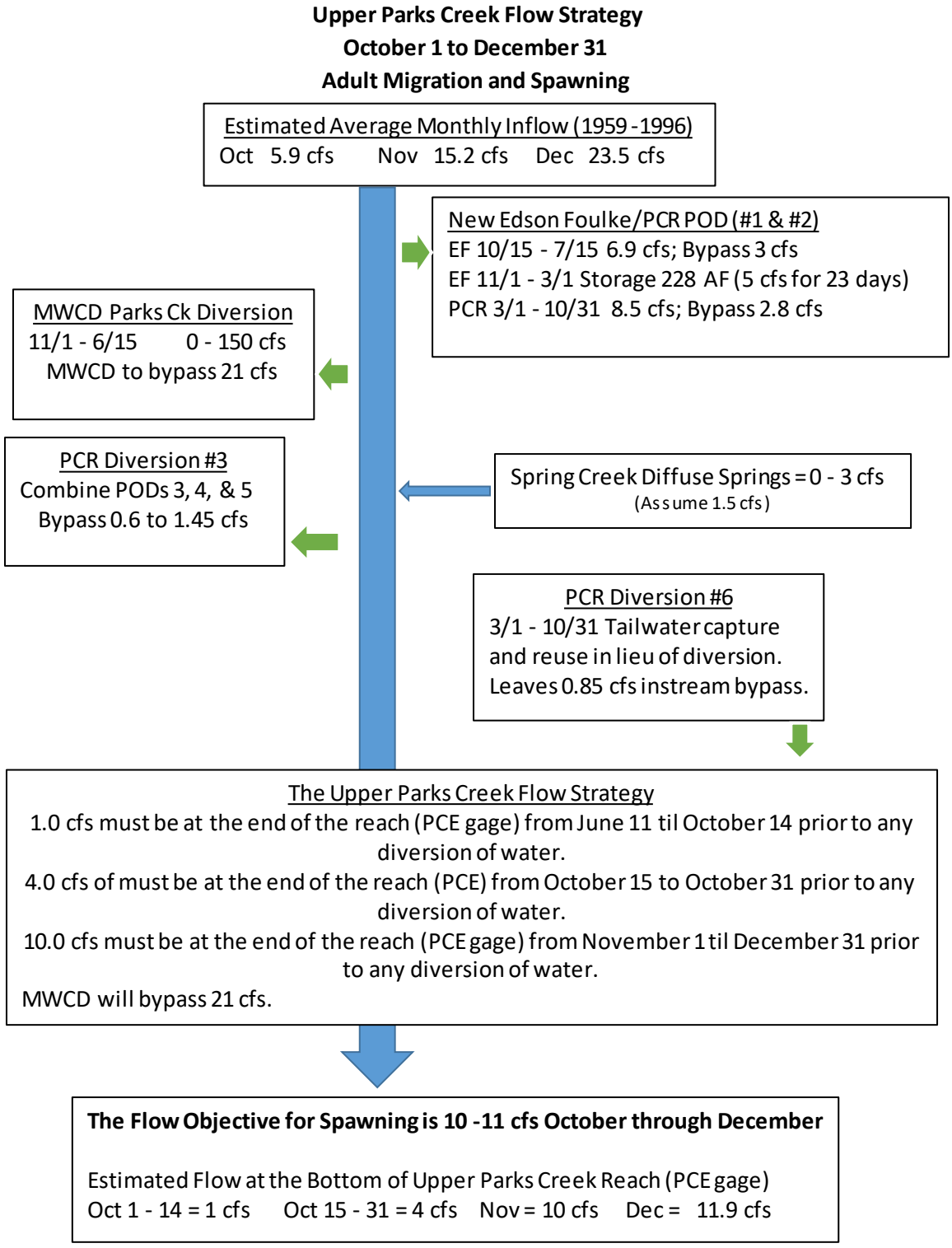


Figure 13. Estimated irrigation diversion volumes and instream flows based on the Upper Parks Flow Strategy proposed under the Shasta Safe Harbor Agreement during the salmon spawning season after all conservation measures have been implemented.

Upper Parks Creek Flow Objectives: Coho Salmon Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

The middle sub reach (from MWCD diversion downstream to the railroad crossing) has a healthy riparian community and there is floodplain connectivity with multiple secondary channels that would provide over wintering habitat for juvenile coho salmon if present. With the exception of stock water and storage rights (Edson-Foulke and MWCD), flows in this reach during the winter generally fluctuate with winter storm events. Flow management during the winter should seek to maintain base flows that provides free fish passage and flow connectivity throughout the reach.

A. Base Flows - To the extent practicable; develop a flow strategy that ensures a minimum flow of 10 cfs to provide suitable over wintering conditions for coho salmon in the Mid Parks Creek reach downstream (Table 1, Reach 2A). If lower flows can be shown to provide adequate protection for incubating eggs and embryos a lower flow target (6 cfs) may be acceptable.

Upper Parks Creek Permittee Commitments: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

MWCD: MWCD has an agreed to bypass adequate water to ensure that a minimum of 6 cfs is available instream at the PCE between January 1st and February 28th. MWCD commits to participate in a collaborative study with the agencies and other participants in the Upper Parks Creek reach to evaluate if redds are sufficiently protected under a 6.0 cfs by-pass. Studies to assess these conditions will be completed within 5 years of signing the Agreement. If coho salmon redds are not sufficiently protected, up to 10.0 cfs may be by-passed at PCE to meet the biological objective. MWCD will ensure 10.0 cfs is at PCE before diverting more than 20 cfs during this period.

Parks Creek Ranch and Edson-Foulke: After signing of the Agreement, Parks Creek Ranch proposes to reduce their stock water rights from 5.6 cfs to 1.2 cfs, or contribute 4.4 cfs to instream use with the goal of providing a minimum flow of 6 cfs at PCE. After signing of the Agreement, Edson-Foulke has agreed to contribute 3 cfs of their 9.9 cfs stockwater right for instream benefits towards meeting a minimum flow of 6 cfs that they propose at PCE during this time period. In addition, Edson-Foulke also has a 228 acre-feet storage right that they historically diverted whenever excess flows were available. However, Edson-Foulke's site plan that was developed un the Agreement stipulates that this storage right will not be exercised until the minimum flow objective of 6 cfs has been met, and the diverted volume will not exceed 5 cfs.

Upper Parks Creek Total Flow Contributions: Egg Incubation and Juvenile Winter Rearing:

Winter instream flows are expected to be between 6 cfs at minimum and could reach as high as 30 cfs at the bottom of this reach depending on water year type. After the signing of the Agreement, MWCD has also committed to curtailing diversion for 24 hours in order to obtain a pulse event at PCE over 100 cfs, if an event of this magnitude doesn't occur within a 2-year period during the term of the Agreement.

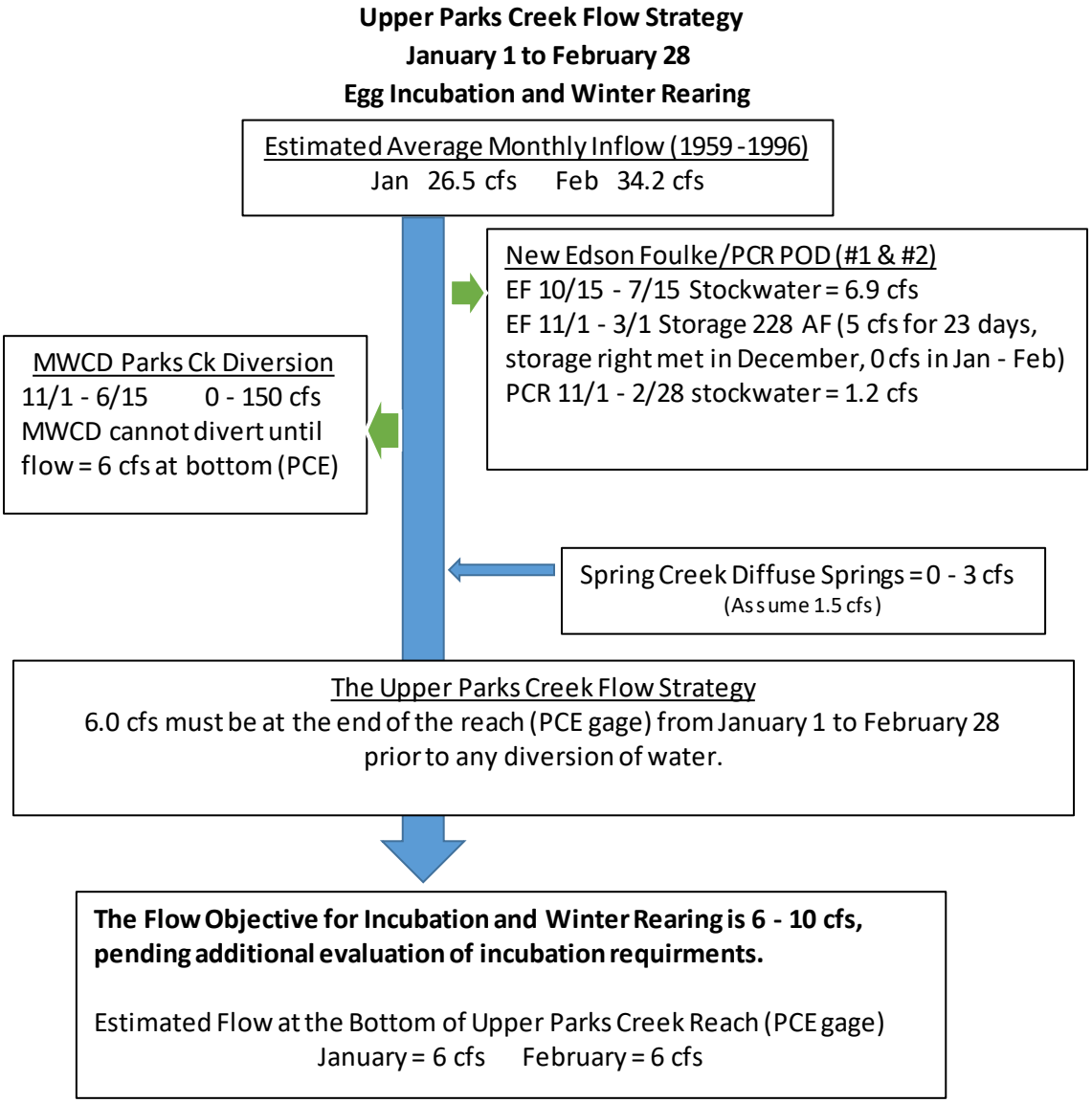


Figure 14. Estimated irrigation diversion volumes and instream flows based on the Upper Parks Flow Strategy proposed under the Shasta Safe Harbor Agreement during the salmon incubation and winter rearing season after all conservation measures have been implemented.

Upper Parks Creek Flow Objectives: Coho Salmon Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

Since coho salmon are not known to utilize this reach at this time, flow management scenarios should focus on helping to provide suitable rearing habitat and emigration flows for rearing coho salmon in the downstream reaches to the confluence with the Shasta River.

A. Base Flows- To the extent practicable; develop a flow strategy that ensures a minimum flow 20 cfs to provide suitable rearing and migration conditions for coho salmon in the Mid Parks Creek reach downstream (Table 1, Reach 2A). Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment throughout this reach. To accomplish this objective a gradual drawdown of spring flows to summer base flow levels would be desired.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage in reaches downstream.

Upper Parks Creek Permittee Commitments: Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

MWCD: Once additional flows become available as a consequence of conservation projects on neighboring properties, MWCD agrees to meet minimum flow objectives at the bottom of the reach, at the PCE real-time station, as follows prior to diverting:

1.) PCE must equal 21 cfs before MWCD can begin diversion and can divert up to 20 cfs

2.) In order for MWCD to divert more than 20 cfs but less than 90 cfs, 30 cfs must be provided for instream flow at PCE.

3.) In order for MWCD to divert more than 90 cfs but less than 150 cfs, 40 cfs must be provided for instream flow at PCE.

Parks Creek Ranch and Edson-Foulke: Parks Creek Ranch and Edson-Foulke proposed to initiate improvements to instream flows in two stages during March which are based on the timing of completion of water conservation projects described in their site plans. Stage 1 would begin when infrastructure improvements to combine the Parks Creek Ranch diversion numbers 1 and 2 with the Edson-Foulke point of diversion. Stage 2 would commence once the Parks Creek diversion numbers 3, 4, 5, and possibly 6, are combined to one point of diversion with additional improvements to the irrigation ditches. Pipelines and irrigation risers would be replace the existing open earthen ditches to improve irrigation efficiencies.

After Stage 1 Parks Creek Ranch and Edson-Foulke have agreed to contribute by pass flows to ensure that a minimum flow of 8.45 cfs from March 1st to March 31st at PCE prior to diverting more than 12.9 cfs. Under this condition flows at PCE generally meet or exceed 20 cfs at PCE during March based on comparisons to conditions observed in 2012 (dry water year) and 2013 (very dry water year). Water conservation projects on Parks Creek Ranch would contribute between 3.4 cfs and 4.25 cfs of their 16.68 cfs of water rights between March 1st and March 31st. Edson-Foulke has a water right of 9.9 cfs for irrigation use that is utilized beginning March 1st and they have agreed to contribute additional bypass flows to meet the minimum flow objective of 8.45 cfs from March 1st to May 15th at PCE. In their site plan water conservation projects are anticipated to contribute a minimum of 3 cfs of their 9.9 cfs of water rights between March 1st to March 31st to contribute towards meeting the above identified flow objectives.

After Stage 2 Parks Creek Ranch and Edson-Foulke will collectively ensure that a minimum flow of 20 cfs is present at PCE prior to diverting more than 6.95 cfs.

May 16th – June 15th : Parks Creek Ranch and Edson-Foulke have committed to managing their diversions to simulate the descending limb of the snow melt hydrograph which will improve conditions for riparian recruitment, maintain suitable rearing for a longer period of time than occurs currently, and provide natural ques for fish movement downstream or to summer refugial habitats. To accomplish this Parks Creek Ranch and

Edson-Foulke have agreed to meet flow objectives at PCE (Table 7) prior to diverting water for irrigation purposes after signing of the Agreement.

Table 7. Minimum flow requirements for the bottom of the Upper Parks Creek reach (PCE) that must be achieved prior to irrigation diversions upstream.

Dates	Flow @ PCE
May 16 to May 23	12 cfs
May 24 to May 31	8 cfs
June 1 to June 10	4 cfs
June 11 through summer	1 cfs (2 cfs at PCR #3)

Upper Parks Creek Total Flow Contributions: Spring Rearing, Redistribution and Emigration

Spring instream flows are expected to be as low as 1 cfs during base flow conditions and up to 40 cfs at the bottom of this reach depending on water year type. An estimate of unimpaired flows at this location would be 30.4 to 35.4 cfs using the DWR data collected between 1959-1996, which summarized average discharges entering the reach. No accretion assumptions were added to these discharge estimates.

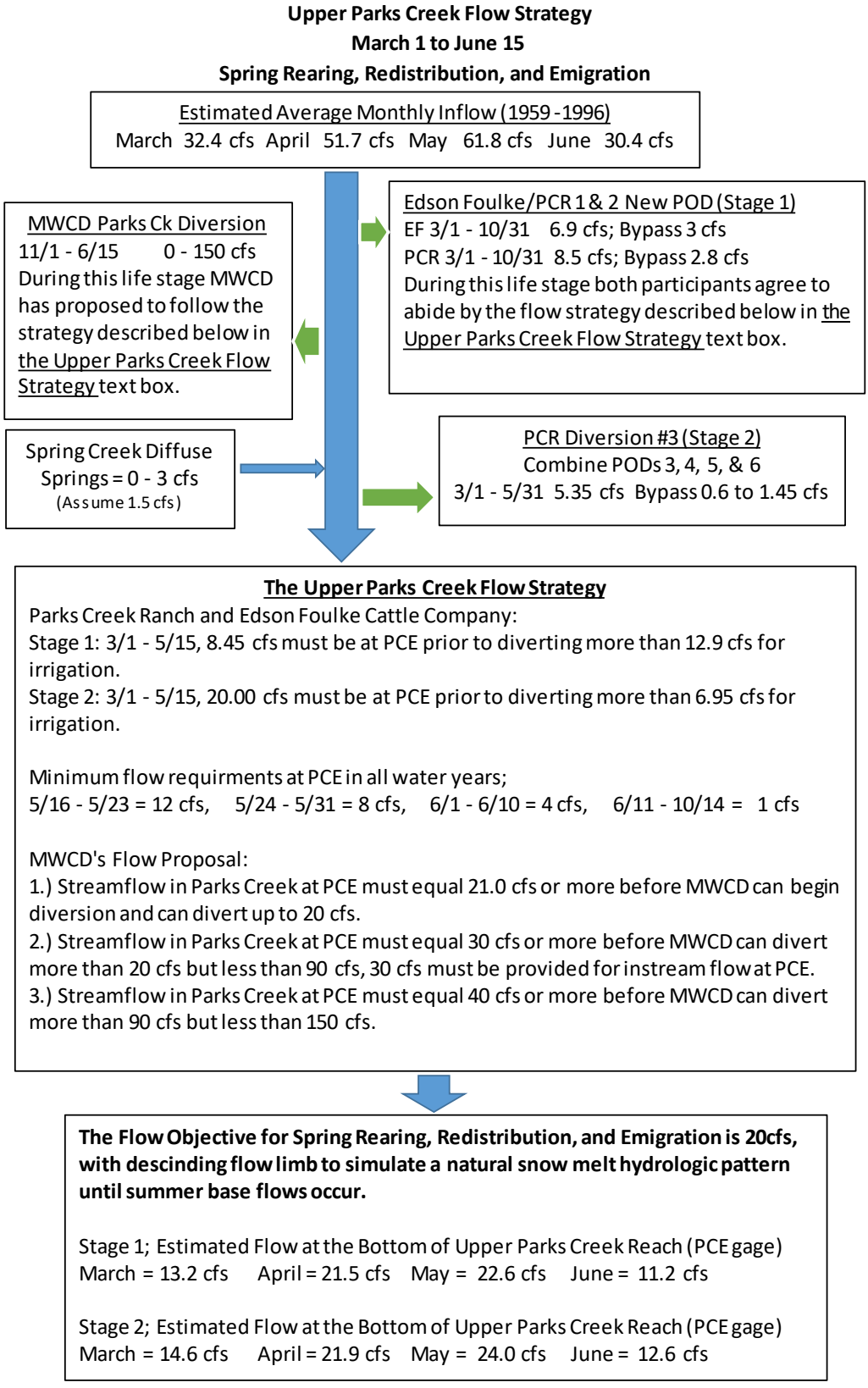


Figure 15. Estimated irrigation diversion volumes and instream flows based on the Upper Parks Flow Strategy proposed under the Shasta Safe Harbor Agreement during the spring rearing, juvenile redistribution, and smolt emigration season after all conservation measures have been implemented.

Upper Parks Creek Flow Objectives: Coho Salmon Juvenile Summer Rearing (June 16 to September 30):

Flow management planning efforts should attempt to provide suitable over summering habitat conditions in the section of Parks Creek upstream of the railroad crossing located on Parks Creek Ranch. Flow levels should attempt to maintain juvenile fish passage and inundation of food producing riffles. Information gathered by the SWCG during the 2017 flow experiment (AquaTerra Consulting 2017) helped determine these flow levels. Additional investigation may be needed to better understand the relationship between surface flows, hyporheic flows, and water temperatures. Pending this information summer base flows should be maintained to support ecological functions (riparian vegetation, invertebrate production) important to maintain coho salmon rearing habitats.

Upper Parks Creek Permittee Commitments: Summer Juvenile Rearing (June 16 to September 30):

MWCD: MWCD's storage right from Parks Creek is limited to the season from October 1st through June 15th. Therefore, MWCD will not be diverting during the time period.

Parks Creek Ranch and Edson-Foulke: Parks Creek Ranch and Edson-Foulke have water rights for irrigation purposes that are typically utilized during this time period when base flows allow. Together, Parks Creek Ranch and Edson-Foulke have agreed to contribute to meeting the minimum flow objective 1.0 cfs from June 16th to September 30th at PCE and 2 cfs in the middle sub-reach of upper Parks Creek between MWCD's Parks Creek diversion and Parks Creek Ranch's diversion #3 located upstream of the railroad crossing west of Interstate Highway 5. This provides improved flow conditions and fish passage for coho salmon in the middle sub-reach where better instream and riparian habitat conditions currently exist and water temperatures tend to be more favorable than those reaches upstream or immediately downstream. Parks Creek Ranch also is proposing to determine the feasibility of releasing spring water from Spring Creek to improve water temperatures during this life stage. It is estimated that between 0.2 to 0.6 cfs of cold water may be available for this reach during this summer months to further improve water temperature conditions.

Upper Parks Creek Total Flow Contributions: Summer Juvenile Rearing:

Summer instream flows at PCE are expected to be between 1 and 2 cfs during this life stage. Water temperatures during base flow conditions generally range between suitable and detrimental (Stevenson et al. 2000) in the middle sub-reach and are generally elevated beyond what is tolerable for rearing coho in the degraded reaches downstream of the railroad crossing.

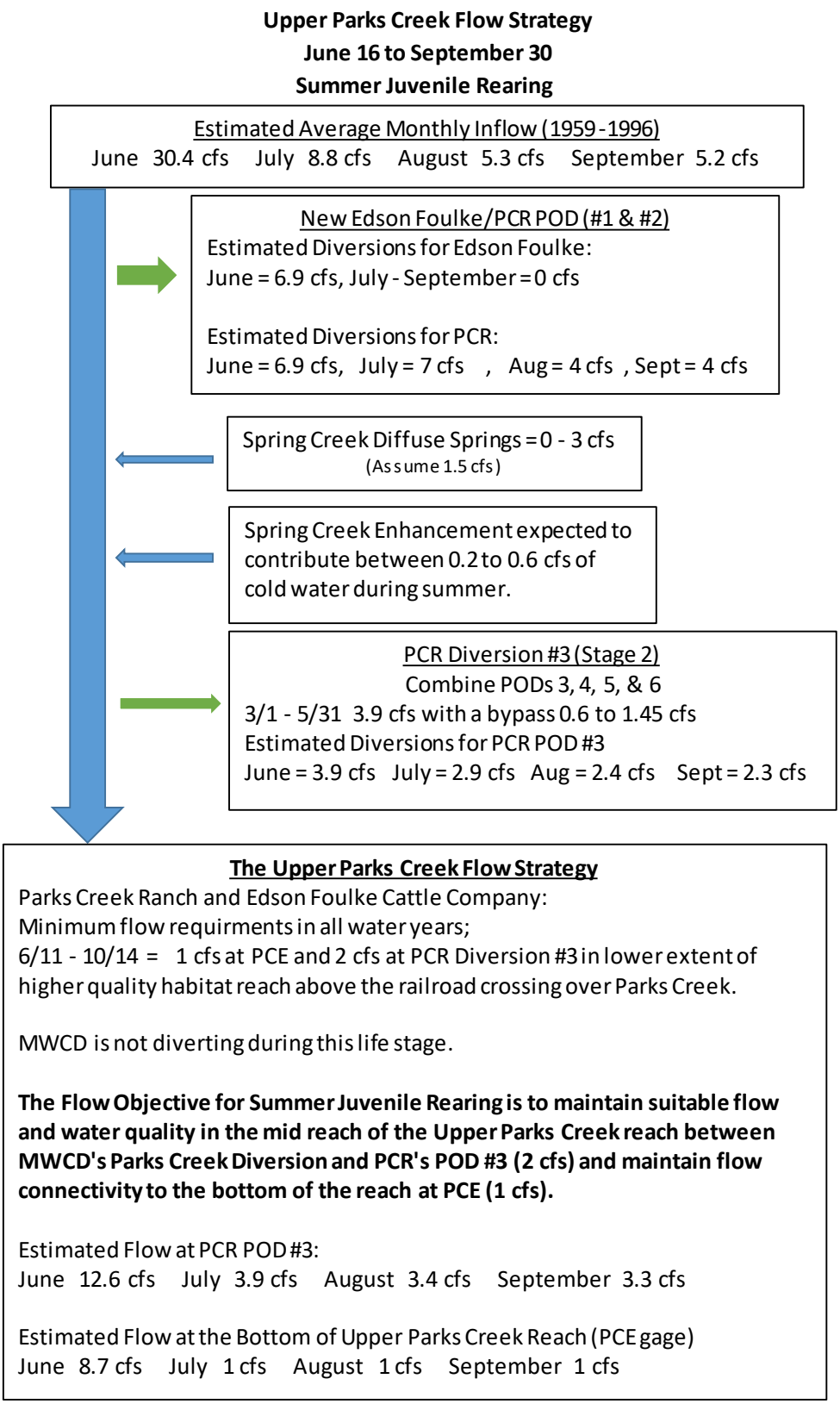


Figure 16. Estimated irrigation diversion volumes and instream flows based on the Upper Parks Flow Strategy proposed under the Shasta Safe Harbor Agreement during the summer rearing season after all conservation measures have been implemented.

Mid Parks Creek Flow Strategy

This reach includes Parks Creek and its tributaries from the confluence of Kettle Springs Creek to the Interstate 5 crossing. The following section describes the NOAA flow objectives and landowners flow commitment in order to meet the outlined flow objectives for this reach. Since the flow available in the reach is highly dependent upon available flow coming from the upstream reach and is identified as upstream contribution in the following section. This reach is located entirely within the boundaries of the Shasta Springs Ranch.

Mid Parks Creek Flow Objectives: Coho Salmon Adult Migration and Spawning (October 1 to December 31):

A. Base Flows - To the extent practicable; develop a flow strategy that ensures a minimum flow 11 cfs to provide suitable spawning and migration conditions for coho salmon (Table 1, Reach 2A).

Upstream Flow Contributions

Winter instream flows coming from the upper Parks Creek reach are expected to range from 1 cfs in the beginning of October and gradually increase in flows through December (> 10 cfs) as minimum flow thresholds and early rain storms begin to move through the region. Based on the mean monthly instream flow estimates entering the upstream boundary of the SHA Covered Area, flows entering this reach from the Upper Parks Creek reach upstream would be 1 cfs on October 1st, 4 cfs on October 15th, 10 cfs in November, and about 12 cfs in December. The minimum bypass flows downstream through the Mid Parks Creek reach are 1 cfs from October 1 through October 14th, 4 cfs from October 15th through October 31, and 10 cfs in November and December.

Mid-Parks Creek Permittee Commitments: Adult migration and spawning (October 1 to December 31):

Shasta Spring Ranch: The Shasta Springs Ranch has agreed to work with the agencies to develop a feasibility study to restore natural stream channel characteristics and improve irrigation practices through a sub reach downstream of Slough Road to about the Parks #5 diversion. The stream channel in this reach has been straightened and habitats are severely degraded. This reach includes the Bridge Field and Black Meadow Springs which provide an important source of cold water for salmonids rearing during the summer. Although coho salmon have not been observed spawning in Bridge Field Springs Creek, Chinook salmon have been observed spawning below the spring source in the past. This reach is currently believed to be the upstream extent of the coho populations present in Parks Creek. If restoration is feasible in this reach, habitat diversity will improve, including the abundance and quality of spawning habitat at the upper end of the reach where stream gradients decrease downstream. Restoration efforts may also improve access and spawning habitat in Bridge Field Springs Creek immediately downstream of the spring source and point of diversion. The feasibility study for this work has been named the East Side Pastures and Spring Channels Renovation Project and is expected to be completed during the first 5 years following the issuance of the SHA Section 10 Enhancement of Survival permit. During the first 5 years the Shasta Springs Ranch has agreed to bypass 1 cfs of cold spring water from the Bridge Field and Black Meadow Spring complex. This will improve the abundance of cold water refugia habitat during the summer and fall rearing season. The 1 cfs of bypass would occur during an interim period when the East Side Pastures and Spring Channels Renovation Project is being evaluated and planned. The goals of the East Side Pastures and Spring Channels Renovation Project are to:

1) Increase the volume of self-sustaining, complex instream habitat for salmonids in Mid-Parks Creek reach and/or unnamed spring channels, including but not limited to safe passage at irrigation diversions in spring channels;
2) Increase the reliability and quality of spring water inflow into Parks Creek from springs east of Parks Creek in the Mid-Parks Creek reach;
3) Increase the productivity of the pastures east of Parks Creek on the Shasta Springs Ranch through improved reliability of water and efficiency of irrigation; and,
4) Increase channel and floodplain function, minimize landowner emergency actions to protect property, and reduce overall maintenance during flood flows and the aftermath.

Pending the results of the evaluation for the East Side Pastures and Spring Channels Renovation Project additional bypass of spring flows may become available with improved irrigation efficiency. Given the topography and underlining geology in this location, restoration of this reach may also increase water table elevations which should improve sub irrigation in adjacent pastures further reducing surface diversion of spring water sources. For this strategy we assume the Bridge Field and Black Meadow Spring provide a total of 6 cfs.

Kettle Springs is located within the Shasta Springs Ranch and the Mid Parks Creek Reach. However, the confluence of Kettle Springs Creek with Park Creek denotes the boundary between the Mid Parks Creek Reach and the Lower Parks Creek Reach. Flow contributions between Kettle Springs and the confluence of Kettle Springs Creek with Parks Creek provide benefits to the Mid Parks Creek Reach. Flow contribution from Kettle Springs Creek, as measured at the source, will benefit the Lower Parks Creek reach. Kettle Springs Creek is consistently used by juvenile coho salmon during the summer rearing season. The Shasta Springs Ranch has an adjudicated water right to divert 1.15 cfs during the irrigation season from March 1 to November 1. During the development of the SHA, with the support of the resource agencies the Shasta Springs Ranch constructed a new irrigation management facility at Kettle Springs. The project also included installation of 2,300 feet of pipe with irrigation risers to improve irrigation efficiency. Shasta Springs Ranch is currently limited to their 1.15 cfs water right and all additional flow (about 2.5 to 4.85 cfs) is allowed to flow downstream unimpeded providing water temperature and consistent flow patterns for rearing coho salmon. Habitat structures have also been installed to improve hydraulic diversity and cover for salmonids. Coho salmon have not been observed spawning in Kettle Springs Creek, however, suitable spawning habitat may be created as habitat structures help improve gravel conditions. Instream flow contributions from Kettle Springs to Kettle Springs Creek is estimated to be about 2.5 to 4.85 cfs.

Mid Parks Creek Total Flow Contributions: Adult Migration and Spawning

Fall and early winter instream flows are expected to be range between about 9.7 cfs in early October and about 22.6 cfs in December (Figure 17). The minimum bypass flow requirements from the Upper Parks Creek reach upstream are 1 cfs from October 1st through the 14th, 4 cfs from October 15th through the 31st, and 10 cfs in November and December. The conserved water bypass requirements at the bottom of the Mid Parks Creek reach including 4.85 cfs estimated contribution from Kettle Springs is 8.69 cfs from October 1st through the 14th, 11.69 cfs from October 15th through the 31st, and 19.35 cfs in November, and 21.56 cfs in December. This includes the bypass flows from upstream plus the bypass flow commitment for Kettle Springs (4.85 cfs) and 1 cfs from the Bridge Field and Black Meadow Springs.

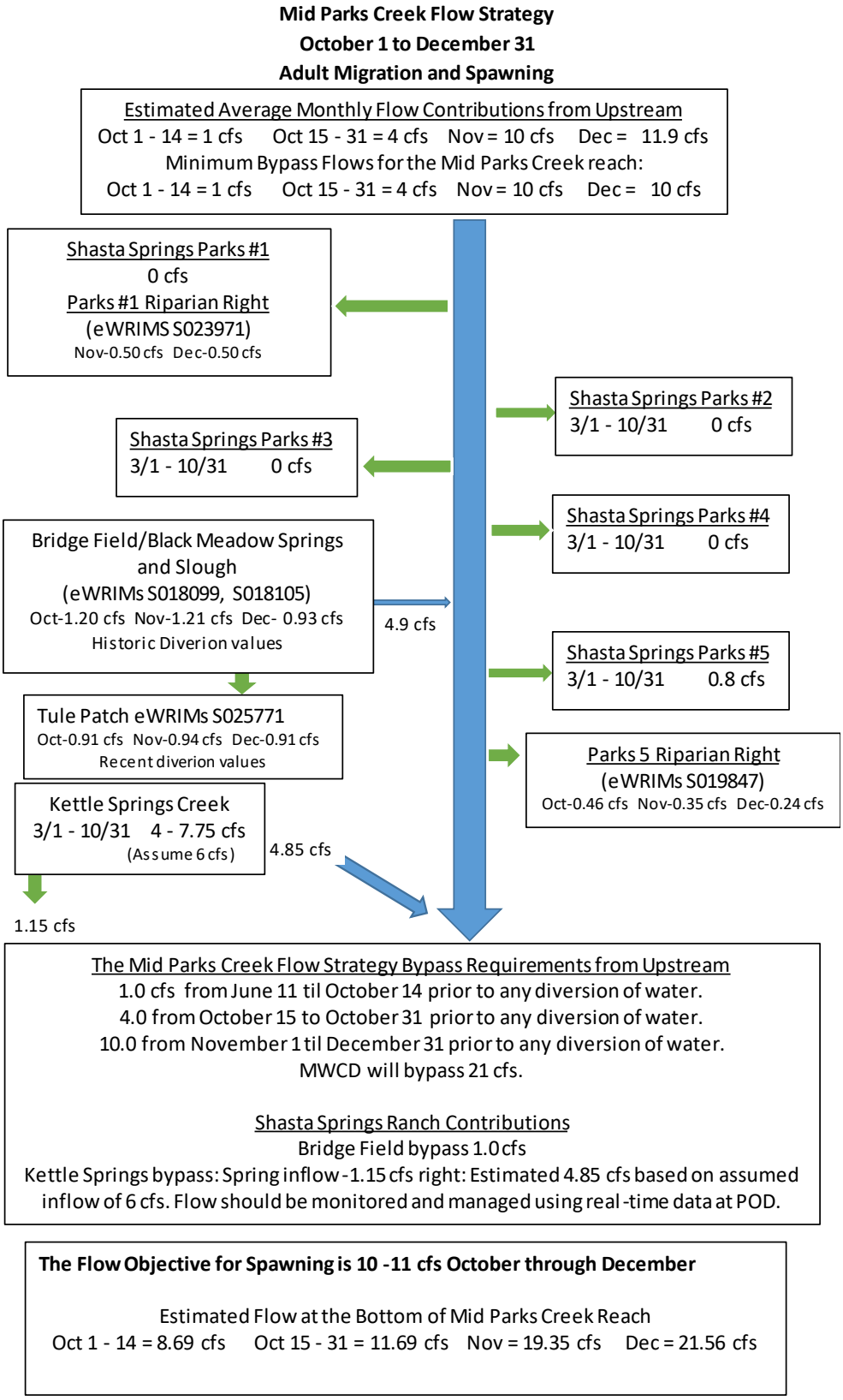


Figure 17. Estimated irrigation diversion volumes and instream flow in the Mid Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the fall migration and spawning season in a normal water year after all conservation measures have been implemented.

Mid Parks Creek Flow Objectives: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

A. Base Flows – To the extent practicable; develop a flow strategy that ensures a minimum flow of 10 cfs to support conditions for over wintering coho salmon (Table 1, Reach 2A).

Upstream Flow Contributions

Winter instream flows entering this reach from upstream are expected to be about 6 cfs, which is the minimum bypass flow requirement for the Upper Parks Creek reach in January and February.

Mid Parks Creek Permittee Commitments: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

Shasta Springs Ranch: Shasta Springs Ranch has not proposed any additional flow contributions during this time period. Diversions are limited to winter stockwater and are limited to a total of 1.15 cfs diverted at Parks #1, Bridge Field and Black Meadow Spring.

Mid Parks Creek Total Reach Contributions: Egg Incubation and Winter Rearing:

Winter instream flows are expected to be between 15.4 cfs and 16.7 cfs at the bottom of this reach in a normal water year type (Figure 18).

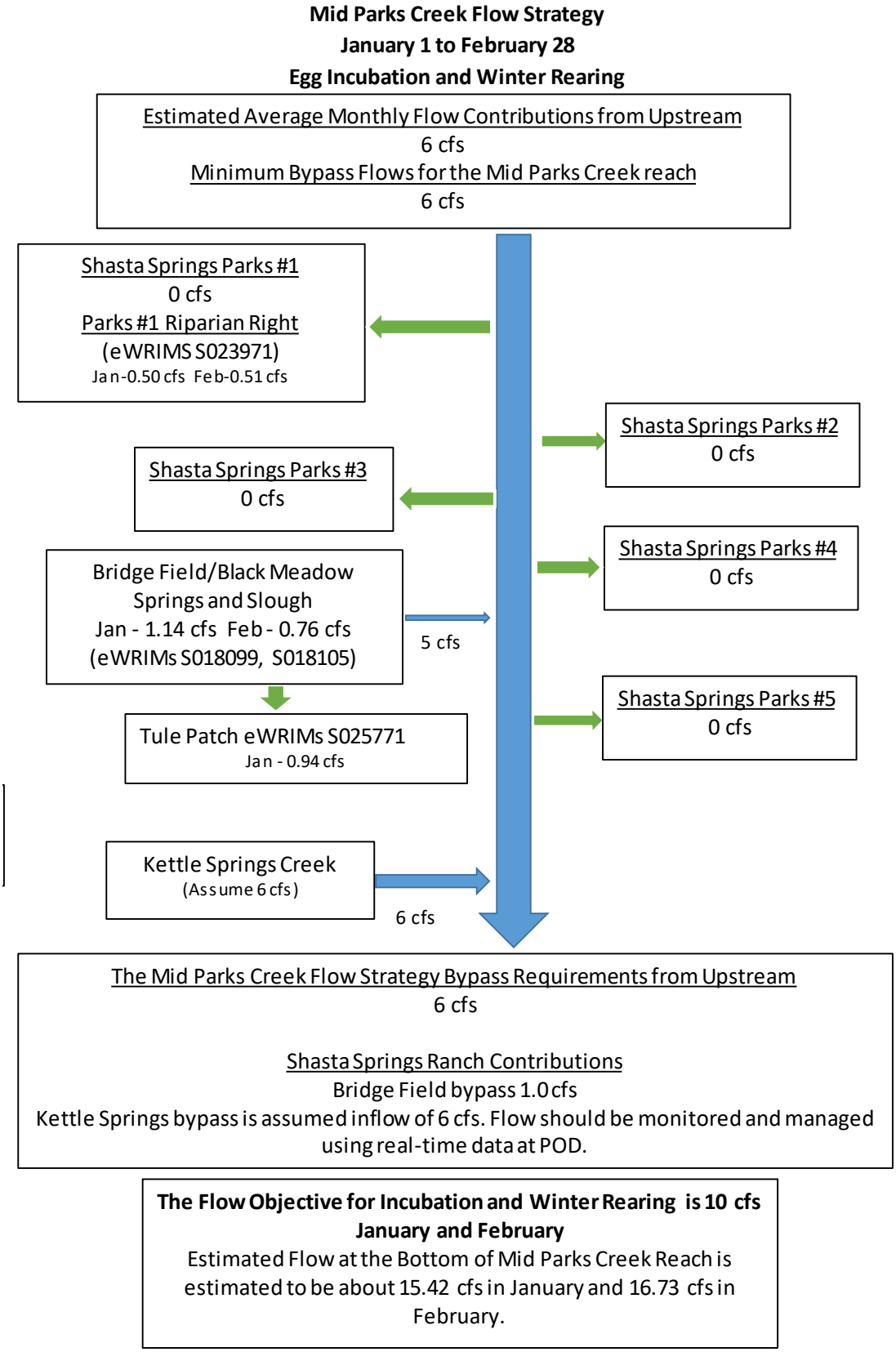


Figure 18. Estimated irrigation diversion volumes and instream flow in the Mid Parks Creek based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the winter rearing and incubation season in a normal water year after all conservation measures have been implemented.

Mid Parks Creek Flow Objectives: Coho Salmon Juvenile Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

A. Base Flows- To the extent practicable; develop a flow strategy that ensures a minimum flow of 20 cfs to provide suitable rearing and migration conditions for coho salmon in this reach (Table 1). Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment in the alluvial sections present towards the upstream sections of this reach.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage. A flow management strategy that includes pulse flows will help support a net conservation finding.

C. Temperature Considerations - As ambient air temperatures rise in the late spring, flow management should optimize cold water releases from spring sources to prevent water temperatures from exceeding 18°C for as long as is possible. The primary goal is to maintain cold water (<18°C) connectivity for as long as possible. This will help to delay triggering temperature avoidance behavior by juvenile coho salmon and will help to maximize the distribution and connectivity of suitable rearing habitat within this reach. The incorporation of water temperature thresholds (18°C and 20.3°C) may help inform management of irrigation diversions while optimizing water temperatures to allow juvenile coho salmon with ample opportunities to redistribute to over summering habitats based on natural environmental cues.

Upstream Flow Contributions

Spring instream flows are expected to be as low as 1 cfs during baseflow conditions and up to 40 cfs entering this reach from Upper Parks Creek depending on water year type. It is anticipated that the flows from the Upper Parks Creek strategy entering the Mid Parks Creek reach will be bypassed throughout Mid Parks reach.

Spring rearing, redistribution and smolt emigration (March 1 to June 15) Permittee Commitments:

Shasta Springs Ranch: Shasta Springs Ranch can irrigate during this life stage and their site plan indicates that Parks #1 water could be kept in stream and could be diverted at Parks #4, keeping that entire diversion amount and ditch loss instream for a longer stretch of the creek. Fields on the east side of the creek are currently irrigated by diverting at Parks #1. Between ditch loss savings (of an undetermined quantity) and flow bypassed between Parks #1 and #4, stream habitat quality could benefit. Additional flows during the spring should improve smolt migration and provide better environmental ques to trigger juvenile coho redistribution to refugial habitats as water temperatures increase in the late spring and early summer. Higher flows in this reach will also improve fish passage conditions over alluvial riffles at the upstream extent of this alluvial reach downstream of Parks #1 diversion. A project proposed in the site plan would reconstruct the diversion at the location of Parks #4 to supply irrigation water to both sides of the stream. This would allow flow to be bypassed at Parks #1, 2, and 3, when water volume and temperature requirements are suitable for coho salmon passage over shallow riffles. As flows and water quality diminish in late spring and early summer, irrigation demand could be taken at either or both POD, mimicking seasonal change in instream aquatic conditions and responding to seasonal increases in crop and stock water demand. This proposed management change improves conditions

for this sub reach but will not result in additional bypass of flow downstream of Parks #4 diversion. The Parks #1 has a diversion rate of 2.25 cfs, so it can be assumed that 2.25 cfs will be kept instream until Parks #4 point of diversion when suitable water temperatures for rearing coho salmon are still available at the upstream point of diversion.

Shasta Springs Ranch has agreed to bypass 1 cfs of cold spring water from the Bridge Field and Black Meadow Spring complex for a 5 year interim period while the East Side Pastures and Spring Channels Renovation Project is being evaluated and planned.

Kettle Springs is located within the Shasta Springs Ranch and the Mid Parks Creek Reach. However, the confluence of Kettle Springs Creek with Park Creek denotes the boundary between the Mid Parks Creek Reach and the Lower Parks Creek Reach. The Shasta Springs Ranch has an adjudicated water right to divert a continuous volume of 1.15 cfs during the irrigation season from March 1 to November 1. The design of the new diversion head works currently limits diversion from Kettle Springs to 1.15 cfs and all additional flow (about 2.5 to 4.85 cfs) is allowed to flow downstream unimpeded providing water temperature and consistent flow patterns for rearing coho salmon. Habitat structures have also been installed to improve hydraulic diversity and cover for salmonids. Instream flow contributions from Kettle Springs is estimated to be about 2.5 to 4.85 cfs.

Shasta Springs Ranch contributions during this life stage is about 6 cfs of spring water from the Bridge Field and Black Meadow Spring complex and Kettle Springs.

Mid Parks Creek Total Flow Contributions: Juvenile Spring Rearing, Redistribution and Smolt Emigration

Spring instream flows are expected to be between 12.1 cfs and 25.1 cfs at the bottom of this reach in a normal water year type (Figure 19).

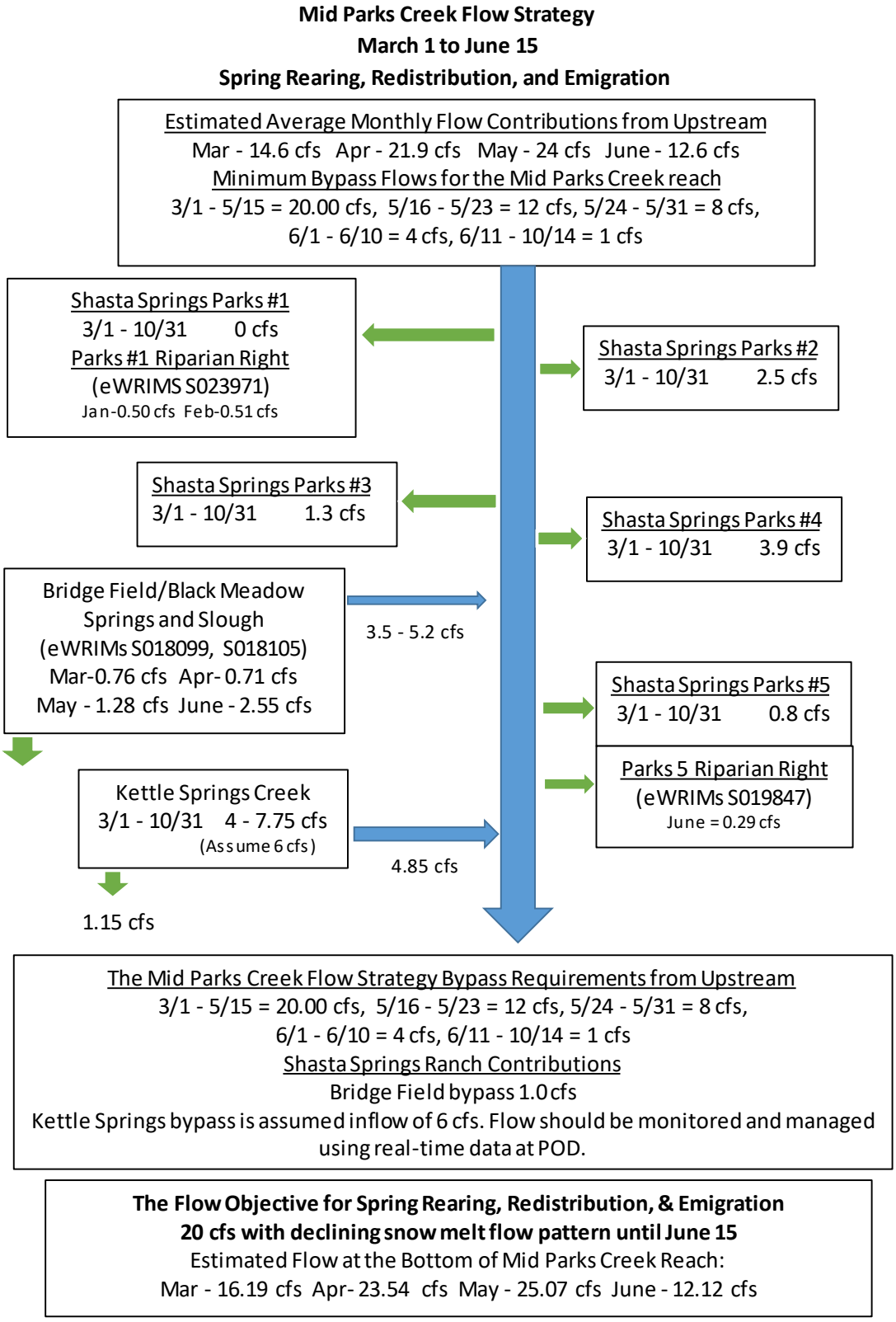


Figure 19. Estimated irrigation diversion volumes and instream flow in the Mid Parks Creek based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the spring rearing, redistribution and emigration season in a normal water year after all conservation measures have been implemented.

Summer Juvenile Rearing (June 15 to September 30) Flow Objectives:

The objective in this reach is to increase the availability cold spring water sources to optimize the duration and extent of cold water habitats available to rearing coho salmon. Development of instream flow strategies need to consider the relationship between flow volume and cold water sources and should seek to maintain fish passage and connectivity over food producing riffles where possible given water temperature objectives. Recent information gathered by the SWCG during flow experiments should be considered to achieve optimum flow and water temperature conditions throughout this important reach.

Upstream Flow Contributions

Summer instream flows entering this reach are expected to be between 1 and 2 cfs during this life stage.

Summer Juvenile Rearing (June 16 to September 30) Permittee Commitments:

Shasta Springs Ranch: Shasta Springs Ranch has several important cold water spring opportunities that will and do provide summer juvenile rearing. The Shasta Springs Ranch has agreed to work with the agencies to develop a feasibility study to restore natural stream channel characteristics and improve irrigation practices through a sub reach downstream of Slough Road to about the Parks #5 diversion. The stream channel in this reach has been straightened and habitats are severely degraded. This reach includes the Bridge Field and Black Meadow Springs that produce an important source of cold water for salmonids that would be beneficial during the summer. The feasibility study for this work referred to as the East Side Pastures and Spring Channels Renovation Project and is expected to be completed during the first 5 years following the issuance of the SHA Section 10 Enhancement of Survival permit. In the interim period, Shasta Springs Ranch has agreed to bypass 1 cfs of cold spring water from the Bridge Field and Black Meadow Spring complex during development of the East Side Pastures and Spring Channels Renovation Project. This will improve the abundance of cold water refugia habitat during the summer rearing season. As described previously, the goals of the East Side Pastures and Spring Channels Renovation Project are to:

1) Increase the volume of self-sustaining, complex instream habitat for salmonids in Mid-Parks Creek reach and/or unnamed spring channels, including but not limited to safe passage at irrigation diversions in spring channels;
2) Increase the reliability and quality of spring water inflow into Parks Creek from springs east of Parks Creek in the Mid-Parks Creek reach;
3) Increase the productivity of the pastures east of Parks Creek on the Shasta Springs Ranch through improved reliability of water and efficiency of irrigation; and,
4) Increase channel and floodplain function, minimize landowner emergency actions to protect property, and reduce overall maintenance during flood flows and the aftermath.

Pending the results of the evaluation for the East Side Pastures and Spring Channels Renovation Project additional bypass of spring flows may become available with improved irrigation efficiency. Given the topography and underlining geology in this location, restoration of this reach may also increase water table elevations which should improve sub irrigation in adjacent pastures further reducing surface diversion of spring water sources.

The Shasta Springs Ranch has an adjudicated water right to divert 1.15 cfs during the irrigation season from March 1 to November 1 and all additional flow (about 2.5 to 4.85 cfs) is allowed to flow downstream unimpeded providing water temperature and consistent flow patterns for rearing coho salmon. Habitat structures have also been installed to improve hydraulic diversity and cover for salmonids. Instream flow contributions from Kettle Springs is estimated to be about 2.5 to 4.5 cfs.

Shasta Springs Ranch contributions during this life stage is estimated to be about 5 cfs of spring water from the Bridge Field and Black Meadow Spring complex and Kettle Springs.

Mid-Parks Creek Total Reach Contribution: Summer Juvenile Rearing

Summer instream flows are expected to range between 8.8 cfs and 9.9 cfs at the bottom of this reach in a normal water year and depending upon spring flows coming from Bridge Field and Black Meadow Springs (Figure 20).

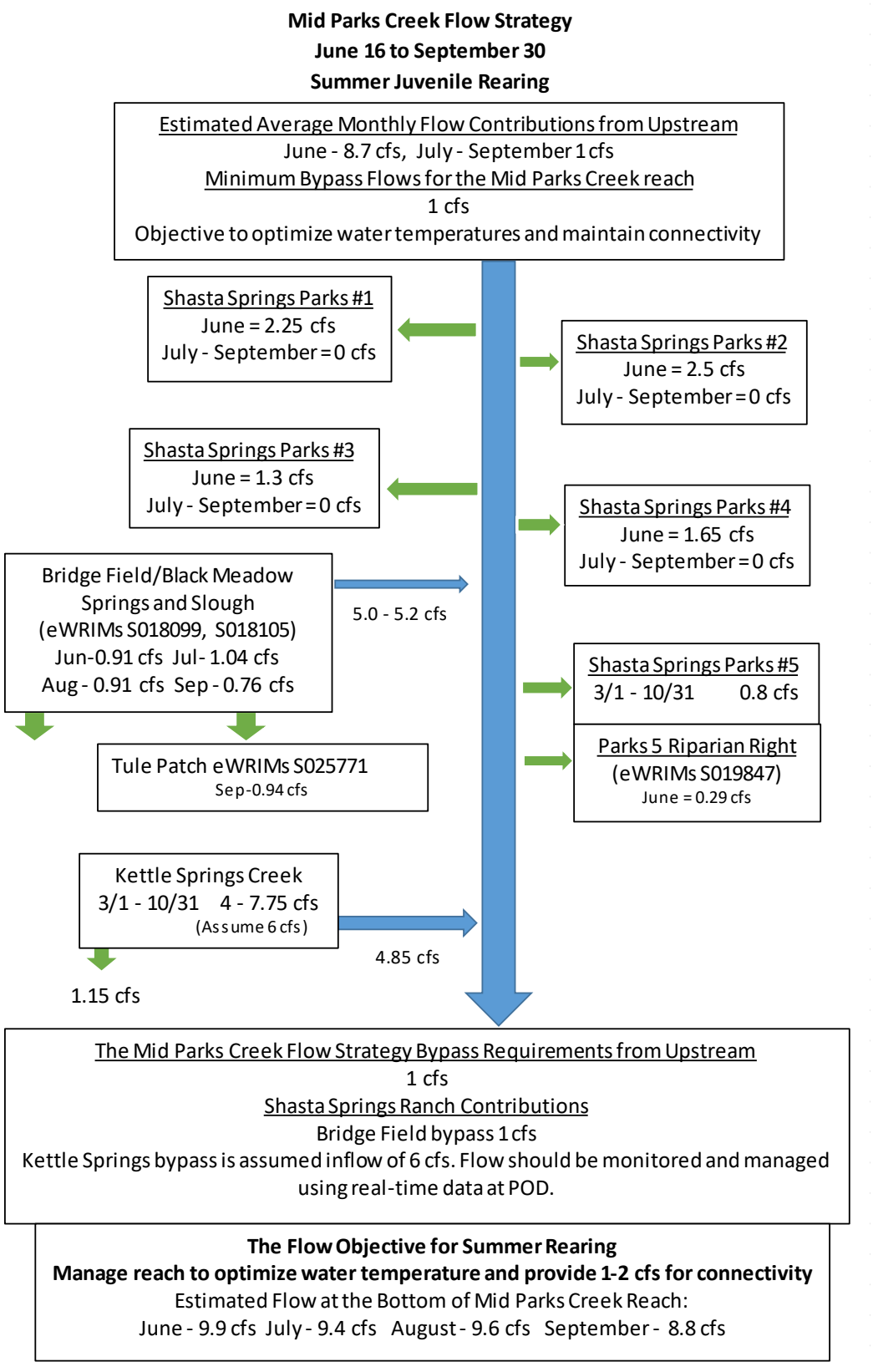


Figure 20. Estimated irrigation diversion volumes and instream flow in the Mid Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the summer rearing season in a normal water year after all conservation measures have been implemented.

Lower Parks Creek

Lower Parks Creek Flow Strategy

This reach includes Parks Creek from its confluence with the Shasta River to the confluence of Kettle Springs Creek. The following section describes the NOAA flow objectives and the landowners flow commitment in order to meet the outlined flow objectives for this reach. Since the flow available in the reach is highly dependent upon available flow coming from the upstream reach and is identified as Upstream Contribution in the following section. The Cardoza interim management of the existing POD is outlined in this section of the Flow Management Plan.

Lower Parks Creek Flow Objectives: Adult migration and Spawning (October 1 to December 31)

A. Base Flows - To the extent practicable; develop a flow strategy that ensures a minimum flow of 11 cfs to provide suitable spawning and migration conditions for coho salmon (Table 1, Reach 2C).

Upstream Flow Contributions

Winter instream flows entering this reach are expected to be between 9.69 cfs from October 1st through the 14th, 12.69 cfs from October 15th through the 31st, and 20.35 cfs in November and 22.56 cfs in December in a normal water year.

Lower Parks Creek Permittee Commitments: Adult Migration and Spawning (October 1 to December 31)

Shasta Springs Ranch: Shasta Springs Ranch does not have active diversions within this reach. Kettle Springs diversion is located in the Mid Parks Creek reach, however, the diversion at Kettle Springs is limited to 1.15 cfs with the remainder of the spring production allowed to flow downstream in Kettle Springs Creek where it enters Parks Creek at the top of the Lower Parks Creek reach boundary.

Cardoza Ranch: The Cardoza Ranch does not divert during October or November when this life stage is present. The POD for the Cardoza Ranch is to be moved downstream to the Shasta River where a new pump diversion will be installed that limits the amount of water diverted to the water right of 2.98 cfs during the irrigation season. In the future this reach will no longer have any diversions of surface flow. Therefore, all flows entering from upstream in addition to flows entering from Kettle Springs Creek will pass through this reach to the Mid Shasta River reach downstream. The adverse water quality impacts caused by the impoundment that was created at the current POD on Parks Creek will be eliminated and diversion volumes will no longer include carriage water of rotation management which allows for diversion rates to be increased above the water right volume will no longer occur. In addition, volitional fish passage through the reach will also be restored.

Lower Parks Creek Total Flow Contribution: Adult Migration and Spawning

Winter instream flows in a normal water year are expected to range between 9.69 cfs in early October and 21.41 cfs in December (Figure 21). These estimates may fluctuate depending on rain fall, and variations in groundwater contribution throughout the year.

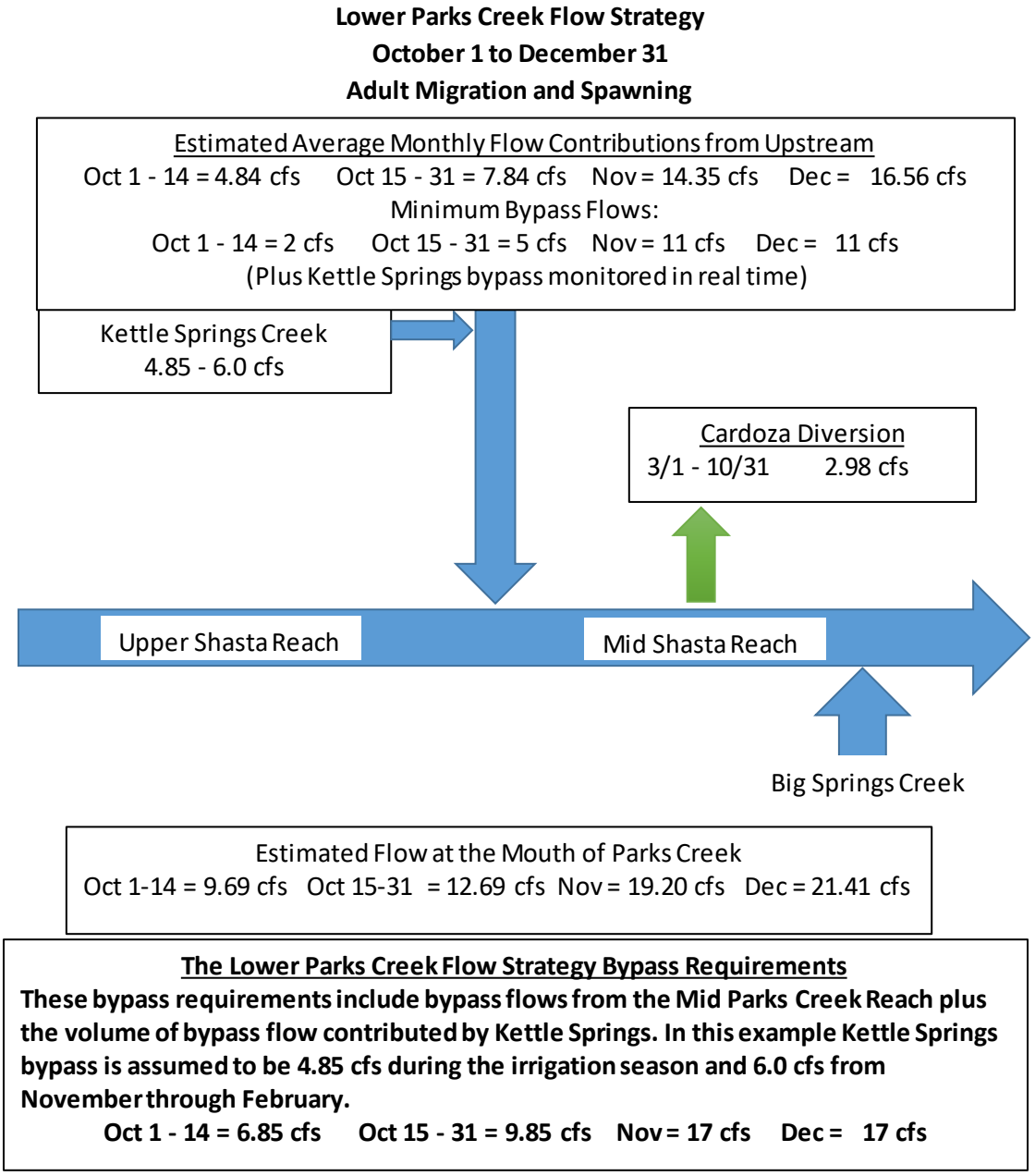


Figure 21. Estimated irrigation diversion volumes and instream flow in the Lower Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the fall migration and spawning season in a normal water year after all conservation measures have been implemented.

Lower Parks Creek Flow Objectives: Coho salmon egg incubation and juvenile winter rearing (January 1 to February 28):

A. Base Flows – To the extent practicable; develop a flow strategy that ensures a minimum flow of 10 cfs to support conditions for over wintering coho salmon (Table 1, Reach 2C).

Upstream Flow Contributions

Winter instream flows entering this reach are expected to be between 10 cfs and 12 cfs in a normal water year (Figure 18). These estimates may fluctuate depending on rain fall, and variations in groundwater contribution throughout the year.

Lower Parks Creek Permittee Commitments: Egg incubation and winter rearing juveniles (January 1 to February 28):

Shasta Spring Ranch: Shasta Springs Ranch does not have active diversions within this reach.

Cardoza Ranch: The Cardoza diversion is to be moved downstream to the Mid Shasta River reach and the water right for this point of diversion is only active from April through September.

Lower Parks Creek Total Flow Contributions: Egg Incubation and Juvenile Winter Rearing

Winter instream flows are expected to be between 16.42 cfs to 17.73 cfs at the bottom of this reach in a normal water year assuming the Kettle Springs contribution is 6 cfs during this time (Figure 22).

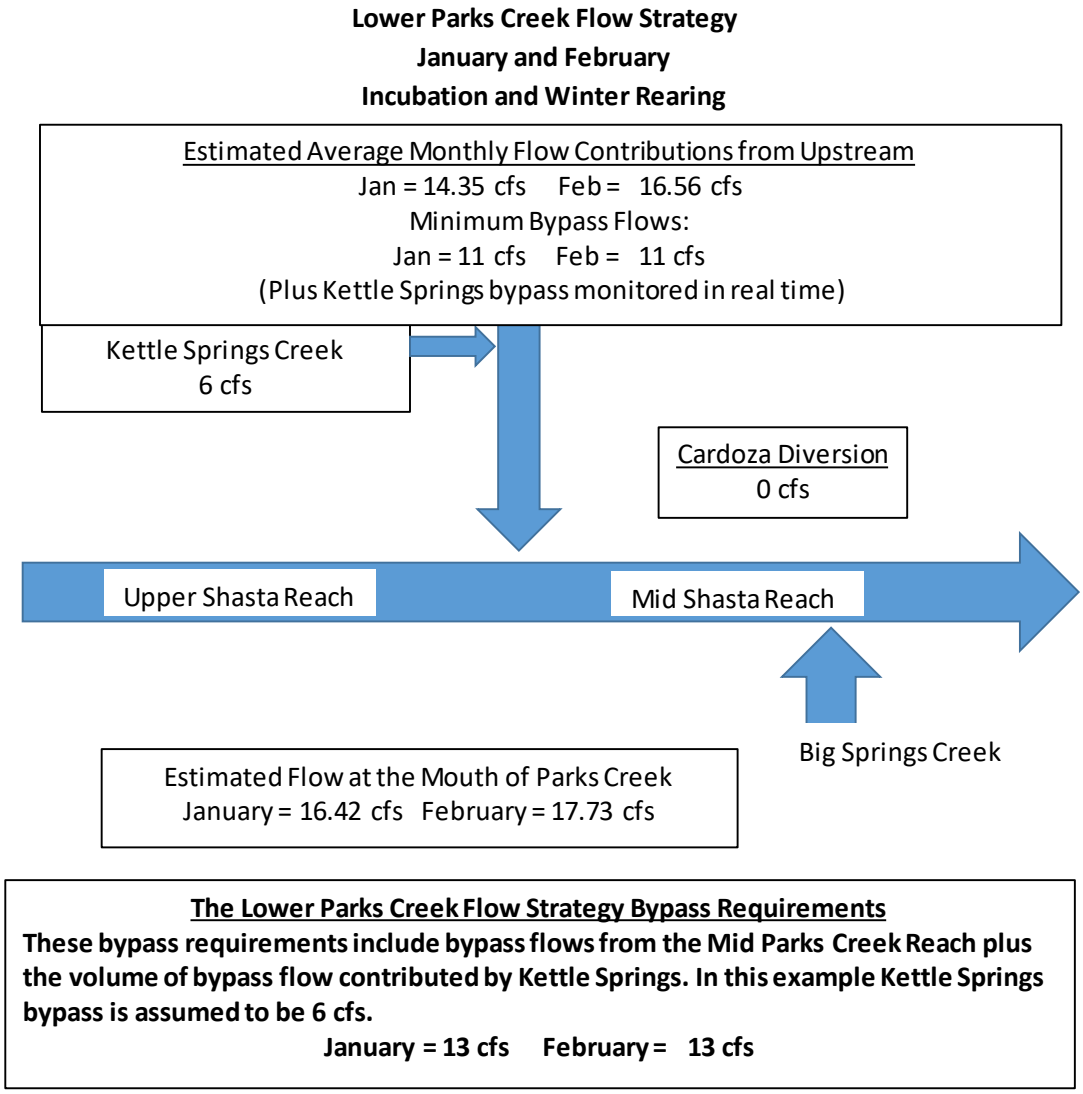


Figure 22. Estimated instream flow in the Lower Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the egg incubation and winter rearing season in a normal water year after all conservation measures have been implemented.

Lower Parks Spring rearing, redistribution and smolt emigration (March 1 to June 15) Flow Objective:

A. Base Flows- To the extent practicable; develop a flow strategy that ensures a minimum flow of 20 cfs to provide suitable rearing and migration conditions for coho salmon in this reach (Table 1, Reach 2C). Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment in the alluvial sections present towards the upstream sections of this reach.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage. A flow management strategy that includes pulse flows will help support a net conservation finding.

C. Temperature Considerations - As ambient air temperatures rise in the late spring, flow management should optimize cold water releases from spring sources to prevent water temperatures from reaching 18°C for as long as is possible. The primary goal is to maintain cold water (<18°C) connectivity for as long as possible. This will help to delay triggering temperature avoidance behavior by juvenile coho salmon and will help to maximize the distribution and connectivity of suitable rearing habitat within this reach. The incorporation of water temperature thresholds (18°C and 20.3°C) may help inform management of irrigation diversions while optimizing water temperatures to allow juvenile coho salmon with ample opportunities to redistribute to over summering habitats based on natural environmental cues.

Upstream Flow Contributions

Spring instream flows entering this reach are expected to be between 8.26 cfs and 21.22 cfs depending on water year type. These estimates may fluctuate depending on rain fall, and variations in groundwater contribution throughout the year.

Lower Parks Creek Permittee Commitments: Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15)

Shasta Spring Ranch: The project that has been implemented at Kettle Springs limits the diversion to 1.15 cfs with the remainder of the spring production allowed to flow downstream in Kettle Springs Creek and Parks Creek at the top of the reach boundary.

Cardoza Ranch: The Cardoza Ranch does not have lands adjacent to Lower Parks Creek but does have a diversion on Parks Creek located on the Hole in the Ground Ranch. The diversion structure consists of an earthen dam with two corrugated metal pipes, which are blocked with flashboards during the irrigation season. The water is backed up behind the dam to gain the force (head) needed to convey the diverted water down approximately 7,000 feet of open, unlined diversion ditch. This ditch goes to a concrete lined ditch, to the place of use. The current diversion, including the dam and ditch is maintained by the Hole in the Ground Ranch by agreement between the two Permittees and is water mastered by the Scott Valley and Shasta Valley Water Master District. The water master allowed for periodic "combine and rotate" management of the diversion, where the diversion amount is increased for a shorter period of time. As a result of these practices, diversion rates ranged between about 6 and 9 cfs during each irrigation cycle. In addition, the current diversion structure

is a fish passage barrier and the impoundment exacerbates water quality problems and provides habitat for non-native fish that likely prey on fry and juvenile salmonids. To correct this problem and improve conditions in Lower Parks Creek, The Cardoza Ranch has agreed to move their point of diversion downstream to the Shasta River near the Louie Road Bridge crossing just upstream from the confluence of Big Springs Creek with the Shasta River. This project has funding for the design, environmental review, and permits, which will be completed by early 2019. Implementation money will be pursued once designs are at 65%, with the goal to have it fully constructed in 2020-2021. Completion of this project will provide free fish passage, improve water quality conditions and will increase flows through out the spring and summer seasons. Once completed, this project will increase flows in the Lower Parks Creek by between 6 to 9 cfs at times when the diversion would be in operation. Sudden changes in flow and increased fine sediment flushes that currently occur when dam boards are placed or removed during the irrigation season would also be eliminated.

In the interim period the Cardoza Ranch has agreed to modify their operation of the existing diversion to allow fish passage to cold water refugial habitats as water quality and temperatures begin to degrade. The interim conditions require that prior to the removal of the diversion on Parks Creek the Cardoza Ranch will remove dam boards at the existing point of diversion when water temperatures first reach 19°C at the PBS (Parks Big Springs gage). This station is a real-time monitoring location (located near at the mouth of Parks Creek). The impoundment shall be fully drained, then left open for at least 7 consecutive days to allow for redistribution of fish. After the 7 days, permittee can resume normal diversion operations throughout the rest of the irrigation season. The flow schematic displayed in Figure 23 below represents a future condition in a normal water year after the Cardoza POD has been moved downstream to the Mid Shasta River reach.

Lower Parks Creek Total Flow Contributions: Spring Rearing, Redistribution and Emigration

Spring instream flows are expected to be between 13.12 cfs to 26.07 cfs at the bottom of this reach in a normal water year (Figure 23). These estimates may fluctuate depending on rain fall, and variations in groundwater contribution throughout the year.

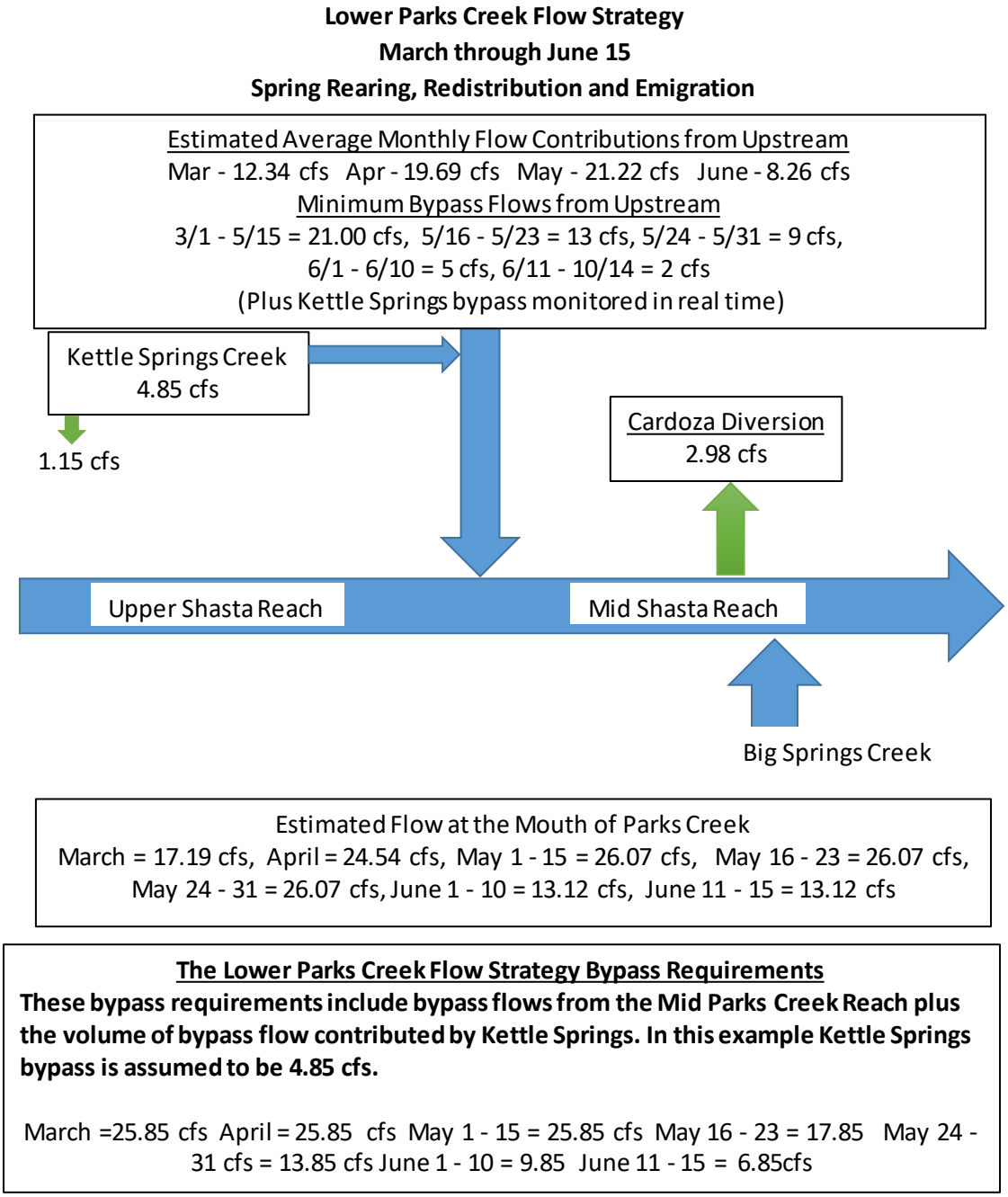


Figure 23. Estimated instream flow in the Lower Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the Spring rearing, redistribution and emigration season from March through mid-June in a normal water year after all conservation measures have been implemented.

Lower Parks Creek Flow Objectives: Coho Salmon Juvenile Summer Rearing (June 15 to September 30)

The objective in this reach is to increase the availability cold spring water sources to optimize the duration and extent of cold water habitats available to rearing coho salmon. Development of instream flow strategies need to consider the relationship between flow volume and cold water sources and should seek to maintain fish passage and connectivity over food producing riffles where possible given water temperature objectives. Recent

information gathered by the SWCG during flow experiments should be considered to achieve optimum flow and water temperature conditions throughout this important reach.

Upstream Flow Contributions

In a normal water year summer instream flows entering this reach are expected to range from about 6 cfs in June to about 4.92 cfs in September.

Lower Parks Creek Permittee Commitments: Juvenile Summer Rearing (June 16 to September 30)

Shasta Springs Ranch: Shasta Springs Ranch has committed to managing the Kettle Spring irrigation efficiency improvement, which piped ditches and maintains a consistent amount of spring water to Kettle Springs Creek, while keeping the amount diverted for irrigation to 1.15 cfs. All of the remaining spring flow is left instream to benefit coho salmon. For this exercise flow contributions from Kettle Springs Creek to the Lower Parks Creek reach are assumed to be 4.85 cfs during this time period.

Cardoza Ranch: The removal of the existing point of diversion for the Cardoza Ranch will provide free fish passage, improve water quality conditions and will increase flows throughout the summer seasons. Once completed, this project will increase flows in the Lower Parks Creek by between 6 to 9 cfs at times when the diversion would be in operation. Sudden changes in flow and increased fine sediment flushes that currently occur when dam boards are placed or removed during the irrigation season would also be eliminated.

In the interim period the Cardoza Ranch has agreed to modify their operation of the existing diversion to allow fish passage to cold water refugial habitats as water quality and temperatures begin to degrade. The interim conditions require that prior to the removal of the diversion on Parks Creek the Cardoza Ranch will remove dam boards at the existing point of diversion when water temperatures first reach 19°C at the PBS (Parks Big Springs). This station is a real-time monitoring location (located near at the mouth of Parks Creek). The impoundment shall be fully drained, then left open for at least 7 consecutive days to allow for redistribution of fish. After the 7 days, permittee can resume normal diversion operations throughout the rest of the irrigation season. The Cardoza Ranch will not provide any additional flow to the Lower Parks Creek Flow Strategy during this interim period. The flow schematic displayed in Figure 24 below represents a future condition in a normal water year after the Cardoza POD has been moved downstream to the Mid Shasta River reach.

Lower Parks Creek Total Flow Contributions: Summer Rearing

Summer instream flows are expected to be about 10.85 cfs in June to about 9.80 cfs in September during a normal water year (Figure 24).

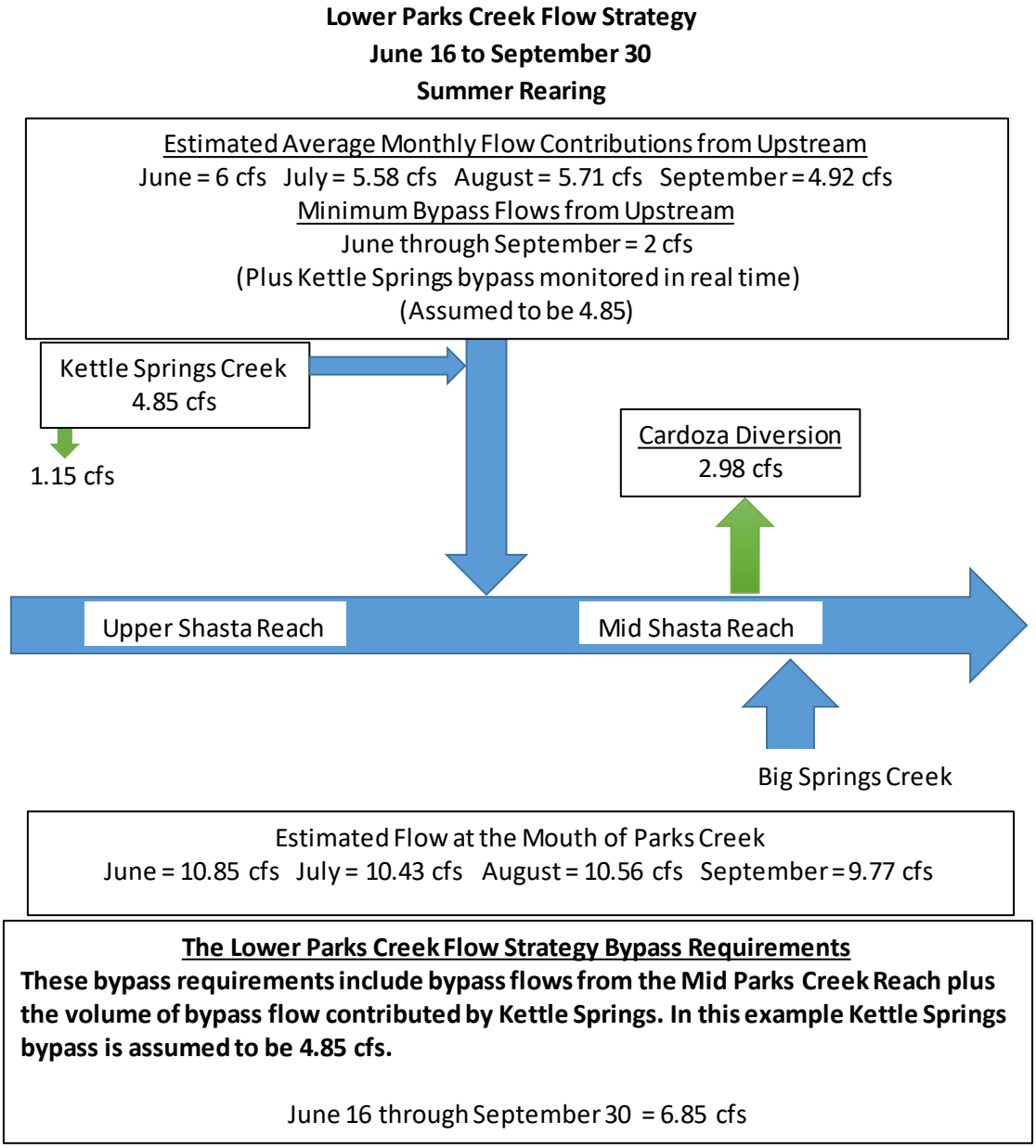


Figure 24. Estimated irrigation diversion volumes and instream flow in the Lower Parks Creek reach based on the Parks Creek Flow Strategy proposed under the Shasta Safe Harbor Agreement during the summer rearing season in a normal water year after all conservation measures have been implemented.

Big Springs Creek

Big Springs Creek Background

The Shasta Big Springs Ranch (SBSR) is owned by the California Department of Wildlife (CDFW). CDFW plans to rename the ranch the Big Springs Ranch Wildlife Area (BSRWA) and CDFW has submitted a site plan describing their management plans. The Big Springs Creek Reach is defined as Big Springs Creek from Shasta River Confluence to Water Wheel (RM 0 to RM 1.6). The following section outlines operations, water rights and how those water rights are exercised along these reaches.

SBSR/BSRWA: The property has adjudicated water rights that total 18.11 cfs. A summary of the existing water rights for the property is provided in Table 8. Prior to 2009 when the property was purchased by The Nature Conservancy, 1,182 acres were under irrigation and the water rights were fully exercised. The Nature Conservancy reduced the number of irrigated acreage down to 494 acres and diversions to irrigate these acres were reduced to 10.51 cfs. In addition, the CDFW had authority of the water rights and they placed additional restrictions on the use of the water rights to further improve conditions for fish and wildlife. In a letter dated August 31, 2015, the CDFW stipulated criteria limited ranch operations as follows:

- Water rights from Little Springs Creek and Hole in the Ground shall not be utilized.
- Water withdrawal pursuant to water right from the Shasta River may be used as deemed appropriate to meet irrigation needs.
- Water withdrawal from Big Springs Creek pursuant to the 6.7 cfs right may occur if maximum daily temperatures measured at the mouth of Big Springs Creek remain below 18 degree C. If water temperatures reach 18 degree C then all irrigation must cease and irrigation may only begin or be resumed when maximum temperatures are less than 18 degrees C for five consecutive days.

These water temperature restrictions generally eliminated the possibility of irrigating from Big Springs Creek from mid-April to mid-August. However, operation of the Nelson diversion on the Shasta River, which has a 2.3 cfs water right to irrigate 200 acres of pasture continued. The Nature Conservancy filed California Water Code Section 1707 petitions with the State Water Resources Control Board (SWRCB) in July 2012 with the expressed intent to recognize fish and wildlife preservation and enhancement as a beneficial use, while retaining the beneficial uses of irrigation and stock water. Davids Engineering Inc. was hired to calculate the consumptive use of those water rights. The consumptive use is the portion of the water right that is evaporated, transpired by plants, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment and therefore would not be available downstream if irrigation was occurring. To successfully add fish and wildlife as a beneficial use to the property's water rights, The Nature Conservancy showed that such an action would not harm other water right holders. As a result, SWRCB added instream flow as a beneficial use for fish and wildlife preservation and enhancement to the water rights on the property (18.11 cfs) but only the consumptively used portion of these water rights can be bypassed downstream as specified in the Order approved by the SWRCB on May 8, 2014. Table 8 shows the consumed values by month, and Table 9 shows the coho salmon life stages that are expected to benefit by the improved flows provided by the consumed portion of the water rights.

Table 8. The amount of consumed water identified for the Big Springs Ranch Wildlife Area.

Diversion Number	Irrigated Area, Acres	Water Right Flow (cfs)	Calculation of Consumed Water (CFS)[1]								Water Source
			Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
167-172	93.9	1.5		0.08	0.55	0.75	0.91	0.79	0.55		Hole in the Ground Creek
241	392.2	6.71		0.34	2.33	3.15	3.8	3.29	2.3		Big Springs Creek
243	251.3	4		0.18	1.43	2.02	2.43	2.11	1.48		Little Springs Creek
244	16.95	0.5		0.01	0.1	0.14	0.16	0.14	0.1		Little Springs Creek
245	122.01	1.15		0.09	0.7	0.98	1.18	1.02	0.72		Little Springs Creek
246	82.98	1.95		0.07	0.49	0.67	0.8	0.7	0.49		Little Springs Creek
247-248	187.39	2.3	0.01	0.16	1.11	1.5	1.81	1.57	1.1	0.33	Shasta River
TOTAL =	**1146.73**	**18.11**	**0.01**	**0.93**	**6.7**	**9.21**	**11.1**	**9.61**	**6.73**	**0.33**	

1 Blank cells indicate that there are no water rights in that month

Table 9. The coho salmon life stages that benefit by the 1707 dedication of the consumed portion of the ranches water rights.

	Target Species	Life Stage targeted for benefit	Objective of potential instream use	Monitoring Location	General timing of potential benefit
Scenario 1	**Coho**	Over summer rearing	Improve water temperatures in Upper Shasta River	Point of Diversion	April through August
Scenario 2	**Fall Chinook**	Adult spawners	Improve water quality in Shasta River Canyon	Montague/Grenada Weir (~RM 15.5)	Late August through September 30th
Scenario 3	**Coho and Fall Chinook**	Out-migrating smolts	Improve water temperature and increase flow volume for out-migrating smolts	Montague/Grenada Weir (~RM 15.5)	April

Big Springs Creek Flow Management Strategy

The CDFW has submitted a site plan for the ranch and proposes the following Beneficial Management Activities for the BSRWA.

- Continue Nelson Ranch irrigation from the Shasta River.
- Divert Hole in the Ground (HIG) Creek tail water return if water quality conditions are detrimental to salmonids (e.g. temperature above 18 degrees C).
    - Permanently dedicate the HIG Creek water right to instream fish and wildlife beneficial use if restoration actions are successful. The current discharge from this tail water source is estimated to be as high as 6.5 cfs.
- Little Springs Creek may be diverted from the spring if both of the following are met: 1) water temperature in Little Springs Creek is 16 degrees Celsius or less at the confluence with Big Springs Creek; and 2) culverts are removed.
    - Permanently dedicate water rights necessary to achieve the temperature criteria for Little Springs Creek.
- Water from Big Springs Lake may only be diverted if diversion would not affect temperature and flow objectives stated below, or it would improve downstream water quality. The temperature objectives are: 1) water temperature in Big Springs Creek at the confluence with Shasta River is 18 degrees Celsius or less; and 2) salmonid habitat flow criteria in the Shasta River Canyon reach are met for upstream adult passage and downstream juvenile passage (Table 2). Water may be diverted if the diversion would improve downstream water quality due to poor quality in Big

    - Springs Lake.Permanently dedicate water rights necessary to achieve the two criteria above for Big Springs Creek and the Shasta River Canyon reach in all months.
- Water availability for future irrigation on the property will be based on the following.
    - 16 °C or less at the confluence of Little Springs Creek and Big Springs Creek.
    - 18 °C or less at the confluence of Big Springs Creek and Shasta River.
    - Juvenile emigration and adult migration flow needs within the canyon reach (Table 2) of the Shasta River.
    - Juvenile rearing temperature and flow conditions needed in the Shasta River below Big Springs Creek.
- Permittee may irrigate in the winter for ground water recharge and to enhance wildlife habitat if legally allowed to do so.
    - Winter irrigation will be minimal and not impact temperature or habitat requirements.

These management actions are focused on protecting and improving habitat for coho salmon as a priority over other beneficial uses.

The landowner located upstream of the BSRWA boundary is not participating in the Agreement and they share some of the diversion infrastructure with the BSRWA. This landowner will likely continue to divert their water rights from Big Springs Creek in the future.

Big Springs Creek Flow Objectives: Adult Migration and Spawning (October 1 to December 31)

Big Springs Creek is recognized as one of the primary coho salmon spawning grounds in the Shasta River watershed. After purchase of the ranch, The Nature Conservancy installed fencing through the entire stream reach to exclude livestock and protect the stream channel. This action has resulted in increased emergent vegetation and associated narrowing and deepening of a previously wide and shallow channel when aquatic vegetation is present. The increased velocities also helped flush fine sediment deposits from localized areas, revealing abundant areas with suitable spawning gravel. Stream flows are currently adequate to support adult salmon migration and spawning within Big Springs Creek.

Suitable spawning habitat for adult coho salmon is present in the entire length of Big Springs Creek.

Big Springs Creek Permittee Commitments: Adult Migration and Spawning (October 1 to December 31)

SBSR/BSRWA: The majority of the water rights associated with this ranch are highly valuable cold water springs. The water resources on this ranch will continue to be managed to protect and improve coho salmon habitat in Big Springs Creek. Chinook and coho salmon currently use Big Springs Creek to spawn each year. The ranch does not divert during this time period.

Big Springs Creek Flow Objectives: Egg Incubation and Juvenile Winter Rearing(January 1 to February 28)

Big Springs Creek has abundant stable flows and favorable water temperatures that have the potential to provide favorable conditions for incubating eggs and over-wintering juvenile coho salmon.

Big Springs Creek Permittee Commitments: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28)

SBSR/BSRWA: The majority of the water rights associated with this ranch are highly valuable cold water springs. The water resources on this ranch will continue to be managed to protect and improve coho salmon habitat in Big Springs Creek. Chinook and coho salmon currently use Big Springs Creek to spawn each year and the stable flow regime provides good conditions for incubating eggs and embryos. During the summer the abundant sub-emergent and emergent aquatic vegetation provides abundant cover and habitat diversity for rearing fish. However, the aquatic vegetation senesces after the first hard freeze and during the winter the amount of cover for overwintering coho salmon is greatly diminished. This loss of habitat complexity may stimulate juvenile coho salmon to seek more suitable habitat elsewhere. Adams and Bean (2016) note that many individuals moved from Big Springs Creek to over-winter in the Upper Shasta River Reach. Those juvenile coho salmon from the 2012 brood year that remained in Big Springs Creek over the winter months exhibited poor survival (28%) relative to those cohorts that over wintered in the Shasta River below Big Springs Creek (71% survival), in the Upper Shasta River (54% survival), or in Parks Creek (55% survival). Lack of cover from predators may be a factor responsible for the lower winter survival rates that were observed. Placement of large woody debris is proposed by the CDFW to increase the amount of cover and improve velocity diversities for coho salmon throughout the year. The ranch may irrigate in the winter for ground water recharge and to enhance wildlife habitat. Winter irrigation will be minimal and would not impact temperature or habitat for coho salmon.

Big Springs Creek Flow Objectives: Juvenile Spring Redistribution and Smolt Emigration (April 1 to June 15)

Cold spring water from Big Springs Creek is important to spring rearing and redistribution of coho salmon in the Shasta River.

> A. Temperature Considerations - CDFW requires that the TNC water rights from Big Springs Creek be left instream once water temperatures reach 18°C. This generally occurs during late spring through early summer prior to the shading effects of the emergent aquatic vegetation. Irrigation may resume once five consecutive days pass with temperatures below 18°C.

Big Springs Creek Permittee Commitments: Juvenile Spring Redistribution and Smolt Emigration (April 1 to June 15)

SBSR/BSRWA: A majority of the water rights associated with this ranch are highly valuable cold water springs. CDFW proposes the following management actions to protect and improve conditions for coho salmon during the spring and summer irrigation seasons.

- Little Springs Creek may be diverted from the spring if both of the following are met: 1) water temperature in Little Springs Creek is 16 degrees Celsius or less at the confluence with Big Springs Creek; and 2) culverts are removed.
- Permanently dedicate water rights necessary to achieve the temperature criteria for Little Springs Creek.
- Water from Big Springs Lake may only be diverted if diversion would not affect temperature and flow objectives stated below, or it would improve downstream water

quality. The temperature objectives are: 1) water temperature in Big Springs Creek at the confluence with Shasta River is 18 degrees Celsius or less; and 2) salmonid habitat flow criteria in the Shasta River Canyon reach are met for upstream adult passage and downstream juvenile passage. Water may be diverted if the diversion would improve downstream water quality due to poor quality in Big Springs Lake. Permanently dedicate water rights necessary to achieve the two criteria above for Big Springs Creek and the Shasta River Canyon reach in all months.

- Water availability for future irrigation on the property will be based on the following.
    - 16 °C or less at the confluence of Little Springs Creek and Big Springs Creek.
    - 18 °C or less at the confluence of Big Springs Creek and Shasta River.
    - Once a temperature threshold is met, diversions from that water source will cease for that irrigation season.
    - Juvenile emigration and adult migration flow needs within the canyon reach of the Shasta River.
    - Juvenile rearing temperature and flow conditions needed in the Shasta River below Big Springs Creek.

Big Springs Creek Flow Objectives: Juvenile Summer Rearing (June 15 to September 30)

Big Springs Creek provides an important source of cold water for rearing coho salmon throughout the summer months.

A. Temperature and flow objectives:

- 16 °C or less at the confluence of Little Springs Creek and Big Springs Creek.
- 18 °C or less at the confluence of Big Springs Creek and Shasta River.
- Juvenile emigration and adult migration flow needs met within the canyon reach of the Shasta River.

Big Springs Creek Permittee Commitments: Juvenile Summer Rearing (June 16 to September 30)

SBSR/BSRWA: The majority of the water rights associated with this ranch are highly valuable cold water springs. CDFW proposes the following management actions to protect and improve conditions for coho salmon during the spring and summer irrigation seasons. CDFW will continue to implement the same management actions described above for juvenile Spring redistribution and smolt emigration during the summer rearing season. The Beneficial Management Actions proposed by CDFW in their site plan submitted under the Agreement are focused on protecting and improving habitats for coho salmon as a priority over other beneficial uses.

Mid Shasta River

Mid-Shasta River Reach Background

The following section describes the NOAA flow objectives and Permittees' flow commitments in order to meet the outlined flow objectives for this reach. The Mid Shasta River Reach is defined as the Shasta River from the end of Huseman ditch to Parks Creek Confluence (RM 25 to RM 35). There are five Permittees located within the Mid Shasta reaches, the Cardoza Ranch, GID, Grenada Novy Ranch, Rice Livestock Company and the NB Ranch.

Participants and Reach Operations

Cardoza (Post POD relocation to Shasta River): The Cardoza Ranch has a 2.98 cubic feet per second (cfs) water right, which is included in the Shasta River Decree. The current point of diversion is located on Lower Parks Creek, 1.5-miles upstream from the confluence with the Shasta River. The ranch has agreed to move their point of diversion from Parks Creek to the Shasta River near the Louie Road Bridge (Mid Shasta reach), which will change the management reach from Lower Parks Creek to the Mid Shasta River, and will end Cardoza Ranch's Parks Creek diversions. The diversion relocation is expected to result in an overall reduction of the total amount of water diverted by Cardoza Ranch, although the exact reduction is unknown at this time. Their diversion rate will remain within their adjudicated water right of 2.98 cfs or less if the full water right is not needed for irrigation between April 1st to September 30th. The ranch has filed a permissive 1707 on the full water right, as there are times when the ranch may cease to irrigate during summer months due to hay production. The 1707 dedication will allow the consumed portion of the Cardoza Ranch's water right to be bypassed downstream.

Grenada Irrigation District POD: The Grenada Irrigation District's (GID) water right is identified in the Shasta River Decree as Diversion #149. GID is a special district that owns and operates several parcels including the point of diversion, a lift station and a parcel along the ditch. GID provides water to over 60 users who irrigate up to 1,477 acres. While GID's water right is large in volume, it is low in priority. Under recent use, GID will routinely divert 40 cfs for short periods of time to fill the ditch and catch up on rotation. Within the past 10-15 years, GID operates between 135-140 (138 average) days a year through the irrigation season (4/1- 9/30) with an average diversion volume of approximately 28-32 cfs or 8,200 acre feet a year. GID diversion volumes are usually reduced or shut off due to priority during base flow conditions in August. GID typically will be allowed to divert again later in September when higher priority rights reduce their diversion volume.

GID's main canal is an inefficient earthen canal. Transmission losses as high as 35% can occur in the main canal when diverting at high levels according to recent investigations completed by NRCS and loss calculations extrapolated from a water balance conducted by Davids Engineering in 2006. On average, ditch loss values during 2006 were 17% for per the study period and 1,100 acre feet were lost in delivery transmission. The project proposed in the Site Plan will reduce GID's maximum diversion rate to 24 cfs.

Novy Pump Diversion: The Novy Pump has a capacity of 5.5 cfs and operates on average 31 days per month from March to November every season. A total of approximately 465 acres are irrigated with this diversion, solely on the Novy property. As this is a riparian right, there are no recorded winter rights on this point of diversion, but the pump can be operated during any part of the year. The diversion pumps water into an open

ditch system and flood irrigation practices are utilized throughout the ranch, with the proposed plan to increase efficiency by replacing main ditches with buried mainline with risers.

Novy-Rice-Zenkus Diversion: Novy-Rice diversion is shared between Novy Ranches, Rice Livestock and Truttman-Zinkas on rotation. According to the 2014 statement of use, a continuous diversion of 10 cubic feet per second (cfs) from March to November or a total of 4520 acre-feet per season was utilized. This diversion is currently taken at a flash board dam and conveyed through open ditches and flood irrigation practices are used. The rotation is dependent on land ownership, with approximately 302 acres irrigated from that diversion owned between the three ranches. As this is a riparian right, there are no recorded winter rights on this point of diversion, but can be operated during any part of the year. The Novy Rice Diversion will be designed as part of their SHA, the diversion structure will be reconstructed as a roughed channel to provide fish passage throughout the year, with an on channel fish screen and the diversion will be reduced to 5 cfs.

Huseman Diversion (Rice Livestock Company and NB Ranches, Inc.): The Huseman diversion has adjudicated water rights during the irrigation season (April 1 to October 1) and during the remainder of the year for stockwater use. The diversion has a capacity of 11.9 cfs which is used from April to October every season. A total of approximately 629.74 acres are irrigated with this diversion between three different users in the Huseman Ditch Association, two of which are Permittees to the Agreement. Rice Livestock irrigates approximately 270 acres with the Huseman Ditch water and has ownership of 50-percent of the entire right. NB Ranches, Inc. irrigates approximately 182 acres for water supplied by the Huseman Diversion and controls 33.5 percent of the total water right. The winter right on the Huseman Ditch is 5 cfs.

In 2011, the Huseman POD was moved from the Grenada Irrigation District POD to a selected location on the Rice Livestock property, located approximately 31,300' feet (5.9 miles) downstream. The project included installing buried pipe and flood risers to replace approximately 4,500 feet of open ditch. As a result of these improvements, irrigation now includes using flood risers on approximately 60 acres of the ranch (known as the Boot Field), improving irrigation efficiency. A second lateral water line delivers water to the remaining fields and other Huseman Ditch users. This lateral water line eliminates the need to deliver water through an additional 7,000' of inefficient open ditch. As a result of this project, 11.9 cfs of water remains instream for 31,300' before being diverted at the second POD. Huseman Ditch Association now pumps Huseman Ditch Water from Shasta River rather than by gravity diversion via the previous POD. Instead of the practice of continuous diversion that was used prior to the project implementation in 2011, the Permittees use approximately 142 AF of water per 15 day irrigation rotation cycle. Thirteen irrigation rotations typically occur during the season. The Permittees (Rice Livestock and NB Ranches) currently apply a total of approximately 3,736 AF of water per year, where previously the amount of water applied was approximately 4,242 AF, which is a reduction of 506 AF of water use or about 1.39 cfs during each irrigation season.

The flow schematic provided in Figure 25 depicts the diversion rates and instream flow conditions that currently exist in the Mid Shasta River reaches as described above.

Mid Shasta Flow Strategy
Irrigation Season: March 1 - November 1
Existing Conditions

Estimated Flow Contribution from Parks Creek

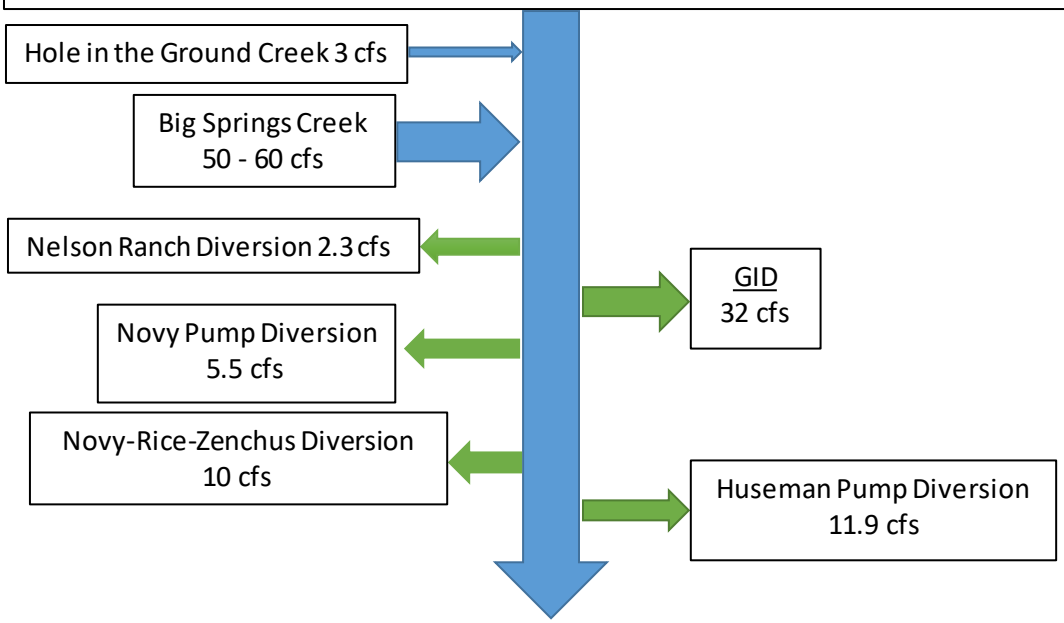
March	5.85 cfs	June	5.65 cfs	Sept	1 cfs
April	10.5 cfs	July	1 cfs	Oct	1 cfs
May	10.5 cfs	Aug	1 cfs	Nov	13.15 cfs

Estimated Flow Contribution from the Upper Shasta River (Normal Water Year)

Flows at the bottom of the reach range from about 25 to 15 cfs in March - April and drop to a summer low base flow of about 3 cfs + minor acretions from tailwater and hyporheic flow contributions.

Total Flow Contribution to the Mid Shasta River Reach

March and April about 21 - 36 cfs. Flows decline in May and June and reach a base flow in July of about 4+ cfs.



Total Estimated Flow Leaving the Mid Shasta River

The irrigation season in this reach begins in April for adjudicated rights. Riparian rights may divert all year. The estimated flows in March include riparian diversions and after April all diversions are assumed to be diverting.

Based on these assumptions the flow estimates are:

March = 64 - 89 cfs April = 12 - 37 cfs Base flows from July - Sept exclude GID based on low priority and would be about 26 to 36 cfs in a normal year less a reduced GID diversion rate.

Figure 25. Estimated irrigation diversion volumes and instream flow in the Mid Shasta River reach under existing conditions prior to implementation of the CHERP flow releases from Dwinnell Dam and the proposed Flow Management Strategy developed under the Shasta Safe Harbor Agreement in a normal water year.

Mid Shasta River Flow Strategy

Adult migration and spawning (October 1 to December 31) Flow Objectives:

A. Base Flows - To the extent practicable; development of instream flow strategies in this reach should contribute towards providing favorable upstream migration conditions (125 cfs) through the lower river canyon (Table 2). Management of diversions should also attempt to reduce large deviations in flow downstream during the migration and spawning season through development of a coordinated irrigation strategy. Downstream diversions have been considered in this flow management strategy, with over 58 cfs of adjudicated water rights and 14 cfs of riparian rights downstream of the geographic scope of the agreement. Given the downstream adjudicated rights, a realistic objective for the SHA to contribute to canyon flows would be 70 cfs (56% of total diversion volume) at the A-12 gage. It should be noted that many of the water rights in the geographic area of the SHA agreement, as well as those water rights downstream end on October 1st.

Upstream Flow Contributions

Upper Shasta River- Winter instream flows entering the Mid Shasta from the Upper Shasta reach are expected to be between 8 and 14 cfs during a normal year.

Parks Creek- Winter instream flows entering the Mid Shasta from Parks Creek are expected to range from about 10 cfs in October to about 21 cfs in December during a normal water year.

Therefore, in a normal water year the total amount of instream flow entering this reach is anticipated to range from about 23 cfs in October to about 35 cfs in December.

Mid Shasta River Permittee Commitments: Adult migration and spawning (October 1 to December 31):

SBSR/BSRWA: The SBSR/BSRWA has an active stock water right on the Nelson Unit which is a total of 0.25 cfs.

Cardoza Ranch: The Cardoza Ranch does not have a stockwater right, thus will not divert during this life stage.

Grenada Irrigation District (GID): GID does not divert during this time period.

Novy Pump: The Novy pump is a riparian right and they may exercise this right during this time period and have not proposed any flow commitment during this time period. Based on current diversion patterns it is likely that 5.5 cfs of water would be diverted at this location during October and diversions would not begin again until March at the start of the next irrigation season.

Novy-Rice-Zenkus Diversion: The Novy-Rice-Zenkus diversion is a riparian right and they may exercise this right during this time period. The users of this diversion (Grenada Novy Ranch and Rice Livestock Company) have proposed to reduce this diversion from 10 cfs down to 5 cfs as part of the water conservation project to improve irrigation delivery efficiencies and eliminate fish passage concerns at the point of diversion.

Huseman Diversion: If diverting for stock water from 10/1-3/31, Rice livestock and NB Ranches will reduce the maximum diversion volume 5.0 to 4.0 cfs and limit days of operation to 25 days a year as opposed to continuous right of 5.00 cfs during non-irrigation season. Maximum cumulative diversion for stock water during winter period will be 200 AF per year.

Mid-Shasta River Reach Total Reach Contribution: Adult Migration and Spawning

Fall instream flows are expected to be between about 65 cfs and 96 cfs at the bottom of this reach during a Normal Water Year (Figure 26). This does not include natural accretion that have been documented in this reach.

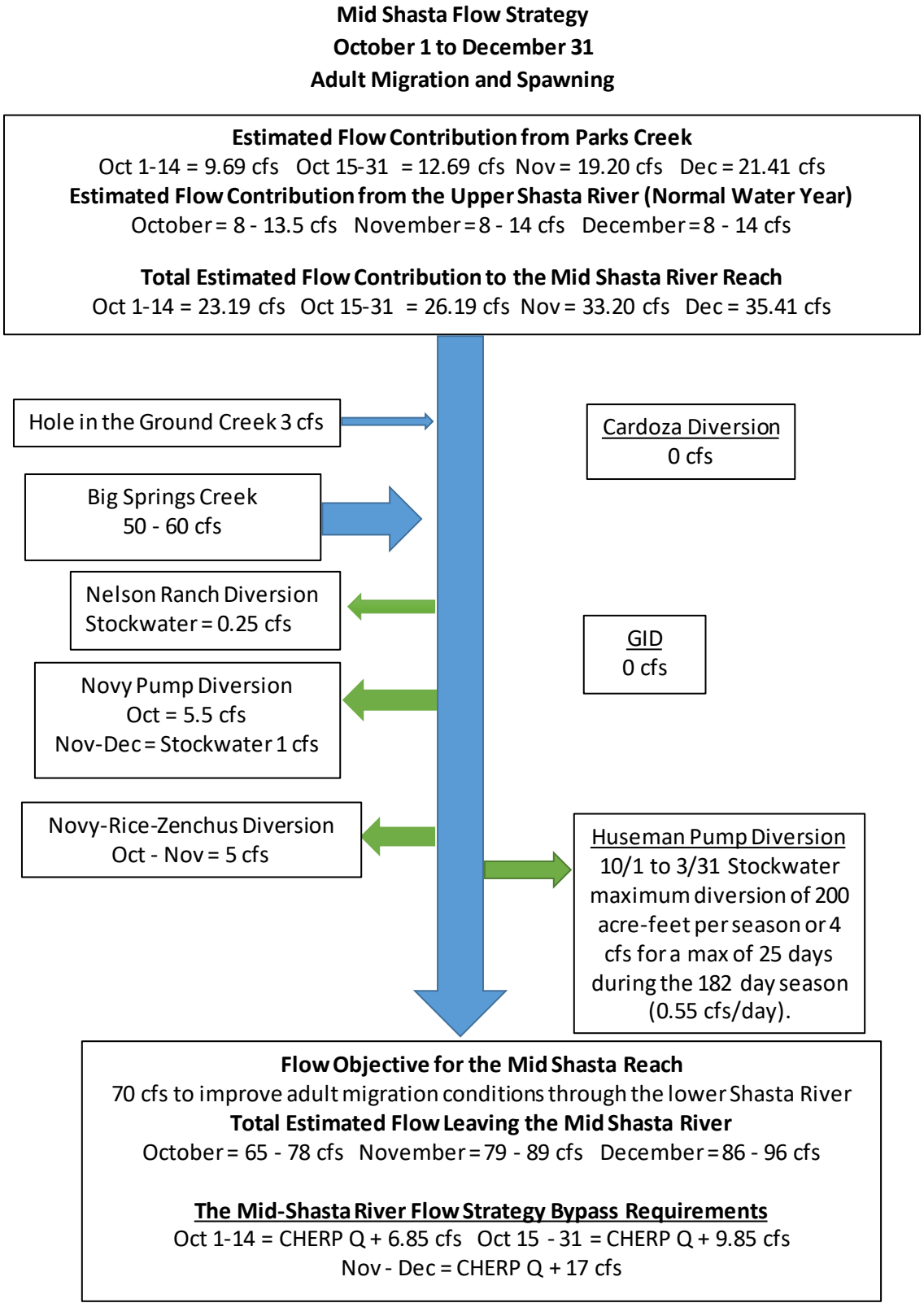


Figure 26. Estimated irrigation diversion volumes and instream flow in the Mid Shasta River during the adult migration and spawning season under normal water year type conditions with the Flow Management Strategy proposed under the Shasta Safe Harbor Agreement after all conservation measures have been implemented.

Mid Shasta River Flow Objectives: Egg Incubation and Juvenile Winter Rearing (January 1 to February 28):

A. Base flow conditions during the winter may not require additional management actions. Diversions during this period of time are greatly reduced and spring flow contributions from upstream (Big Springs Creek) provide stable base flow conditions.

Upstream Flow Contributions

Upper Shasta River- Winter instream flows entering the Mid Shasta reach from the Upper Shasta reach are expected to range between about 5.5 cfs and 12 cfs during a normal water year.

Parks Creek- Winter instream flows entering the Mid Shasta reach from Parks Creek during a normal water year are expected to be between 16 cfs to 18 cfs.

Total flow enter the Mid Shasta Reach from upstream in a normal type water year are anticipated to be between about 18 cfs and 30 cfs during the incubation and winter rearing season.

Mid Shasta River Permittee Commitments: Egg incubation and winter rearing juveniles (January 1 to February 28:

SBSR/BSRWA: The SBSR/BSRWA have an active stock water right on the Nelson Unit which is a total of 0.25 cfs, which has minimal impact to the amount of available flow for this reach.

Cardoza Ranch: The Cardoza Ranch does not have a stockwater right, thus will not divert during this life stage.

GID: GID does not divert during this time period.

Novy Pump: The Novy pump is typically operated from March through October and this riparian right is generally not used during this time period with the exception of a stockwater pump that may divert about 1 cfs.

Novy-Rice-Zenkus Diversion: The Novy-Rice-Zenkus diversion is a riparian right and they may exercise this right during this time period however, based on the water right reports for this diversion (eWRIMs application #S000808) this diversion has not been active during January and February since at least 2009.

Huseman Diversion: If diverting for stock water from 10/1-3/31, Rice livestock and NB Ranches will reduce the maximum diversion volume 5.0 to 4.0 cfs and limit days of operation to a maximum of 25 days a year as opposed to a continuous diversion of 5.00 cfs during non-irrigation season. Maximum cumulative diversion for stock water during winter period will be 200 AF per year. If this volume were to be diverted continuously the diversion rate would be equivalent to 0.55 cfs per day.

Mid Shasta River Total Flow Contributions: Egg Incubation and Juvenile Winter Rearing

Winter instream flows are expected to be between 70 cfs to 91 cfs at the bottom of this reach depending on water year type (Figure 27). This does not include natural accretion that has been documented in this reach.

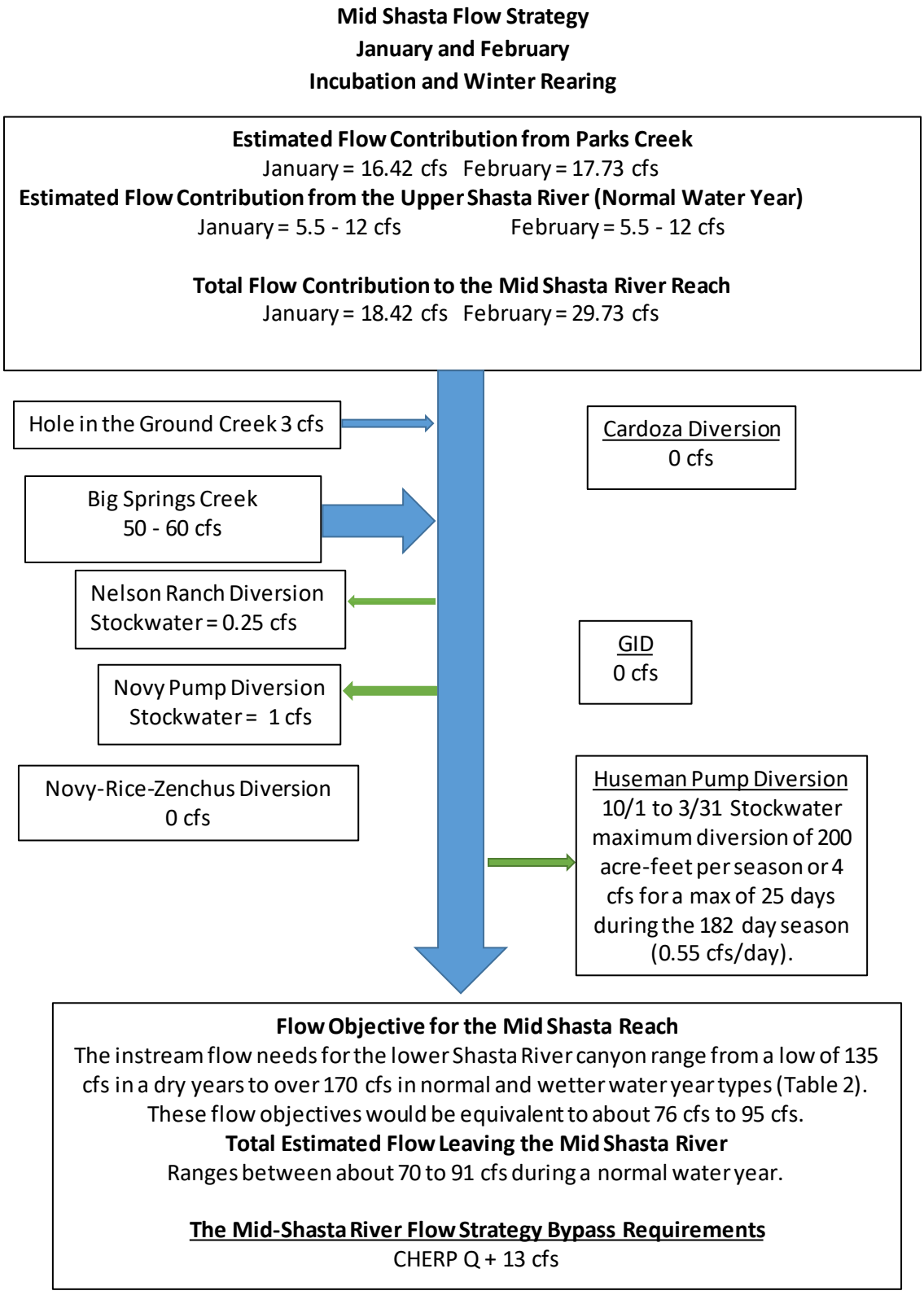


Figure 27. A schematic of the estimated diversion volumes and instream flow in the Mid Shasta River during the egg incubation and winter rearing season during a normal water year type that would occur under the Flow Management Strategy proposed under the Shasta Safe Harbor Agreement after all conservation measures have been implemented.

Mid Shasta River Flow Objectives: Coho Salmon Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

The reductions in flows coincident with the onset of the irrigation diversion season greatly reduce rearing habitat in the lower river canyon and large variations in flow can result in stranding of fry and juvenile coho salmon rearing in off channel habitats an may threaten survival of embryos still incubating in redds present in side channel habitats.

A. Base Flows – Development of flow strategies should try to temper the large variations in flow downstream to help maintain abundant off channel rearing habitats and reduce the frequency of dewatering these habitats prematurely. Spring flows that mimic snowmelt hydrology are recommended to help restore riparian recruitment throughout this reach.

B. Pulse Flows - Pulse flows provide an important environmental cue for movement, help mobilize fine sediments, enhance riparian recruitment and growth, and improve juvenile passage.

C. Temperature Considerations - Development of flow strategies should seek to maintain and extend cold water temperatures downstream for as long as possible.

Upstream Flow Contributions

Upper Shasta River- In a normal water year the instream flows entering the Mid Shasta reach from the Upper Shasta reach are expected to range between 17 cfs and 34 cfs in March and April, declining to a low of about 7 cfs to 12 cfs in June.

Parks Creek- The instream flow contributions entering the Mid Shasta reach from Parks Creek in a normal water year are expected to be between 17 cfs and 26 cfs from April through May and then decline to about 13 cfs in June.

The total amount flow entering the Mid Shasta reach during the time period in a normal water year is expected to range from about 51 cfs in March, 48 cfs in April, 45 cfs in June and 25 cfs by mid-June.

Mid Shasta River Permittee Commitments: Spring Rearing, Redistribution and Smolt Emigration (March 1 to June 15):

SBSR/BSRWA: The majority of the water rights associated with this property are highly valuable cold water springs. In concurrence with the conservation easement and as the future owners of the property CDFW will continue to manage the water resources on the property to improve conditions for coho salmon during this life stage.

The water right associated with the Nelson unit will continue to be active throughout this time period, where 2.3 cfs may be diverted during this time period.

GID: GID has committed to the following diversion schedule after a proposed water conservation project is implemented.

Normal and Drier Years

Date	Life Stage	Current CFS	Proposed CFS	Conserved
4/01-4/9 (9 days)	Juvenile	30	0 cfs	535 AF
4/10-5/20 (39 days)	Juvenile	30	24 cfs	464 AF
5/21-8/15 (86 days)	Over-summering	24	24 cfs*	00 AF

Wet and Very Wet Years

Date	Life Stage	Current	Proposed	Conserved
4/01-4/9 (9 days)	Juvenile	30	0 cfs	535 AF
4/10-5/20 (39 days)	Juvenile	30	24 cfs	464 AF
5/21-8/15 (86 days)	Over-summering	24	24 cfs*	00 AF

*Schedule does not consider limitations of diversion caused by bypass of conserved water, decree priority and water mastering.

Novy Pump: The Novy Ranch has committed to reducing the Novy Pump diversion from 5.5 cfs to 2.75 cfs between April 1st to April 10th to help alleviate the drop in the hydrograph at the start of irrigation season. After April 10th the Novy pump will operate at full capacity.

Novy-Rice-Zenkus Diversion: The Novy-Rice-Zenkus diversion conservation project will allow the landowner to reduce the current diversion from 10 cfs to 5 cfs.

Huseman Diversion: The Huseman diversion, as described in the Rice Livestock Company and NB Ranches, Inc. Site Plans, will not initiate diversion until April 6th and after the Huseman pipeline project is implemented, the maximum diversion rate will be reduced from 11.9 cfs to 10 cfs.

Mid Shasta River Total Flow Contributions: Juvenile Rearing, Redistribution and Smolt Emigration:

In a normal water year the spring season instream flows at the bottom of the Covered Area for the Safe Harbor Agreement are expected to be range from about 89 cfs to 99 cfs on April 1, 62 cfs to 52 cfs on April 10th, 58 cfs to 48 cfs in May and 38 cfs to 28 cfs in June (Figure 28). These estimates do not include natural accretion that occurs in this reach.

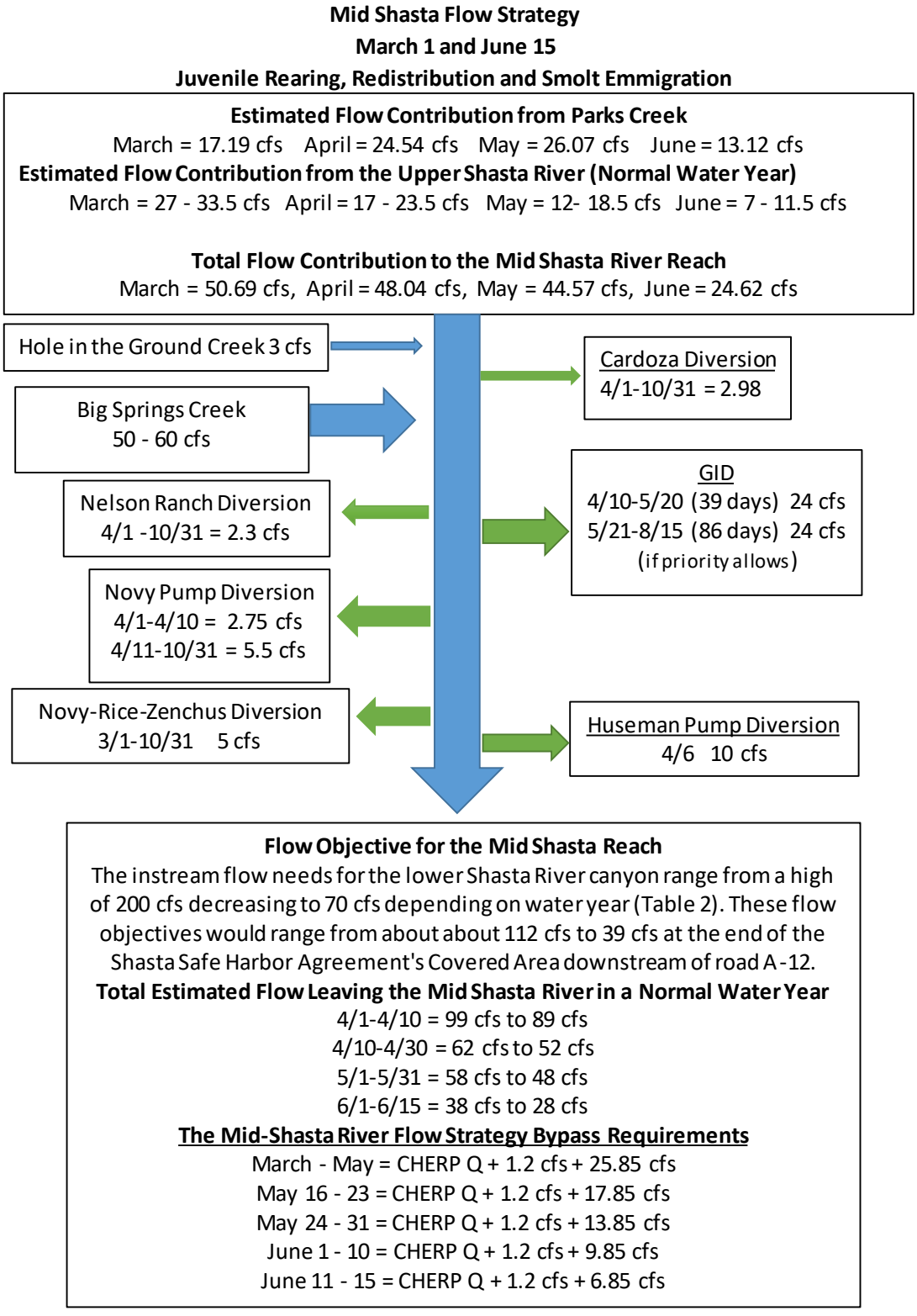


Figure 28. A schematic of the estimated diversion volumes and instream flow in the Mid Shasta River during the spring rearing, redistribution and emigration season during a normal water year type that would occur under the Flow Management Strategy proposed under the Shasta Safe Harbor Agreement after all conservation measures have been implemented.

Mid Shasta River Flow Objectives: Coho Salmon Summer Rearing (June 15 to September 30):
Improvements in flow, water quality and habitat quality that will occur upstream have the potential to improve over summering habitat within this reach, particularly in those areas further upstream. Water management strategies should focus extending these benefits downstream to the extent practicable. Efforts should focus on restoring spring sources to the mainstem to create additional cold water refugia opportunities. Water management should also seek to reduce large variations in flow through effective coordination of diversions.

Upstream Flow Contributions

Upper Shasta River- Summer instream flows entering the Mid Shasta reach from the Upper Shasta reach are expected to range between 5 cfs and 13 cfs in a normal water year.

Parks Creek-Summer instream flows entering the Mid Shasta reach from Parks Creek are estimated to be about 10 cfs during this time period.

The total amount of flow entering the Mid Shasta River reach is expected to range from about 20 cfs in June, July and August with a slight increase to about 23 cfs in September under a normal water year.

Mid Shasta River Permittee Commitments: Summer Rearing (June 15 to September 30):
SBSR/BSRWA: The majority of the water rights associated with this ranch are highly valuable cold water springs. In concurrence with the conservation easement and as the future owners of the ranch CDFW will continue to manage the water resources on the ranch to improve conditions for coho salmon during this life stage.

The water right associated with the Nelson unit will continue to be active throughout this time period, where 2.3 cfs may be diverted during this time period.

GID: GID has committed to the following flow schedule as part of the site plan agreement:

Normal and Drier Years

Date	Life Stage	Current	Proposed	Conserved
5/21-8/15 (86 days)	Over-summering	24	24 cfs*	00 AF
8/16-9/6 (22 days)	Over-summering	0-15	0-15*	00 AF
9/7-9/30 (23 days)	Over-summering	21	18 cfs*	137 AF

*Schedule does not consider limitations of diversion caused by decree, priority and water mastering.

Wet and Very Wet Years

Date	Life Stage	Current	Proposed	Conserved
5/21-8/15 (86 days)	Over-summering	24	24 cfs*	00 AF
8/16-9/6 (22 days)	Over summering	24	24 cfs *	00 AF
9/7-9/30 (23 days)	Over-summering	24 cfs	18 cfs*	274 AF

*Schedule does not consider limitations of diversion caused by decree, priority and water mastering.

Novy Pump: The Novy Ranch will divert 5.5 cfs from June 16th to September 20th and then will reduce diversion to 2.75 cfs to assist with fall flows for Chinook.

Novy-Rice-Zenkus Diversion: The Novy-Rice-Zenkus diversion conservation project will allow the landowner to reduce the current diversion from 10 cfs to 5 cfs and has committed to reducing the diversion to 2.5 cfs to assist with fall flows for Chinook.

Huseman Diversion: The Huseman diversion, under the Rice and Nicolletti Site Plan agreements, will reduce diversion from the current 11.9 cfs to 10 cfs after the Huseman pipeline project is implemented. The diversion will be shut off on September 25th to assist with fall flows for Chinook.

Mid Shasta River Total Flow Contributions: Juvenile Summer Rearing

In a normal water year the summer season instream flows are expected to range between 47 cfs and 62 cfs (Figure 29). When GID is not diverting and are expected to range between 23 cfs and 45 cfs when GID is diverting volumes proposed under the Flow Management Strategy provided those flows are available to GID based on their water right priority. These estimates do not include natural accretion.

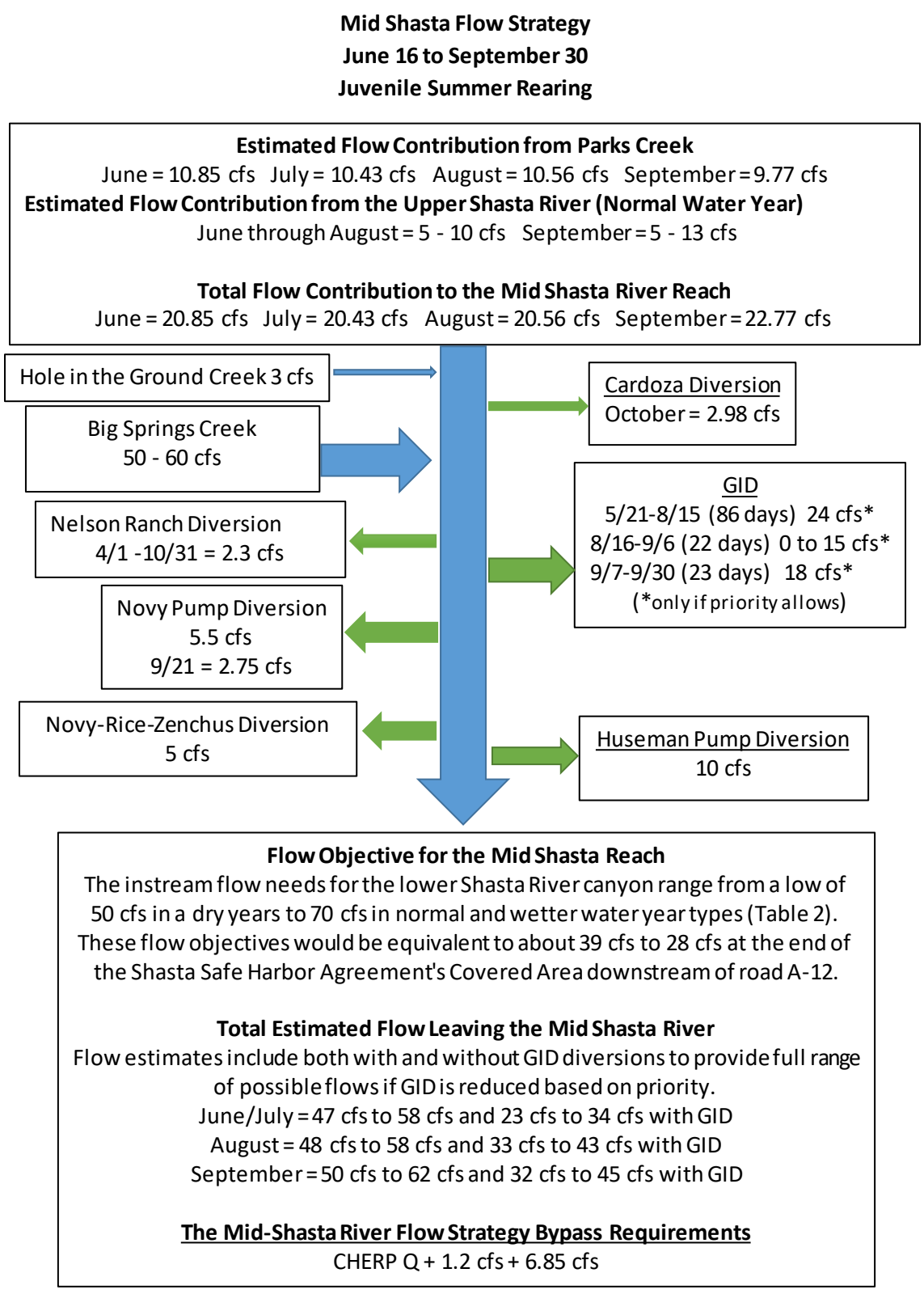


Figure 29. A schematic of the estimated diversion volumes and instream flow in the Mid Shasta River during the summer rearing season during a normal water year type that would occur under the Flow Management Strategy proposed under the Shasta Safe Harbor Agreement after all conservation measures have been implemented.

Conclusion

Agreement Parties have developed a flow management strategy under the Shasta River Safe Harbor Agreement that will increase instream flow and improve water quality conditions (Tables 10, 11 and 12). The greatest improvements are anticipated to occur during the spring and summer seasons when fry and juvenile coho salmon are present. Spring flows will better mimic natural snow melt hydrology and peak flows will generally meet or exceed minimum instream Tier 1 objectives recommended by McBain and Trush, Inc. and Humboldt State University for upper Shasta River and Parks Creek. Summer base flows will slightly improve in Upper Parks Creek Reach, with greater improvements accumulating downstream. Spring flow contributions will increase throughout the Covered Area increasing the availability of cold water refugia habitats in several locations with the greatest improvements expected to occur in Upper Shasta River and Mid-Parks Creek reaches. Adult coho salmon will have access to all stream reaches due to improved fish passage conditions. In addition, adult Chinook salmon will receive benefits to migration and spawning habitat availability due to the earlier onset of increased fall flows. Over wintering flows generally remain similar to current conditions with some localized improvements that should benefit over wintering juvenile coho salmon and incubating eggs.

Benefits to coho salmon described above are expected to be fully realized in a phased approach as water conservation projects described in individual site plans are completed. As such, the Agreement Parties are committed to strategic coordination to optimize project funding opportunities. NOAA anticipates the benefits from projects on instream flows may vary somewhat from those described in site plans the Flow Management Strategy. In addition, there is limited understanding of the mechanisms that influence spring flow volumes, hyporheic flows, and tailwater return pathways to the river. Hydrological uncertainties underscore the importance of implementing effectiveness monitoring program described in the Adaptive Management Program to validate the flow requirements of the Agreement.

Table 10. Comparison between current instream flow conditions and instream flow conditions anticipated under the Shasta Safe Harbor Agreement's Flow Management Strategy in the Upper Shasta River Reach.

Reach	Life Stage	Flow Objectives	Current conditions	SHA Flow Strategy	Result
Upper Shasta River	Adult Migration and Spawning	10 - 13 cfs	5 - 11 cfs	8 - 14 cfs	+ 3 cfs, Objective met more often and exceeded at times
	Incubation and Winter Rearing	7 - 10 cfs	3.5 - 10 cfs	5.5 - 12 cfs	+2 cfs, Objective met more often
	Spring Rearing, Redistribution, Emigration	20 - 25 cfs peak with declining flows to mimic snow melt hydrograph	3 - 25 cfs	6.5 - 33 cfs	+ 3 cfs to 8 cfs throughout the season
	Summer Rearing	6 cfs	3 cfs	5 - 13 cfs	+2 cfs to 10 cfs, Objectives met more frequently and exceeded at times

Table 11. Comparison between current instream flow conditions and instream flow conditions anticipated under the Shasta Safe Harbor Agreement's Flow Management Strategy in Parks Creek.					
Upper Parks Creek	Adult Migration and Spawning	10 - 11 cfs	0.05 - 7.5 cfs	1 - 12 cfs	+ 4.5 cfs, The objective is met earlier in the season
	Incubation and Winter Rearing	6 - 10 cfs	7.5	6 cfs	Small decrease
	Spring Rearing, Redistribution, Emigration	March-April 20 cfs; 5/16 - 5/23 = 12 cfs; 5/24 - 5/31 = 8 cfs; 6/1 - 6/10 = 4 cfs	March = 7.4 cfs April = 12.2 cfs May = 12.2 cfs June = 7.2 cfs	March = 14.6 cfs April = 21.9 cfs May = 24.0 cfs June = 12.6 cfs	Flow volumes are nearly doubled and better mimic natural flow patterns.
	Summer Rearing	1 cfs	1.45 - 0 cfs	1 cfs	Connectivity and fish passage improved
Mid Parks Creek	Adult Migration and Spawning	10 - 11 cfs	0 - 5.4 cfs	Oct 1 - 14 = 8.7 cfs Oct 15-31 = 11.7 cfs Nov = 19.4 cfs Dec = 21.6 cfs	Objectives met sooner and exceeded after Oct 15
	Incubation and Winter Rearing	10 cfs	11 - 12 cfs	15 - 17 cfs	+ 5 cfs, Objective met
	Spring Rearing, Redistribution, Emigration	3/1 - 5/15 = 20 cfs; 5/16 - 5/23 = 12 cfs; 5/24 - 5/31 = 8 cfs; 6/1 - 6/10 = 4 cfs,	Mar-4.1 cfs Apr- 8.9 cfs May - 8.4 cfs June - 2.1 cfs	Mar-16.2 cfs Apr- 23.5 cfs May - 25.1 cfs June - 12.1 cfs	Flow volumes are much higher and better mimic natural flow patterns
	Summer Rearing	1 cfs	June = 2.1 cfs July= 0 cfs August= 0 cfs Sept = 0 cfs	June = 9.9 cfs July = 9.4 cfs August = 9.6 cfs Sept = 8.8 cfs	Base flows are and cold water habitat is increased
Lower Parks Creek	Adult Migration and Spawning	Oct 1 - 14 = 6.85 cfs; Oct 15 - 31 = 9.85 cfs; Nov = 17 cfs; Dec = 17 cfs	Oct - 1 cfs Nov - 11.4 cfs Dec - 18.1	Oct 1-14 = 9.69 cfs Oct 15-31 = 12.69 cfs Nov = 19.20 cfs Dec = 21.41 cfs	Flows are improved earlier and objectives are met.
	Incubation and Winter Rearing	13 cfs	Jan = 17.9 cfs Feb = 18.2 cfs	Jan = 16.4 cfs Feb = 17.7 cfs	Small decrease, objectives exceeded
	Spring Rearing, Redistribution, Emigration	March =25.85 cfs; April = 25.85 cfs; May 1-15 = 25.85 cfs; May 16-23 = 17.85 cfs; May 24-31 = 13.85 cfs; June 1 - 10 = 9.85 cfs; June 11 - 15 = 6.85 cfs	March = 5.1 cfs April = 9.9 cfs May = 9.4 cfs June = 3.1 cfs	March = 17.2 cfs April = 24.5 cfs May 1-15 = 26.1 cfs, May 16 - 23 = 26.1 cfs, May 24 - 31 = 26.1 cfs, June 1-10 = 13.1 cfs, June 11-15 = 13.1 cfs	Spring flows are substantially increased and objectives are exceeded
	Summer Rearing	6.85 cfs	1 cfs	9.8 - 10.6 cfs	Base flows are increased substantially and cold water refugia is increased

Table 12. Comparison between current instream flow conditions and instream flow conditions anticipated under the Shasta Safe Harbor Agreement's Flow Management Strategy in the Mid-Shasta River Reach.

Mid Shasta River	Adult Migration and Spawning	70 cfs	140 -170 cfs[1]	Oct = 65 - 78 cfs Nov = 79 - 89 cfs Dec = 86 - 96 cfs	Objectives generally met or exceeded
	Incubation and Winter Rearing	76 cfs to 95 cfs	257 cfs[2]	70 - 91 cfs	Objectives generally met or exceeded
	Spring Rearing, Redistribution, Emigration	112 cfs decreasing to 39 cfs by summer	89 cfs to 12 cfs	4/1-10 = 99 to 89 cfs 4/10-30 = 62 to 52 cfs 5/1-31 = 58 to 48 cfs 6/1-15 = 38 to 28 cfs	Flow are improved and better mimic snow melt hydrology
	Summer Rearing	28 cfs to 39 cfs	25 to 36 cfs less GID Diversion Rates	23 - 62 cfs	Flows are similar however, flows during the spring and fall transitions are improved to help juvenile emigration and adult immigration

1: Average monthly flow at USGS Yreka gage for water years 2000 to 2016 for October and November.

2: Average flow at the USGS Yreka gage for water years 2000 to 2016 for December and January, combined.

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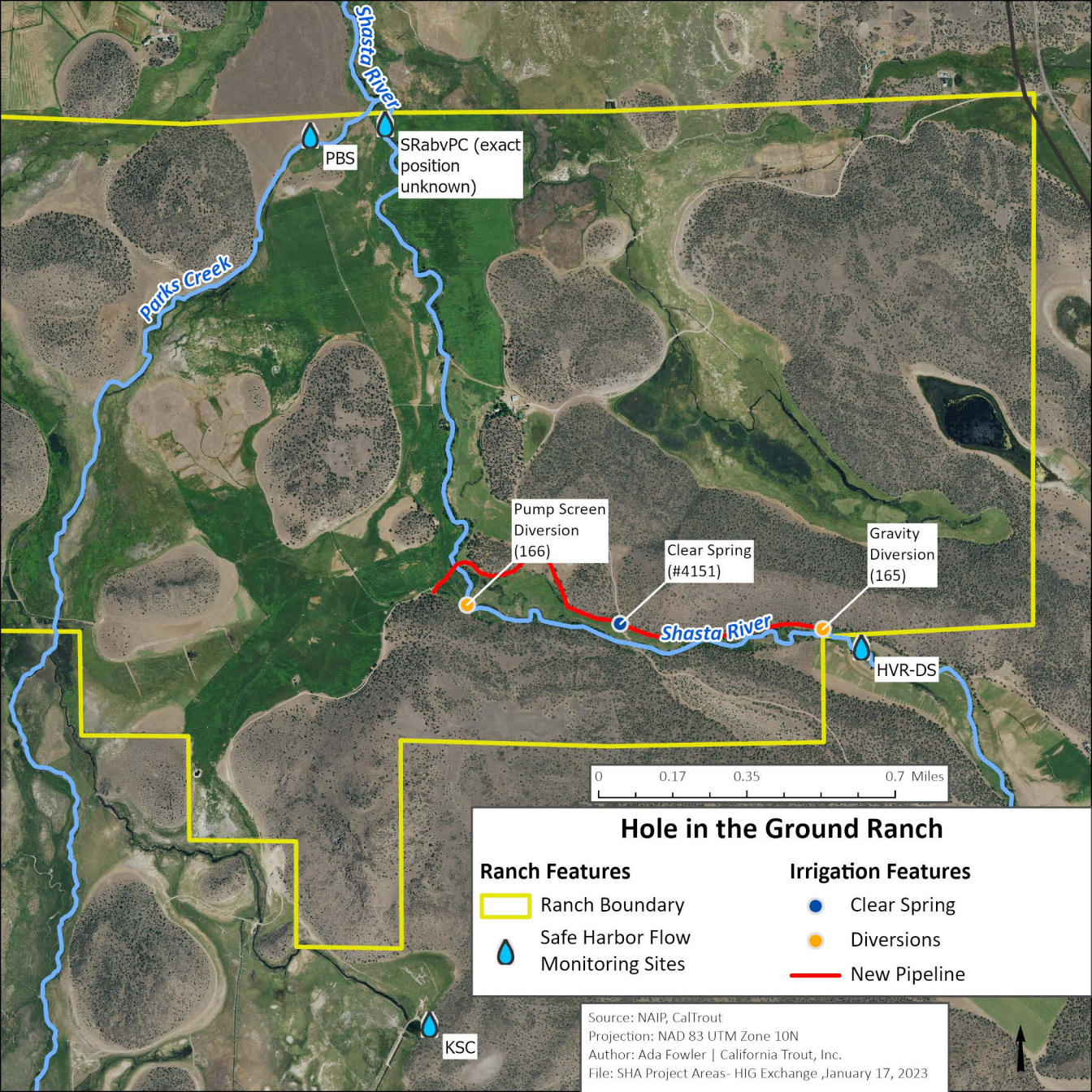
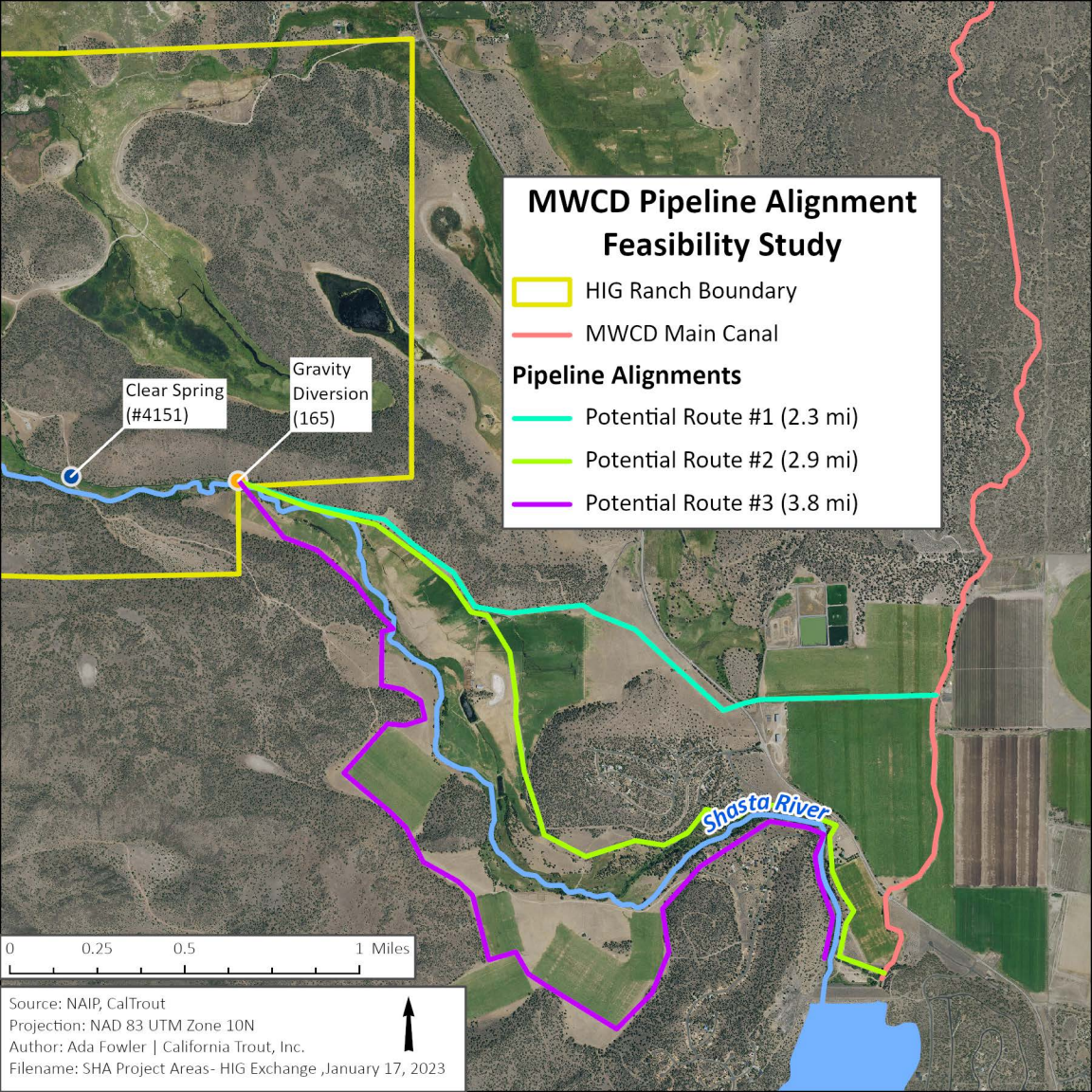

Shasta River
PBS
SRabvPC (exact position unknown)
Parks Creek
Pump Screen Diversion (166)
Clear Spring (#4151)
Gravity Diversion (165)
Shasta River
HVR-DS
KSC
0
0.17
0.35
0.7 Miles
Hole in the Ground Ranch
Ranch Features
Ranch Boundary
Safe Harbor Flow Monitoring Sites
Irrigation Features
Clear Spring
Diversions
New Pipeline
Source: NAIP, CalTrout
Projection: NAD 83 UTM Zone 10N
Author: Ada Fowler | California Trout, Inc.
File: SHA Project Areas- HIG Exchange ,January 17, 2023


MWCD Pipeline Alignment Feasibility Study
HIG Ranch Boundary
MWCD Main Canal
Pipeline Alignments
Potential Route #1 (2.3 mi)
Potential Route #2 (2.9 mi)
Potential Route #3 (3.8 mi)
Clear Spring (#4151)
Gravity Diversion (165)
Shasta River
0
0.25
0.5
1 Miles
Source: NAIP, CalTrout
Projection: NAD 83 UTM Zone 10N
Author: Ada Fowler | California Trout, Inc.
Filename: SHA Project Areas- HIG Exchange ,January 17, 2023

Trinity River Watershed Meadows Restoration and Sediment Mitigation

Appendix A: Full Concept Restoration Plans for Proposed Projects

Mumbo Basin Concept Restoration Plan

Site Description

Mumbo Basin is an upper headwater basin in the Trinity River watershed, contributing flow to Mumbo Creek and ultimately the East Fork of the Trinity River. The overall basin is approximately 1900 acres, which can be roughly divided between a relatively flat lower basin with areas of meadow and conifer forest to the East, a series of upper basins to the South and West (including Mumbo Lakes and some smaller meadows areas), and a large, mostly forested slope to the North. The elevation of the lower basin is approximately 5700', with the elevation of almost all meadow areas between 5570' and 6130'. Mumbo Creek at the basin's eastern edge drains to 5400', while the peaks on the basin rim are above 7100'. Average annual precipitation for Mumbo Basin is approximately 68", and USGS StreamStats shows 2-year flood flows as 343 feet^3/s, with 10-year flood flows at 804 feet3/s.

Mumbo Basin retains a substantial area (~173 acres) of meadow habitat, scattered throughout the basin in pockets of varying sizes, mostly associated with riparian zones. Meadows also vary in terms of wetness, but most meadow areas appear relatively wet and support wetland vegetation (Fig. 1). Most existing wet meadows are graminoid-dominated with abundant forbs and some low shrubs, although lodgepole pine has encroached heavily in many areas (Fig. 2). Immediately adjacent to the open meadows are areas of low shrubby understory with *Vaccinium*, *Ceanothus*, and other species with a denser overstory of lodgepole pine. Lodgepole pine that have fallen into the meadow systems appear to arrest incision and provide an important source of grade stabilization and aquatic structure. The slopes of the basin are mixed conifer forest with areas of manzanita/ceanothus thickets, as well as some sparsely vegetated talus slopes. The entire basin appears to be underlain by large cobbles and boulders, likely glacial outwash, which is covered by several inches to a foot of dark, fine-grained soil in most areas. There may be patches with deeper soil, but this would be the exception rather than the rule. Vegetation differences clearly delineate raised areas adjacent to meadows, even when the absolute elevation difference is very minor.

Mumbo Basin receives water from Mumbo Creek and at least one major spring, as well as from small ephemeral channels, overland sheet flow, and subsurface flows from the upper basins and side slopes. A large slope to the north of the main basin in particular appears to contribute a substantial amount of water, mostly as diffuse flow passing through porous talus fields. Snowmelt and rain in the upper basins to the east and south are predominantly captured by smaller meadows and Mumbo Lakes before draining into the lower basin, although these flows are probably much more channelized than they were prior to the construction of roads through the basin and the dam at the outlet of Lower Mumbo Lake. A prominent feature in lower Mumbo Basin is a low ridge that separates the main fork of Mumbo Creek coming out of Mumbo Lake from a more southerly channel. These channels at one point pass within <75' of each other, but are prevented from joining by an almost imperceptible rocky rise, which flares out downstream to around 650' across. In general, the channel on the north side of the rocky rise is more defined, while the southerly channel is braided. The channels join just upstream of USFS Road 39N29, before passing under a culvert. The channel downstream of that is heavily incised and does not feature significant meadow habitat, except for a few small areas immediately adjacent to the stream. In general, there do not appear to be large highly-sloped meadows on the periphery of Mumbo Basin, which contrasts somewhat with the Picayune, Bear Creek, and Deadfall basins further north.

Issues Identified

Overall, Mumbo Basin meadows are in fair condition, with major incision starting only just above the culvert on USFS Road 39N29, and native vegetation still largely intact. However, there is substantial conifer encroachment throughout the basin, as well as nascent incision in the larger meadow areas. There are also major problems with road erosion (Fig. 3) and plugged culverts (Fig. 4) on several roads, including the major USFS road 39N26 which runs parallel to Mumbo Creek to the North. When flows from the northern slope hit the 39N26 road, the inboard ditch is rapidly filled, overflows onto the road and leads to major scour issues on the road itself, which was formerly paved, and also contributes to the formation of flow channels below the road. These channelized flows carry sediment from the roadbed, and eventually lead to erosion in the downslope meadows themselves. Due to shallow rocky glacial outwash this does not typically lead to massive incision, but the resulting scoured rocky fields do not support the same degree of wet meadow vegetation as

more intact areas nearby. There are also closed roads in and adjacent to meadow areas that were never fully decommissioned and recontoured, as well as berms associated with those roads, both of which channel flow along them and lead to incision. Additionally, disturbance from user roads and OHV use in and around meadows areas lead to additional erosion and damage to meadow habitats.

Restoration Potential

Road Work and Culvert Replacement – Work to improve road drainage and reduce flow channelization by roads is a key restoration opportunity for Mumbo Basin. The suite of road-related restoration actions encompasses upgrading undersized or misaligned culverts, adding new ditch relief culverts, outsloping road segments, adding rolling dips or armored fords, and decommissioning non-system roads. Currently, the 39N26 road is being 'decommissioned' by nature rather rapidly as a result of poor drainage, and would be a major focus for road improvements. Other system roads have numerous drainage issues as well that limit their accessibility and increase maintenance needs, and approximately 2.5 miles of non-system or closed roads in and around the meadows could be officially decommissioned and regraded (Fig. 5). Overall, this work would drastically reduce erosion from the road system, and disperse channelized flows entering the meadow system to limit downcutting in the existing meadows and help restore meadow vegetation in areas currently starved of water.

Process-Based Restoration (PBR) and In-Meadow Tree Removal - A second complementary restoration pathway is to remove conifers (almost all lodgepole pine) from the interior and periphery of the existing meadows, and use these to add woody debris to incised channel sections in particular, and any observed flowpaths through the meadows generally. Thinning work to supply materials for PBR would be by hand and/or using long-reach feller-bunchers, given the fragile nature of the meadows. The added PBR structures could be in the form of Beaver Dam Analogs (BDAs), Post-Assisted Log Structures (PALS), gully stuffing, or simply tree boles contour-felled across scoured channels with slash piled underneath. Individual structure type and size would be dependent on the size and estimated streampower of channels, and instream locations would be prioritized based on the presence of headcuts, vertical banks, and other erosive features. Conifer thinning would provide more light and water for meadow areas, and PBR treatments would slow flows, aggrade sediment, and arrest both downcutting. Overall, this combination of treatments would improve meadow health and the provision of water downstream during the summer, while reducing sediment export from both the road system and the meadow complex downstream to East Fork of the Trinity River.

Figure 1 – Wet meadow complex in Mumbo Basin, with ponds containing buckbean (*Menyanthes trifoliata*), pitcher plant (*Darlingtonia californica*) and other characteristic flora.

Figure 2 – Potential ‘lost’ meadow heavily encroached by mature lodgepole pine, but with very flat terrain and some meadow vegetation present in the understory.

Figure 3 – Severe erosion on the 39N26 road near Mumbo Basin meadows. Uplsope drainage has effectively channelized and scoured the roadbed, continuing downslope for some ways.

Fig. 4 – Plugged and overtopped culvert on the 39N81 road, with an eroded and channelized dry stream bed below.

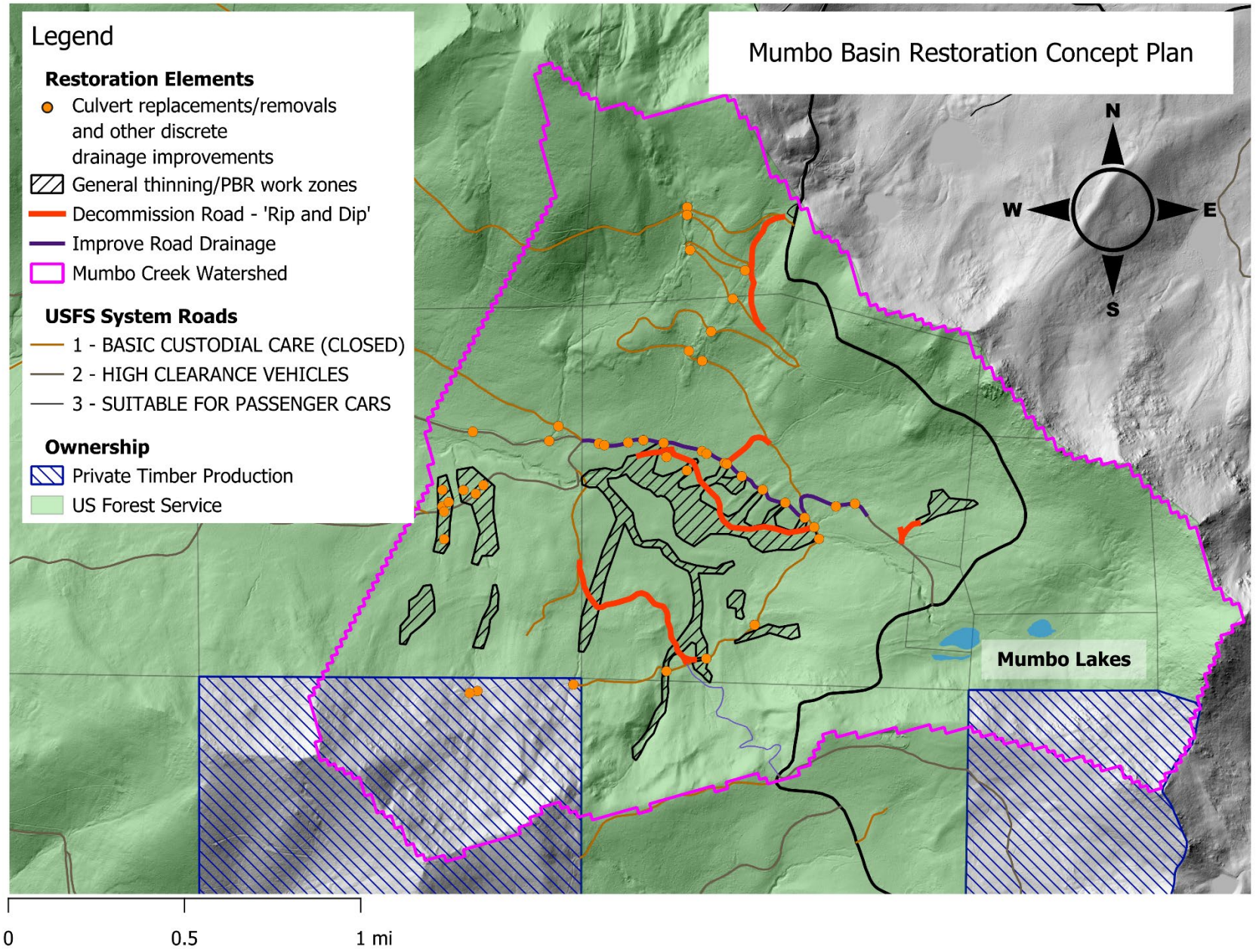


Figure 5 – Restoration opportunities in upper Mumbo Basin, focusing on meadow health and extent. Upper Mumbo Basin was defined using the USGS StreamStats tool (https://streamstats.usgs.gov/ss/) to delineate the area draining to a point on Mumbo Creek, which was selected intentionally to encompass the primary meadow restoration areas identified for the overall Mumbo Creek watershed.

Bear Creek Basin Concept Restoration Plan

Site Description

Bear Creek Basin is an upper headwater basin in the Trinity River watershed, ultimately draining into the upper mainstem Trinity River. The primary basin is approximately 2200 acres, ranging from 5825' to just over 8000' along the basin rim. Average annual precipitation is 44.9", falling mostly as snow in the winter and early spring. Land ownership is primarily US Forest Service, with some private timberland; much of the USFS portion was recently acquired from a separate private timber company.

Bear Creek Basin contains at least 318 acres of meadow features, including classic wet meadows in former lake basins, spring-fed sloped meadows, and seasonally dry meadows (Figs. 1-3). Outside of the meadows are large areas of montane chaparral (primarily huckleberry oak and manzanita, some true huckleberries, ceanothus, etc.), extensive pine/fir forest, riparian alder thickets, sparsely-vegetated talus fields, and at least one aspen grove. Many of the meadow areas are heavily encroached by lodgepole pine (Fig. 4), while others are relatively open. Wet meadow plant diversity is very high, with many sedges and other graminoid species present, as well as various sensitive forbs.

Most of the upper basin appears to have a subsurface layer of large cobbles and boulders left after past glaciation, which is overlain by several inches or more of soil in most areas. This substrate resists incision in many of Bear Creek's smaller channels within the upper drainage, except where flows cut through moraines. Many wet meadow areas also appear to be fed from subsurface flow coming off of the basin slopes, rather than relying on water from the creek. Slightly raised surfaces are often dryer, but in generally wet areas there are also raised spring mounds that are totally saturated and support lush wetland vegetation. In general, flows emerge and disappear with some regularity throughout the entire basin, with numerous springs supporting large meadows before going subsurface. The slopes on the north/east side of the basin have several wet seep areas, with extremely wet vegetation leading into the main basin, but are bisected by an old timber harvesting road. There is also a small stand of aspen adjacent to one of these hillslope meadows, one of the few in the Trinity River watershed.

Issues Identified

Upper Bear Creek Basin is relatively intact, with a relatively sparse road network, no evidence of substantial recent grazing, and abundant and diverse native habitat, including wet meadow features. However Lost Meadow Model projections show larger areas of meadow than currently exist, likely as a result of heavy encroachment by lodgepole pine. Other tree species (incense cedar and red and white firs) occasionally encroach on meadow areas, but are restricted to scattered patches, while lodgepole pine covers large swaths of what would otherwise likely be open meadows in the basin. This dense conifer cover reduces light and water availability for graminoid and herbaceous meadow species, and is likely due in part to a heavily restricted fire regime compared to conditions that existed prior to intensive fire suppression.

A second source of degradation is channelization of flows from upslope, related to several closed former logging roads run along the northeast side of the Bear Creek drainage. While these roads do not confine Bear Creek itself, they do channelize substantial diffuse flows coming off the northeast basin slope and bisect several sloped meadows. The sections of these meadows below the road appear drier in most areas and with a more prominent channel, compared to the same meadow above the road (Fig. 5).

Portions of the meadows above the road are also drained by the roadcut itself. Additionally, the inboard ditches and culverts on these roads are in disrepair, leading to flows across the roadbed and resultant erosion. Channelized flows downslope of these roads have extended into valley-bottom meadow areas, and are causing incision in some areas.

In addition to the NE slope closed logging roads, Bear Creek Basin is bisected by an open USFS road (40N45) with relatively high use. Mainstem Bear Creek is confined to a single large culverted crossing that generates erosion downstream, although improving this crossing is beyond the scope of currently planned work. However, several smaller culverts funnel flows from springs and smaller channels under the 40N45 road, leading to some incision and general shrinking of meadow areas below the road. Similarly, a spur road off of 40N45 suffers from generally poor drainage and erosion as diffuse flows from upslope surface on the roadbed.

Restoration Potential

Process-Based Restoration (PBR) and In-Meadow Tree Removal – A primary restoration opportunity in Upper Bear Creek Basin is conifer (primarily lodgepole pine) removal in and around wet meadow areas (Fig. 7). 40 acres or more could benefit from thinning, given the extensive areas covered by lodgepole pine. Thinning within wet meadow areas should be done with hand crews and at the driest time of the year, preferably in a dry year, to avoid damaging the soils and vegetation. A portion of cut logs could be placed in stream channels or across slopes with evident scour marks from high flow events, to slow and spread flows and capture sediment. Process-based restoration structures such as beaver dam analogs should also be employed strategically to slow and spread flows and rebuild incised channels, particularly below roads where channelized flows run downslope.

Road Work and Culvert Replacement - Decommissioning the logging roads along the north and east slope of the basin would greatly improve meadow health and expand meadow areas below the road, as well as alleviating the potential for further channelization and incision. While the roads themselves are in reasonable condition, they do cut through several spring-fed wet meadow slopes, with the typical inboard ditch/culvert configuration condensing flows and limiting wet meadow habitat below the roadbed. The road network is currently closed and serves no purpose beyond access for timber harvest, and terminates soon after crossing the wetted slopes. This was formerly commercial timberland, but is now public land managed by the USFS. Decommissioning would include culvert removal and full recontouring of the roadbed in the wet meadow areas, with dry road segments ‘ripped and dipped’ to cost-effectively facilitate better drainage and revegetation.

On roads that will not be decommissioned, upgrading problematic culverts to a larger size (and/or a ‘squash’ configuration) would improve road drainage and reduce the potential for overflows onto the roadbed, as well as benefit downstream meadow areas. Rod drainage could be improved by cleaning out existing culverts and adding rolling dips and water bars. These activities would complement the thinning and PBR work in the meadows themselves, by reducing streampower entering those areas.

Figure 1 – Very wet flat meadow in Bear Creek Basin dominated by graminoid vegetation.

Figure 2 – Lush hillslope meadow in Bear Creek Basin, with abundant *Darlingtonia californica.* This meadow is not bisected by any roads or trails.

Figure 3 – Dry meadow area with scattered pines, a fairly unique habitat type within Bear Creek Basin.

Figure 4 – Wet meadow area with a stream channel, heavily encroached by small lodgepole pines.

Figure 5 – A partially desiccated meadow downslope of an old logging road, showing the view of a dried area from the road (5a, left) and an aerial photo of the same location (5b, right) with the slope running downhill from the top of the photo to the bottom.

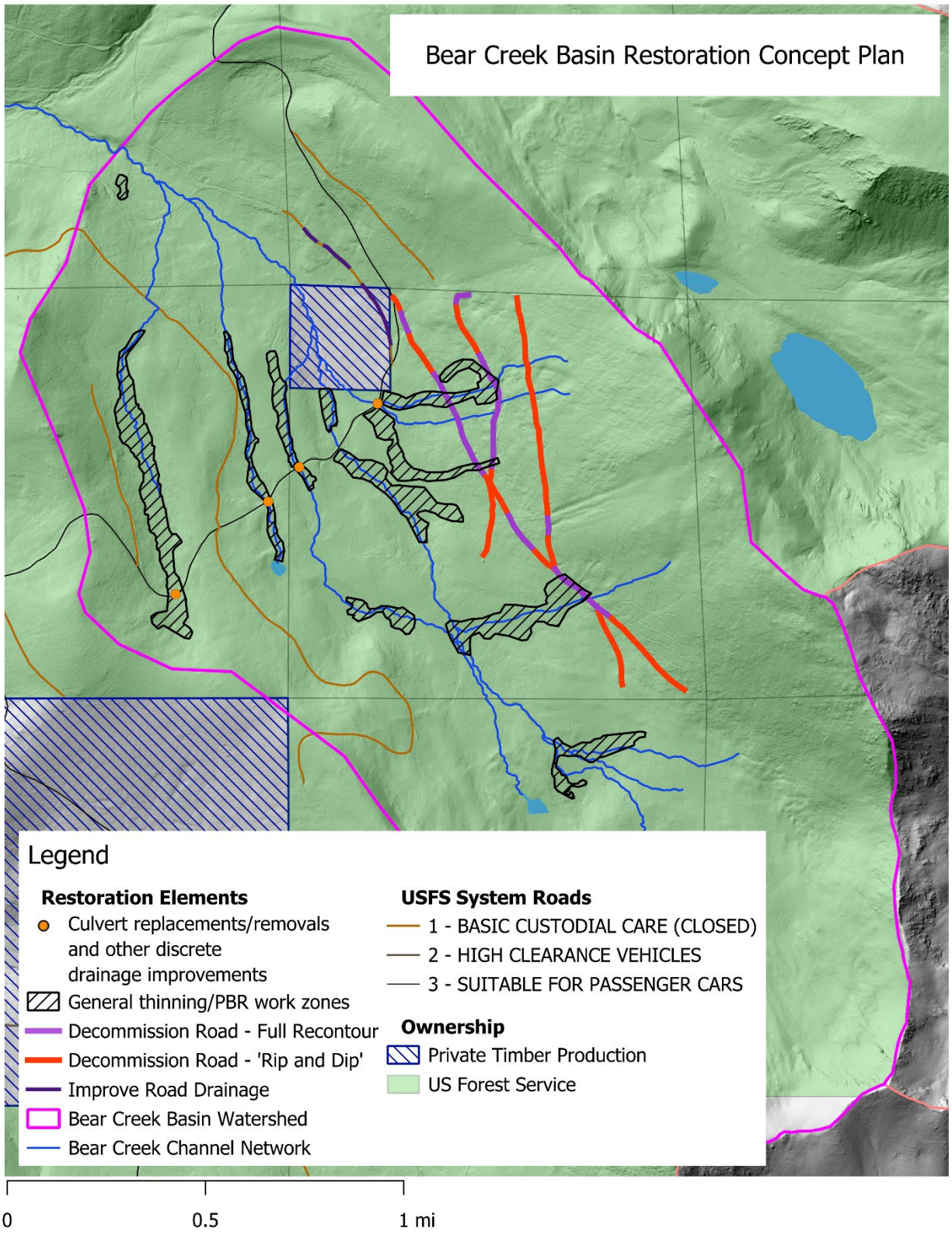


Figure 7 – Restoration opportunities in Bear Creek Basin, focusing on meadow health and extent.

Upper Picayune Basin Restoration Concept Plan

Site Description

Upper Picayune Basin is a headwater basin in the Trinity River watershed, contributing important streamflow to the upper Trinity River. Upper Picayune Basin, which is defined as all land draining into Picayune Creek just downstream of its confluence with Little Picayune Creek, is approximately 6,110 acres and contains the vast majority of wet meadow areas in the overall Picayune Basin. This upper basin is relatively unique, in that a large central portion (620 acres, or approximately 10%) is contained within a private recreational property, and another 1,240 acres (approximately 20%) are part of the Trinity Headwaters Forest, managed by the Watershed Research and Training Center. The remainder of the basin is managed by the United States Forest Service as part of the Shasta-Trinity National Forest. There are several existing large wet meadow areas totaling 146.4 acres, along with some smaller areas of dry meadows and Picayune Lake, a 16.6-acre permanent waterbody.

The highest peak on the basin rim is just below 7,800', and the lowest elevation in the basin, just downstream of the Picayune Creek and Little Picayune Creek confluence, is approximately 4,860'. Picayune Lake's surface elevation is 6,100'. Annual precipitation for Upper Picayune Basin is highly variable, but averages approximately 57", much of which falls as snow in the winter and melts during spring runoff or 'rain-on-snow' events. USGS StreamStats shows the combined Picayune and Little Picayune Creek 2-year flood flows as 746 $feet^3/s$, with 10-year flood flows at 1,800 $feet^3/s$. Both the upper drainages and the valley bottom are crossed by apparent glacial moraines, which leads to a pattern of braided, meandering channels in the flat wet meadow basins alternating with sections of concentrated flowpaths where water cuts steeply through the raised moraines. Runoff from the sides of the basin is transported as channelized, sheet, and subsurface water flows; a common trend is for water to percolate through talus slopes before emerging in springs and seeps that feed wet meadows.

Meadows in Upper Picayune Basin vary widely in terms of topographic position (perched vs. valley bottom vs. hillslope) wetness (seasonally moist to perennially saturated), hydrology (lacustrine vs. riparian/stringer vs. slope-discharge), species composition, and degree of degradation. The largest meadow areas occur in upper sub-basins and the valley bottoms of Picayune and Little Picayune Creeks, and are primarily wet and graminoid-dominated, with a lush mix of sedges, grass, and various small forbs. Hillslope meadows fed by springs and seeps are smaller, but very common, and often feed larger wetland basins. *Darlingtonia* is common in most meadow types, especially along channels, while certain seasonally ponded areas are effectively monocultures of one or two sedge species. Various shrubs occur along meadow borders, but are not common in most locations.

The slopes of the basin are mixed conifer forest with lodgepole pine, sugar pine, red and white fir, Douglas-fir, and incense-cedar, as well as some dry shrub thickets (primarily huckleberry oak and manzanita) and sparsely vegetated talus slopes. Most of the valley bottom meadows are also encroached to varying degrees by conifers, particularly lodgepole pine. Much of the basin was logged in the past, but most of the formerly-logged sites were either logged very lightly or regrowth has been surprisingly robust. Current stand densities vary considerably based on aspect, site conditions, and logging and fire history. Geology is somewhat variable, but bedrock is primarily ultramafic igneous and metamorphic. The entire basin appears to be underlain by large cobbles and boulders, likely glacial outwash. Soil depths vary considerably, with fairly deep fine soils in valley bottoms, and much thinner and sparser soils on slopes.

Issues Identified

While the Picayune Basin has extremely intact native habitat overall, there are numerous issues leading to degradation and loss of wet meadow habitat, including channel incision, conifer encroachment, flow capture and routing away from former wet meadows, and roads that bisect wet meadow areas. Ultimately, all of these impacts act, often in concert, to reduce the water supply to meadow areas through active draining, loss of inputs from floodwaters or upslope runoff, and increased evapotranspiration. The majority of meadow degradation appears to be directly associated with roads where undersized culverts or poorly sited roads have condensed natural flows, leading to channel scour and incision.

Figure 1 – A wet meadow in Picayune Basin bisected by a road. Groundwater is being drained and concentrated in a roadside ditch below the photo, and slope is being undercut and failing.

Culvert blowouts and other discrete events relating to poor road design can also lead to localized but extreme scour that creates or enlarges channels. Incised channels efficiently drain runoff, preventing it from interacting with the floodplain, lowering the local water table, and eventually allowing conifer trees to invade areas that were formerly too wet to support them. Dense stands of conifer trees can further dry meadows during the summer when evapotranspiration is high and water inputs are low, and combined with increased shade and litterfall leads to the loss of sedges and other typical meadow species.

Other degraded meadows do not feature prominent incised channels but may be cut off from their original water source by ditches and roads that capture sheet and subsurface flows and route them elsewhere. Roads that bisect wet meadows, often while traversing slopes, usually cut into the soil profile and quickly drain water that would have slowly percolated down into lower meadow areas. Trails and roads cutting through meadows can also become flowpaths themselves, causing issues not only for hydrology but also for infrastructure. Mining and logging activities may have also contributed to meadow degradation in certain areas, either directly through equipment impacts or by reducing the ability of the landscape to slow and capture runoff, thereby increasing stream power, erosion, and incision. Around 1950 (based on a comparison of historic USGS maps) Picayune Lake appears to have been modestly enlarged via a low-rise rock dam feature, but this does not appear to be a cause of current meadow degradation.

Restoration Potential

A large percentage of the 146 acres of current meadow could benefit from work that enhances natural hydrology and removes or ameliorates anthropogenic disturbances. In addition, a version of the Lost Meadow Model (LMM) trained on data from the Klamath Mountains shows 299 acres of potential meadow (double the existing meadow area), including both existing meadows and 'lost' meadows that no longer display typical meadow vegetation characteristics. The LMM polygons show good agreement with existing meadows, so there is high potential for up to 150 acres of expanded wet meadow area as a result of restoration. In most cases these restored wet meadow areas would be in current lodgepole pine forest which has invaded dried out former meadows, or adjacent to streams which have incised down into confined channels. Most meadow restoration and enhancement opportunities could be carried out quickly and without major disturbance, using process-based restoration (PBR) techniques. Conifer thinning and PBR structure installation are typically conducted using chainsaws and various hand tools, and so have minimal ground-disturbing impacts, but these paired techniques can be extremely effective, as well as quick and relatively cheap. PBR work in and around meadows will be complemented by the strategic use of heavy equipment to remove or upgrade problematic culverts, and to address road drainage issues upslope, either by decommissioning or by adding dips and other drainage features. Several specific project types are described separately below, but should be implemented concurrently to maximize benefits to meadow health and extent.

<u>Priority Projects</u>

1. **Remove and recontour the northern road and culvert crossing on Picayune Creek –** An old road which crosses Picayune Creek close to the northern private property boundary is closed and unused, but was never fully decommissioned. The built-up prism where this road crosses Picayune Creek blocks natural flows of water through the valley, condensing them into a single small culvert (Fig. 2) and leading to erosion and incision in the channel downstream (Fig. 3). A small excavator will be used to remove the culvert and excavate the road prism fill, thereby fully recontouring the crossing and decommissioning the road. This will let water flow across the full width of the floodplain, rather than just through the culvert, which will reduce the speed and power of Picayune Creek downstream and begin the process of repairing the incised channel. Ideally, fill material removed from around the culvert should be used to raise the streambed in particularly incised spots above and below the culvert, to complement PBR work in the area. Any excess fill material would be placed back on the cut slope where it was originally sourced.

   Combined with PBR structures (see Priority Project 2), the road crossing removal will promote floodplain connection and elevate groundwater tables, allowing more spring snowmelt to be stored as groundwater and eventually released it as cool summer baseflow. Wet meadow habitat is likely to expand upslope in many directions in response to the increased water supply, becoming healthier and more vibrant. The old roadbed past the crossing will also be ripped and partially recontoured (a narrow trail may be left, with appropriate drainage features), to complete hydrologic restoration of the valley. This will require the use of a small excavator or similar heavy equipment, but disturbance would be confined to previously-disturbed roadbed. Erosion control measures (straw wattles, jute/coir netting, etc.) and seeding and replanting with native vegetation would be used to speed up the recovery process.

Figure 2 – Problematic culvert on an old road, that crosses Picayune Creek downstream of Picayune Lake in the middle of the meadow complex. The roadway and culvert concentrate flows downstream, leading to severe incision (Fig. 3).

Figure 3 – A severely incised portion of the Picayune Creek, where the incised channel is migrating laterally and undermining the roots of a mature tree to the left of the photo. A younger tree (right side of photo) has recently established in the dried-out bank, as water has drained from the meadow, leaving only sparse grasses.

2. **Conifer removal and process-based restoration –** Conifers (primarily lodgepole pine) will be removed from the interior and periphery of several existing riparian meadows, and used to install process-based restoration structures within incised channel sections (see Fig. 4). Depending on site-specific conditions, PBR could be in the form of Beaver Dam Analogs (BDAs), Post-Assisted Log Structures (PALS) or simply tree boles contour-felled across scoured channels with smaller woody debris packed under the boles. These treatments would slow and spread flows, arrest channel downcutting, aggrade sediment, and generally improve meadow health and the provision of water downstream during the summer. These treatments also arrest conifer encroachment into meadows through their physical removal, and also by the increasing the supply of groundwater in the meadows, creating such wet conditions that conifers will not be able to establish and survive as well.

Figure 4 – A moderately incised stretch of Picayune Creek downstream of Picayune Lake, cutting through the fragile meadow and scouring laterally into bank sediments. Note what appears to be an older channel of the stream across the surface of the meadow to the right of Bridger Cohan (slightly darker vegetation) that could be reactivated with a small beaver dam analog. Also note the small lodgepole pines that are beginning to encroach into the meadow.

3. **Remove and recontour culverted stream crossings on the old road to the East and South of Picayune Lake, and decommission the roadway –** Five unused culverted crossings are constricting flow in tributary creeks to Picayune Lake, leading to incision problems in the associated downstream meadows (Fig. 5). A small excavator

could remove these culverts and partially recontour the road prism (a narrow trail may be left, with appropriate drainage features) to relieve these flow constrictions and restore natural hydrology. Ideally, fill material from the recontoured crossings would be used to repair the streambed where possible, in order to raise engage the floodplain, facilitate sediment aggradation, and begin the process of restoring wet meadow habitat.

Figure 5 – A relict culvert on an old logging road above Picayune Lake that is no longer in use. This culvert is concentrating surface flows and damaging wet meadows just downstream (behind the trees in this image). Several similar culverts exist in the area.

4. **Address moderate to severe erosion issues on several private and USFS roads –** Inboard ditches and undersized culverts on several public and private roads are concentrating diffuse downslope flows, and in some cases causing sizeable erosion gullies (Fig. 6) or partially dewatering meadows (Fig. 1). Several responses would help address these road-related hydrology issues, depending on the road status (currently used vs. closed), problem severity, and other site-specific details. For roads that are currently closed or unused, decommissioning may be

an effective option depending on landowner acceptance. Road segments with severe hydrologic issues would be fully recontoured, while those with less severe issues or a greater potential for later re-opening would be 'ripped and dipped', or 'hydro-closed' (culverts removed and crossings regraded, otherwise left largely intact).

For roads that will remain in use, undersized or poorly aligned culverts would be upgraded to pass flows more easily and with less potential for 'shotgunning' or other contributors to downslope erosion. The exact upgrade specifications will vary from site to site, and culverts causing more severe erosion issues will be prioritized. In some instances, culverts may be replaced with armored fords or other crossing types, or large rock features installed to disperse outlet flows where culverts upgrades alone are insufficient. In addition to these discrete drainage improvements, overall road hydrology will be improved in several areas via strategic grading, adding outsloped dips and waterbars, and potentially raising the roadbed on rock causeways that allow for diffuse drainage. This work would require some heavy equipment use (excavators, graders, etc.), but disturbance would be confined to the roadway and previously-disturbed peripheral areas.

Figure 6 – An inboard ditch along a USFS road has overflowed, scouring both downslope areas and the roadbed itself.

5. **Fill and recontour an inboard ditch –** A long segment of one private road is paralleled by an inboard ditch, which appears to have been constructed by a previous owner to carry water from two upslope wetland basins to Picayune Lake. In addition to partially draining the upslope wetlands, this ditch has also overflowed and damaged the roadbed in several location (Fig. 7), scouring the road and downslope areas and contributing sediment to downstream waterways. Short ditches in the wetland basin were also machine excavated (with the fill material set to the side as berms) (Fig. 8) to move water between the basins and then into the roadside ditch, ultimately redirecting water away from the original drainage path. Regrading these in-basin ditch segments,

restoring the original channel alignment, and filling and regrading the roadside ditch would restore wet meadow areas downslope, and improve road hydrology by reducing erosion and the risk of blowouts and scour.

Figure 7 – Inboard ditch along the upper access road, carrying water from upslope wetland basins to Picayune Lake. This ditch has overtopped and caused erosion on the fill-slope of the road itself, as well as downslope of the road.

Figure 8 – Machine excavated ditch at the outlet (north end) of the wetland basin located upslope just NW of Picayune Lake. Note the angular rocks piled alongside the ditch in a straight line. There is also machine damage to nearby trees indicating the mechanical excavation of this feature. We believe this was excavated to drain water from this basin into Picayune Lake.

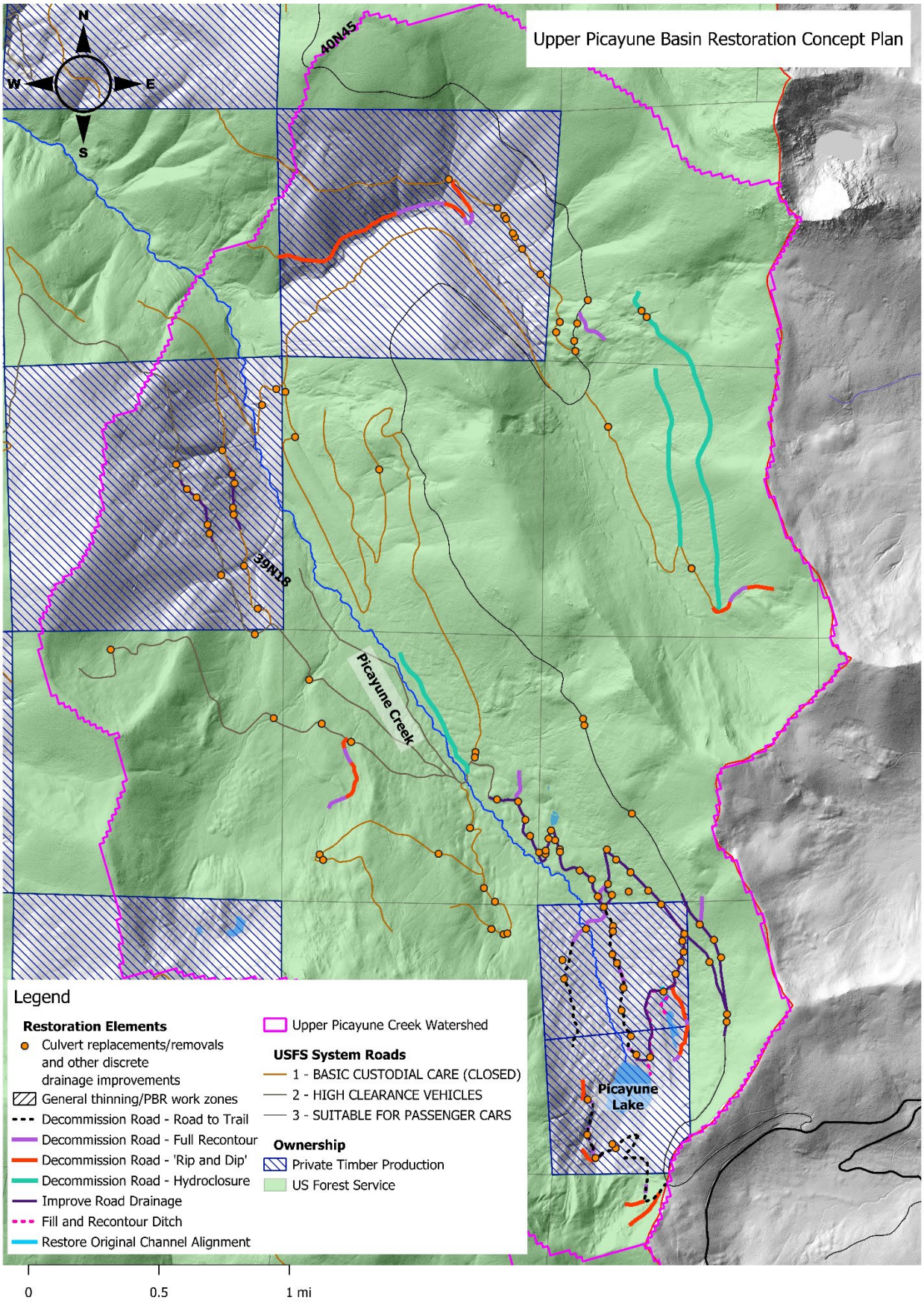


Figure 9. Planned restoration activities in Upper Picayune Basin, focusing on improving meadow health and extent, as well as reducing sediment exports from roadways. USFS system roads and land ownership displayed for context.

Echo Flat Concept Restoration Plan:

Site Description

Echo Flat is a large basin in the Mule Creek drainage, which is itself a tributary to Trinity Lake, near Covington Mill, CA. Mule Creek and several tributaries, along with significant groundwater inputs, support a complex mosaic of wet meadow, dry meadow, forested swamp, and mixed conifer forest habitats. Forest cover adjacent to Mule Creek is extremely dense, and consists primarily of Oregon ash and mixed conifer trees, with occasional black cottonwoods (Fig. 1). Large-scale groundwater inputs are present along the northern and western edges of Echo Flat, and support springs, pocket meadows areas, and generally lush vegetation far upslope; the eastern portion of Echo Flat both naturally drier and ditched, and so has significantly more xeric vegetation, including dried meadow areas which could likely be restored to wetter conditions (Fig. 2).

The potential restoration area within Echo Flat is primarily located between 2830-2875 feet, and comprises private recreational properties and private commercial timberlands. USFS land is present downstream and in the extreme headwater areas of the basin (Fig. 3). The east face of Granite Peak drains into Mule Creek, which flows into the meadow system and carries large amounts of eroded decomposed granite sediment. The basin appears to be underlain by an extremely deep (>12' in at least some areas, depth mostly unknown) layer of decomposed granite-based fine sediment, with an ultramafic rock outcrop forming the downstream grade control in the area of where the main private parcel access road crosses Mule Creek. Flows in Mule Creek are perennial and relatively stable, although there is evidence of high flows during 'rain on snow' events and other similar weather conditions.

Issues Identified

Due to a combination of ditching within the meadow, constriction of flows by roads, bridges, and culverts, clearcut logging upslope that increased runoff, and a likely diversion dam blowout, Mule Creek has cut down massively into what appears to have originally been a floodplain wet meadow. In some reaches the streambed is at least 12 feet below the floodplain surface, with near-vertical walls on at least one bank (Figs. 1 and 4). This incised channel is actively eroding laterally (and possibly vertically in some areas), and has generated several headcuts moving upstream into side channels as well. In addition to exporting large amounts of sediment downstream to Trinity Lake, this has also lowered the local groundwater table, particularly on the dryer eastern slope. As the riparian areas surrounding Mule Creek has dried out, conifers (especially ponderosa pine) have encroached heavily many areas that were likely floodplain meadow (Fig. 5). Many of these trees have fallen in the channel as it has eroded, but individual boles don't appear to be effective in retaining sediment, and smaller debris are blown out during winter storms. Willows exist in the area, but appear to be excluded from the primary riparian corridor due to a lack of floodplain and very limited light penetration through the canopy.

Restoration Potential

Process-Based Restoration (PBR) and Thinning – Ample sediment is available from upstream portions of the watershed, and in certain areas where the gradient is low or high flows pool behind obstructions, significant sediment deposits do appear to be accumulating in the channel (Fig. 6). This potential for mass sediment retention on a short time-scale, combined with a large number of available trees makes the site suitable for a PBR-type approach, despite the severe incision. However, it also appears that a

few relatively small structures will neither survive flood flows on Mule Creek. And, building 'tidy' structures within the deeply-incised channel may be logistically challenging.

The most feasible approach to restoration within the channel therefore appears to be using a large number of small-to-medium diameter trees from the riparian area to create a long series of robust but not particularly water-tight structures, stabilized with poles driven through them into the streambed. These Post-Assisted Log Structures (PALS) would not be intended to create pools or raise water surface elevations, but rather slow and break up high flows, allowing coarse and mid-size sediments to drop out and aggrade. PALS may also be arranged at a slant as 'bank blasters' to divert flows into unstable banks and release additional sediment. In either event, it is imperative that a large number of structures are installed at once, to enable incremental slowing of flows, and in order to provide redundancy in case of structure failures. 24 structures are currently planned, and will build off of existing fallen logs or point bars whenever possible.

PALS installation would be complemented by approximately 12 acres of smaller-scale thinning and PBR work outside the main channel to fill in existing ditches and headcuts. BDAs may be more valuable in these contexts, and some ditches could potentially be quickly recontoured with equipment. Thinning could also ultimately benefit restoration by increasing the water, sediment, and sunlight available, supporting willows and wet meadow species. But, these benefits would be unlikely to manifest without a robust in-channel restoration effort. Ultimately, full restoration of Echo Flat would require several years of adaptive management - as initial PALS begin to fill in with sediment, multiple series of additional structures will need to be installed to further raise the streambed, and eventually spread flows out onto the relict floodplain. However, even a modest initial raise in streambed elevation would produce an equivalent increase in groundwater elevations, expanding high habitat value wet meadow and Oregon ash swamp.

Work is currently planned only for one or both the lower private properties, which have some of the most severe incision issues, as well as interested landowners. Future PBR work on commercial timberland upstream may be possible depending on the results of this initial restoration, but is not currently being considered. Upgrades to several key bridges and culverts would also be beneficial, but would need considerable additional design and outreach prior to implementation, and are not planned as part of this project.

Figure 1 – Mule Creek riparian zone, showing deeply incised channel with adjacent dense Oregon ash and mixed conifer forest.

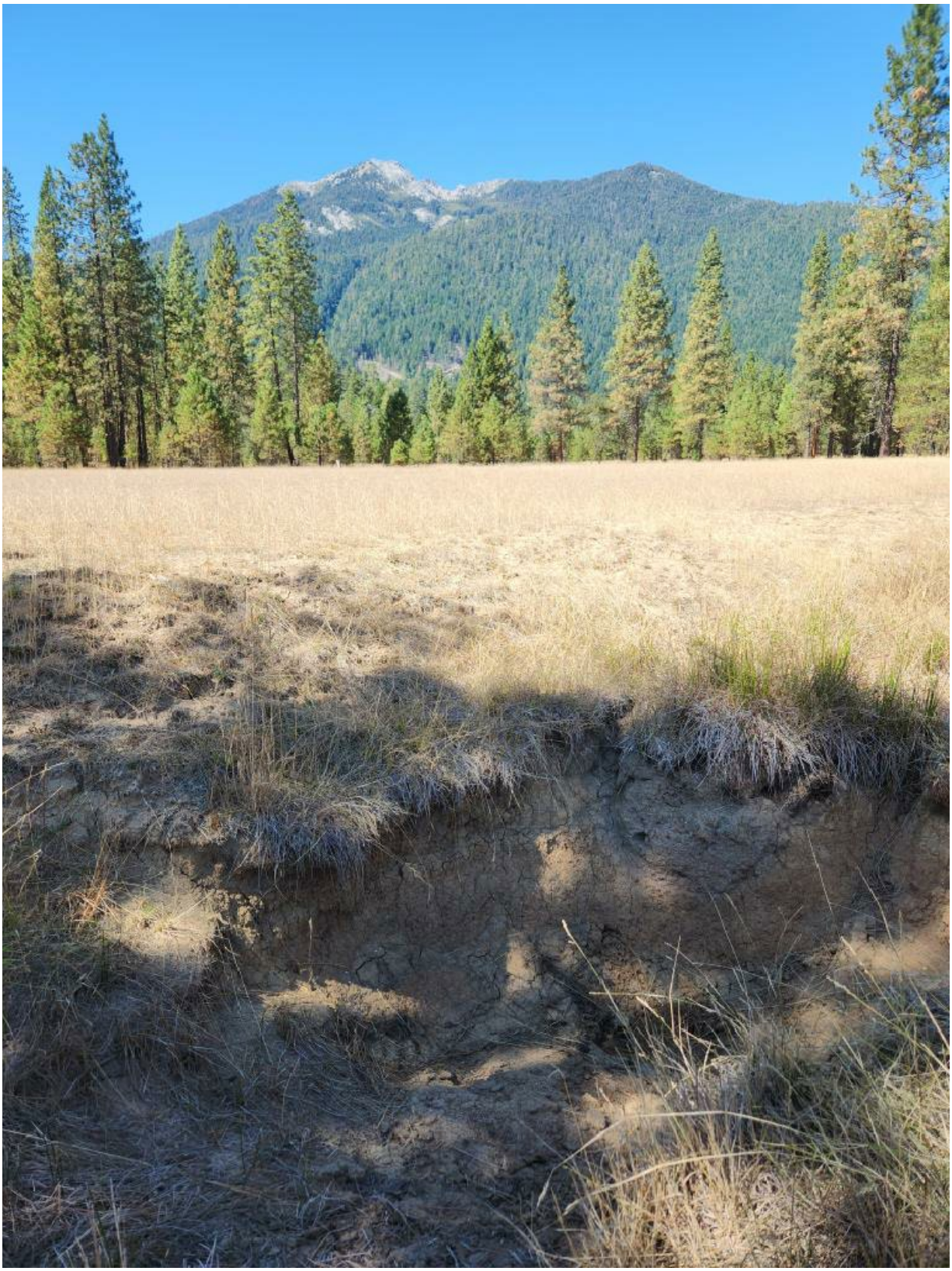


Figure 2 – Dry meadow areas on the eastern side of Echo Flat, with an eroding headcut in the foreground, and ponderosa pine forest in the background.

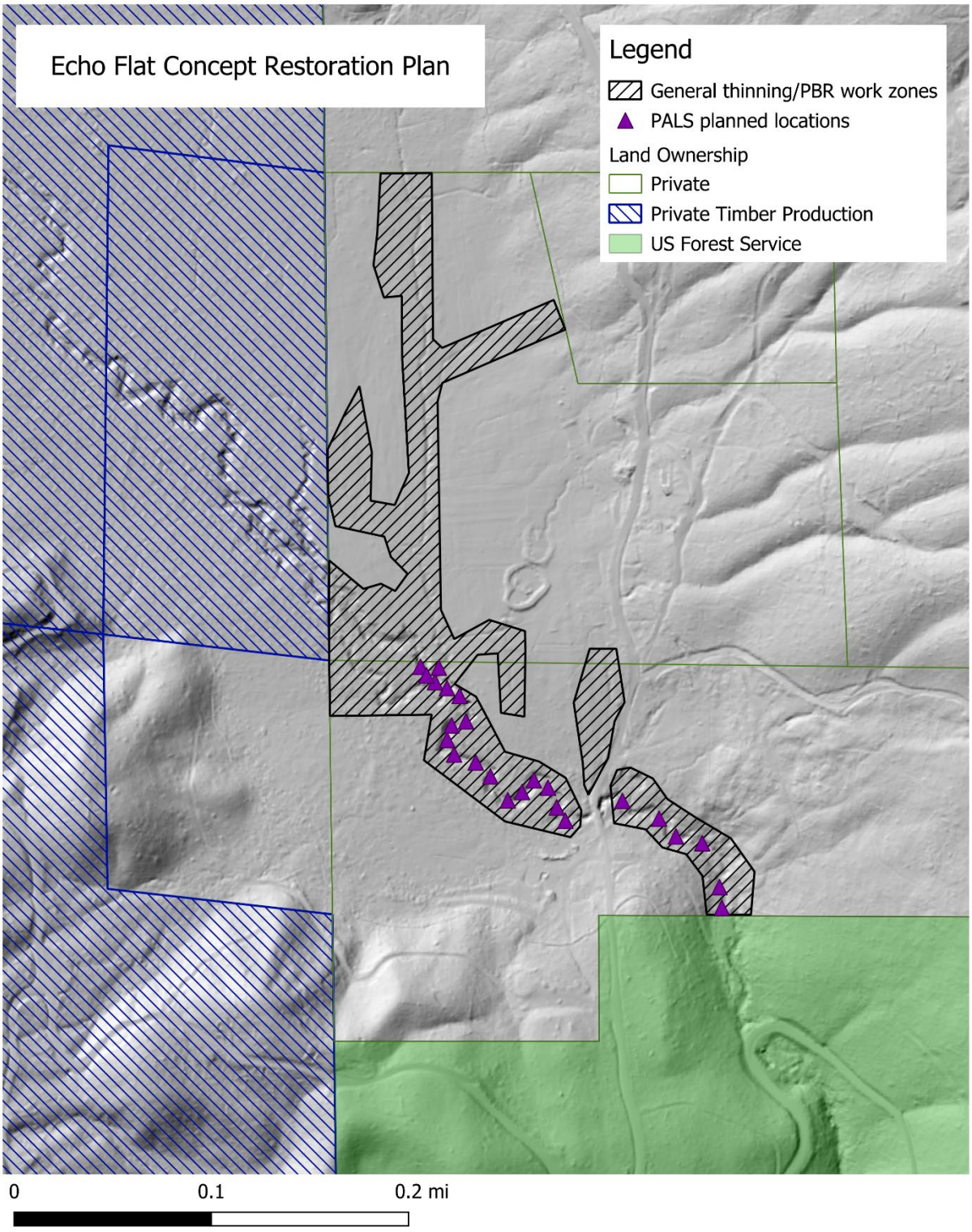


Figure 3 – Map of the proposed restoration plan for the private land on lower Echo Flat. 24 post-assisted log structures are planned for the main channel of Mule Creek, with smaller-scale PBR work proposed for adjacent areas and several existing ditches and headcuts outside the main riparian zone.

Figure 4 – Deep incision along Mule Creek, with active bank erosion clearly visible. This particular bank is made up of slightly finer and denser sediments, compared to the relatively coarse decomposed granite sediment found elsewhere in Echo Flat.

Figure 5 – Young, dense ponderosa pine stand on dried meadow area adjacent to Mule Creek.

Figure 6 – Sediment aggradation behind a natural log-jam at the downstream end of the project area.

Trust for Public Lands (TPL) Parcels Restoration Concept Plan

Site Description

The Trust for Public Lands, a national environmental non-profit, administered the purchase, restoration, and transfer to the USFS of five private timber parcels located in Trinity County (Fig. 1), in the upper Trinity River watershed. Geology, topography, and habitat types vary widely within and between these parcels, each essentially a full 640-acre section, but the area overall is largely montane conifer forest with exact species composition depending on slope and aspect. There are also large areas of wet meadow present, usually in the higher elevations. These meadows vary in terms of moisture source and species composition, and also in their degree of degradation (Fig. 2). A large number of meadow areas are sloped, and fed by various springs and diffuse groundwater seeps.

One primary, but unique, work location is a large wet meadow located across Eagle Creek from Horse Flat campground. The meadow complex, unofficially named Horse Flat Meadow, is mostly intact, occupying a bench that accumulates water from upslope and supports a wide variety of flora (Fig. 3), including sensitive species. There are several small vegetated ponds at the Eastern end of the meadow complex, and the area becomes somewhat grassier towards the Western end, with shrubby margins along much of the Southern edge. The outlet of the meadow delivers water to Eagle Creek via a high gradient, highly channelized stream.

Issues Identified:

All five Trust for Public Lands parcels had a large number of logging roads from the previous owner that were decommissioned in 2023 as part of the acquisition and transfer process (Fig. 1). While not every mile of road was fully recontoured, all culverts were pulled and the excavated areas recontoured to a 'V' shape with a channel at the bottom replacing the former culvert and the fill piled on the sides (Fig. 4). This technique works well to restore culverted flows that were originally single-thread streams, and as a result was specified by CDFW permits for the original restoration project. However, recontouring to a single channel does not restore the natural hydrology of hillslope meadows, which typically pass water through the soil in a diffuse manner without a primary channel. Headcuts upstream of the original culvert were also not typically addressed (Fig. 5) during the heavy equipment work to restore these crossings, due to the potential for damage to sensitive species. As a result, many hillslope meadows are still somewhat degraded by channel incision, and are smaller and drier than they would be with more intact hydrology. Local water tables are somewhat are deeper and deplete faster during the summer than would likely have occurred historically. Many meadows also display some degree of encroachment by conifers, partially as a result of the depleted groundwater table.

The hydrologic functionality of Horse Flat Meadow is threatened by a large headcut that has formed at the outlet (~41.162303°, -122.708731°). The headcut is approximately 6' deep, and varies in width, forming a large cavity with substantial undercut portions (Fig. 6). Several cubic yards worth of material are missing, and the drainage downstream is somewhat incised as well, though much less so. Erosion into the meadow appears to be relatively slow, but as there is very limited sediment and debris passing through the meadow it is very unlikely this headcut will fill naturally, and will eventually begin to seriously dewatering Horse Flat Meadow. The original source of this headcut is likely related to either a large crossing blowout on the recently-decommissioned road (38N27A) below the meadow, and/or a logging road that appears to have originally crossed the bottom of the meadow at the headcut location.

Whether this upper crossing was removed intentionally at some point, or suffered a blowout similar to the 38N27A road is unclear.

Restoration Potential

Process-Based Restorat on – The most cost-effective way to further restore meadows in the footprint of the previous TPL road decommissioning project is to use process-based restoration techniques to either directly fill in the bottom of the channel (gulley-stuffing) or encourage sediment to aggrade and build up the channel bottom over time (beaver dam analogs). There is ample woody material available in the vicinity of the decommissioned meadow crossings to support both techniques, which would quickly reduce the possibility of further channel incision. Over time, adding woody material to the channels left within and adjacent to the decommissioned road will spread flows over a wider area and ultimately help to restore a lush contiguous mat of meadow vegetation. Thinning of encroaching conifers will also enhance meadow habitats directly by increasing sunlight and water availability.

Given the very large number of decommissioned meadow crossings on the TPL parcels, exact work sites are (for the most part, see the proposed action for Horse Flat Meadows below) not currently specified. The anticipated need is for approximately 30 acres of PBR work, typically in small (0.5-2) acre patches in and adjacent to decommissioned meadow crossings. PBR work may also extend away from former crossings into incised channels through meadow areas. The exact nature of process-based restoration will vary between specific sites, but with the consistent goal of returning meadow systems to a diffuse flow state, rather than channelized flow that exists due to historic logging and road-building and was maintained in the previous road decommissioning project.

Only one primary action is required to restore Horse Flat meadow: repairing the headcut at the meadow outlet (Fig. 6). This can be done using available wood (primarily from hand thinning of encroaching conifers – see Fig. 7) and some rock and debris from a nearby clearcut to first fill the large cavity immediately below the headcut. Essentially this is ‘gully-stuffing’, but on a larger scale than typically practiced. The same materials used for the outlet gully stuffing would then be used to create several BDA-type structures immediately downstream of the filled outlet to pond water against the headcut (‘drowning’ to minimize erosive forces), and then gradually tie the water surface elevation at the outlet into the lower stream gradient. Approximately 7 structures (in addition to the fill placed in the outlet cavity) should be sufficient, with the largest located upstream and gradually becoming smaller downstream. A few smaller BDAs could also be placed above the headcut, to further slow and spread flow, alleviating erosive forces from upstream. See Fig. 8 for a map of planned activities.

Streampower coming out of the meadow appears to be stable and quite low, and since the downstream crossing has recently been decommissioned and regraded, there is no threat of a second culvert blowout that would lead to a large discrete erosion event. The primary difficulty in implementing PBR at this site is sourcing and transporting the large required volume of material without vehicle access, as well as tying fill into the undercut banks at the outlet cavity. Once placed, the saturated woody material at the outlet should decompose quite slowly, allowing ample time for the small volume of sediment transported through the meadow to fill in any voids. If possible, bioengineering techniques (e.g. willow stakes) should be used in conjunction with PBR to help lock fill materials in place.

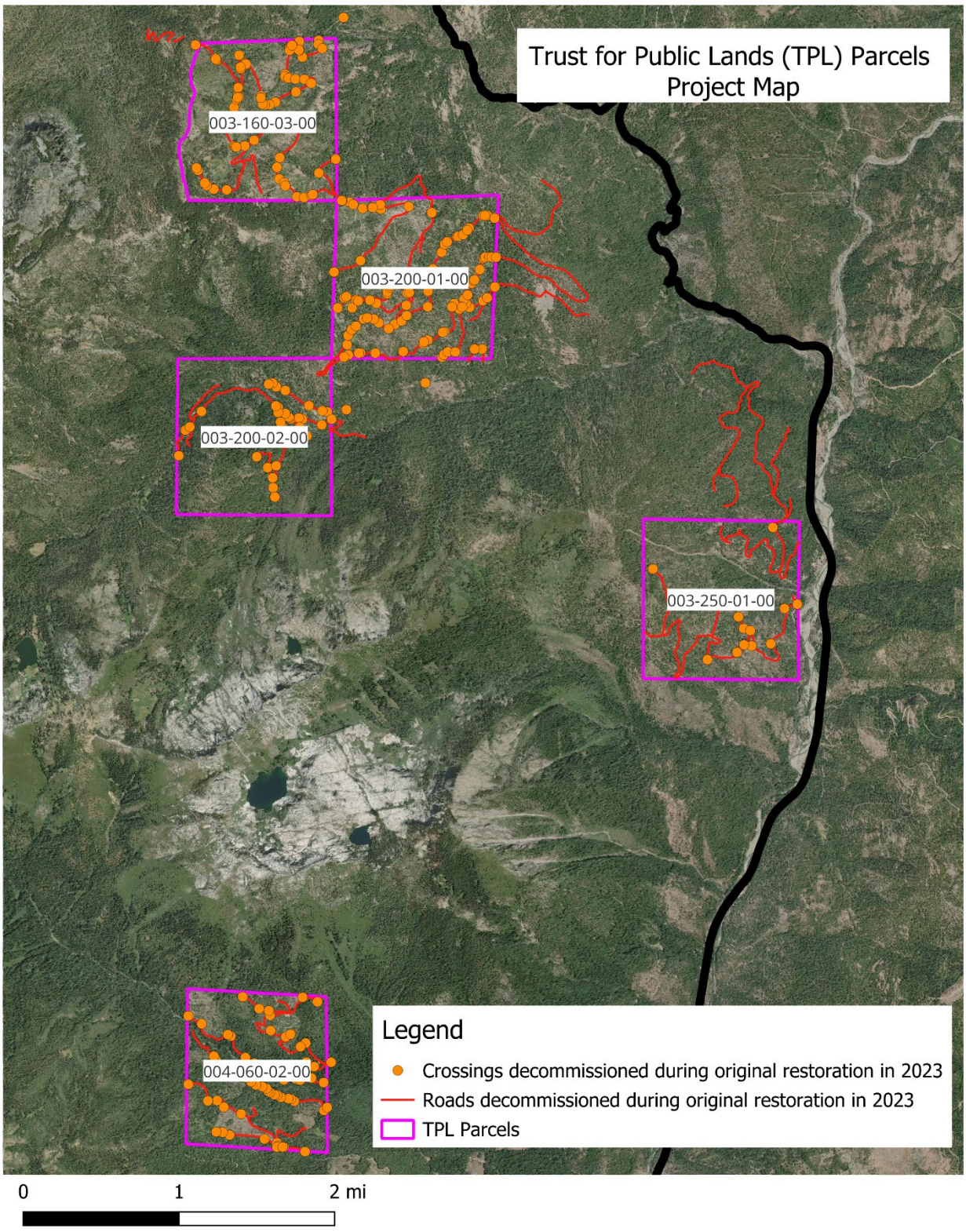


Figure 1 – The five parcels acquired by the Trust for Public Lands for transfer to the US Forest Service, with restoration activities displayed.

Figure 2 – Meadow area below a road decommissioned in 2023. Some incision is present in the center of this photo, where the meadow is visibly less green.

Figure 3. Horse Flat Meadows in early spring, showing lush vegetation and interspersed pools.

Figure 4 – A decommissioned road crossing where formerly diffuse flows through a meadow upslope have been channelized, and the post-decommissioning streambed is now stabilized at the incised level.

Figure 5 – A decommissioned meadow crossing with the culvert removed, but with a related headcut left exposed and unfilled immediately upslope (red arrow). This feature is still draining the meadow above the road, even after decommissioning.

Figure 6 – Large headcut and cavity at the outlet of Horse Flat Meadow. Roots from dense meadow vegetation are holding the surface sediment together, but the edges are undercut by up to ~2 feet in some places. The cavity bottom is mostly cobbles and other coarse materials. Some bank slumping is apparent along the outlet channel, both at the headcut itself and downstream.

Figure 7 – Encroaching small conifers in part of Horse Flat Meadow. These should provide ample material for PBR activities at the outlet. This level of encroachment is common through the TPL Parcels meadows.

Figure 8 – Restoration plan map for Horse Flat meadow showing the full length of PBR reach, the specific outlet headcut location, and the decommissioned 38N27A road for context.

Middle Weaver Creek Basin Concept Restoration Plan:

Site Description

Weaver Creek's watershed encompasses approximately 32,000 acres of mixed of federal (BLM and USFS), private timber, other private, and Trinity County ownership (Fig.1), and is located at the Southern edge of the Trinity Alps, centered around the town of Weaverville. The watershed overall can be roughly divided into three zones based on management and habitat conditions:

Headwaters – Extending from the Northern watershed boundary to one mile downslope of the Trinity Alps Wilderness boundary. This zone is primarily managed by the USFS as relatively intact conifer forest. There is minimal riparian floodplain or wet meadow habitat naturally present due to steep slopes.

Middle Weaver Creek Basin – Heavily overlapping with the Weaverville Community Forest, this is the middle portion of the watershed, including most of Little Brown's Creek, East and West Weaver Creeks, and Sidney Gulch, as well as numerous smaller tributaries, and the upper portion of Mainstem Weaver Creek (Fig. 1). This zone has mixed ownership, and habitat is generally highly degraded (Figs. 2 and 3).

Lower Mainstem Weaver Creek – Encompassing the watershed draining into Weaver Creek below it's confluence with Little Browns Creek. This is largely private or BLM-managed land, paralleling State Highway 299 between Weaverville and Douglas City, where Weaver Creek has its confluence with the Trinity River. This zone has generally intact floodplain in many areas (including black cottonwood gallery forest), although it is confined somewhat by the highway and other infrastructure.

The upper and lower reaches of the Weaver Creek Basin are, while not pristine, providing reasonably high habitat value at this time, so this restoration concept plan focuses exclusively on the Middle Weaver Creek Basin ('basin') between the forested headwaters and Highway 299. This zone is both the most degraded, and also offers the most opportunity for restoration (Figs. 2 and 3). Parts of the basin are critical for both recreation and fire safety for the town of Weaverville, and in addition to Weaver Creek itself, several tributary streams support runs of SONCC Coho and wild steelhead (Fig. 4). However, the landscape and aquatic conditions are highly degraded due to historic mining activtiies, and there are dozens of miles of roads and trails crisscrossing the area. Much of the area also burned during the 2001 and 2014 Oregon fires.

Due to extensive hydraulic mining in the 1800's and early 1900's almost no intact original surface remains in many areas of the basin. These mined landscapes have had most soil washed away, and are predominantly tailings piles and dense clay outcrops, with sparse vegetation dominated by *Ceanothus*, *Manzanita*, and other hardy shrubs. The more intact middle-elevation zones are a mix of oak woodland and dry meadows. Wet meadow areas are rare, small, and almost always immediately next to streams or other water features, even though stream gradients are not overly steep. Stream channels are typically incised, due to both mining and intentional channelization to protect infrastructure. Sediment loads vary dramatically between reaches. Despite poor aquatic and riparian habitat conditions overall, patches of good salmonid habitat still exist, and Coho have been observed spawning even in heavily modified stream reaches (Fig. 4). In addition, many projects benefiting aquatic habitat have either been implemented recently (e.g. West Weaver Creek Salmonid Habitat Rehabilitation Project, East Weaver

Creek Dam Removal and Intake Relocation Project) or are in advanced planning stages (various CalTrans culvert upgrades, Little Brown's Creek storage and forbearance program).

Issues Identified

Streamflow in the Middle Weaver Creek Basin, especially in smaller tributaries such as Sidney Gulch and Garden Gulch, is extremely flashy, with winter storms generating huge flood pulses (Fig. 5)but baseflows disappearing completely by mid-summer in dry years. This flashiness is likely due in large part to very limited floodplain connection and highly incised stream channels, combined with relatively impermeable clay soils and sparse plant cover that do not spread out precipitation inputs over time. Excessively flashy flow regimes are problematic for Coho, steelhead, and other aquatic species due to the potential for redd scour and velocity barriers to migration during winter, and low flows and high temperatures during the summer. This flashiness is also problematic to human use of streams, due to flooding of property, damage to culverts and other infrastructure, and lack of drinking water provision during the summer.

Riparian habitat condition is variable, but poor in most areas with few floodplain meadows and depauperate riparian forest cover, as well as high invasive species pressure from Himalayan blackberry, Scotch broom, black locust, and other weedy species. High peak stream power, disturbed soils, and sparse plant cover (and sparse roots systems for most invasive species) facilitate high rates of erosion from the basin, and due to a lack of floodplain connection to allow sediment aggradation, it is readily exported downstream to the Trinity River (Fig. 5). In certain areas, high densities of small conifer trees may be drawing down water tables and present a fuels loading risk, which is particularly problematic given the proximity to Weaverville and other developed areas. Overall, the basin currently provides poor habitat value for terrestrial and aquatic species, and presents water availability and sediment export issues. Larger-scale environmental damage related to changes in basin topography and soil properties (stemming from historic mining) are also pervasive, but addressing those issues is outside the scope of any foreseeable restoration action.

Restoration Potential

Process-Based Restoration (PBR) and Fuels Reduction Thinning – Despite the scale of degradation, restoration in the Middle Weaver Creek Basin will be most efficiently implemented with a light touch, to avoid disrupting critical infrastructure and to secure community support. Low-tech process-based restoration techniques such as beaver dam analogues (BDAs) are ideal for this type of setting, cost-effectively retaining sediment and rebuilding floodplain and groundwater connections. Over time, PBR work along riparian corridors in the basin would revitalize and expand floodplain meadows, improve riparian and aquatic habitat conditions, and moderate the flashiness of the stream system. The improved hydrologic connection and moderated flow regime would support cool summer baseflows and reduce flood risk and stress on culverts and other infrastructure downstream. This work would also utilize trees on the landscape in BDAs and other structures, decreasing fire risk via fuels reduction and the conversion of dense, dry conifer forests to wetter, more open habitat. Proper siting, public outreach, and adaptive management (structure repair, invasive species removal, riparian plantings etc.) are also vital to ensure successful long-term restoration.

All major drainages within the Weaver Creek basin portion of the WCF are currently being assessed for overall restoration potential, specific PBR sites, and any restrictions due to downstream infrastructure or high peak streampower. The potential for synergies with other planned restoration and infrastructure upgrade projects will also be considered. In addition, work to inventory the size of culverts downstream of potential sites must be completed to inform use of appropriately-sized material in any PBR structures, to avoid the potential for clogging and blowouts. Secured funding from Trinity County Resource Conservation District will be used to complete this assessment and design work prior to 2026. The goal is approximately 40 acres total of PBR work, distributed across 2-5 drainages within the basin.

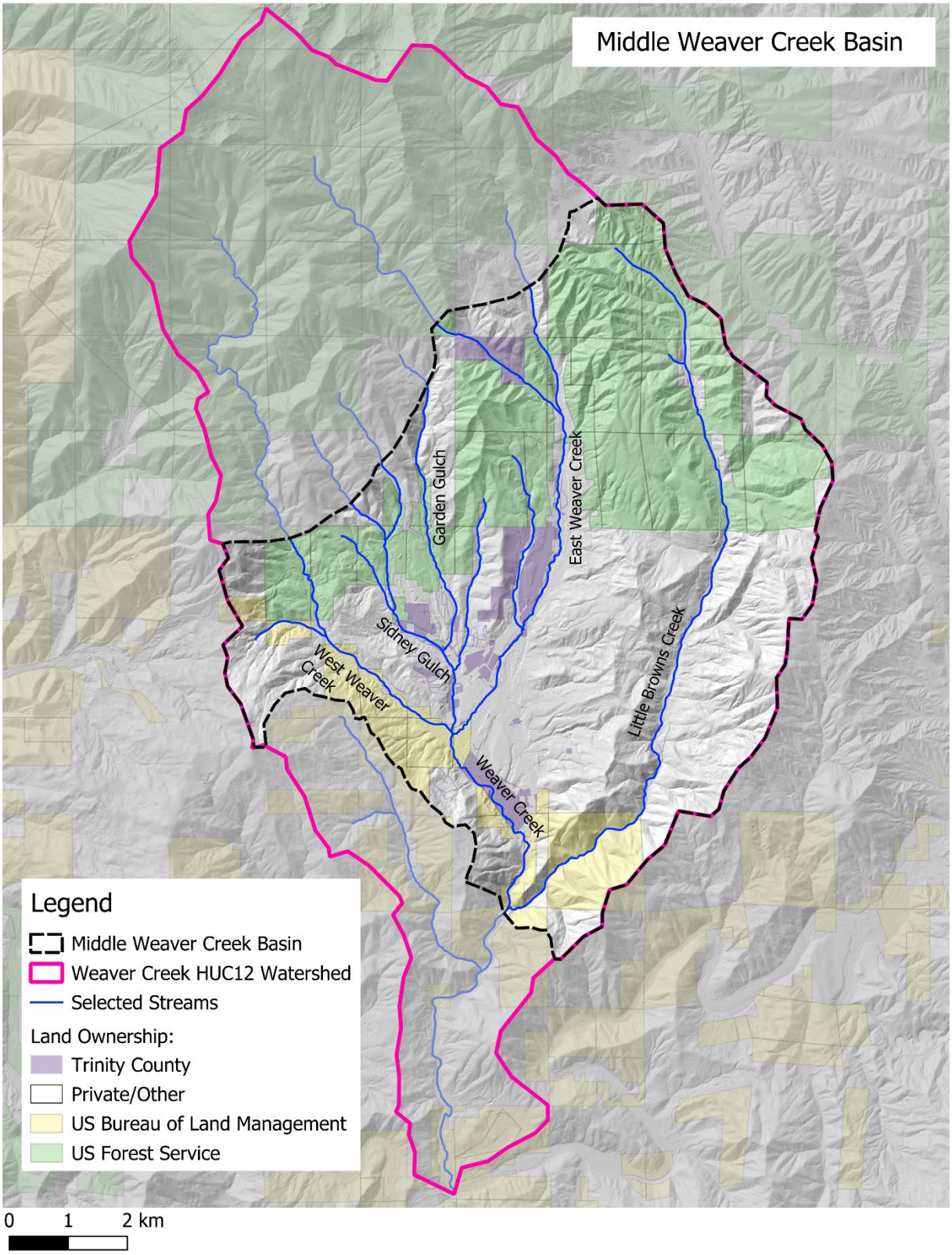


Figure 1. Middle Weaver Creek Basin in the context of the larger Weaver Creek watershed, with land ownership and selected streams displayed.

Figure 2 - Active erosion from a steep bank (likely related to hydraulic mining) along Garden Gulch, with overstocked conifer forest surrounding.

Figure 3 – Degraded floodplain along Garden Gulch just after a storm event, showing potential for process-based restoration. This area was burned during the 2014 Oregon fire, and a hydraulic mining scar is visible in the background.

Figure 4 – Coho salmon in Sidney Gulch, likely immediately post-spawning. Note poor riparian cover dominated by invasive Himalayan blackberry.

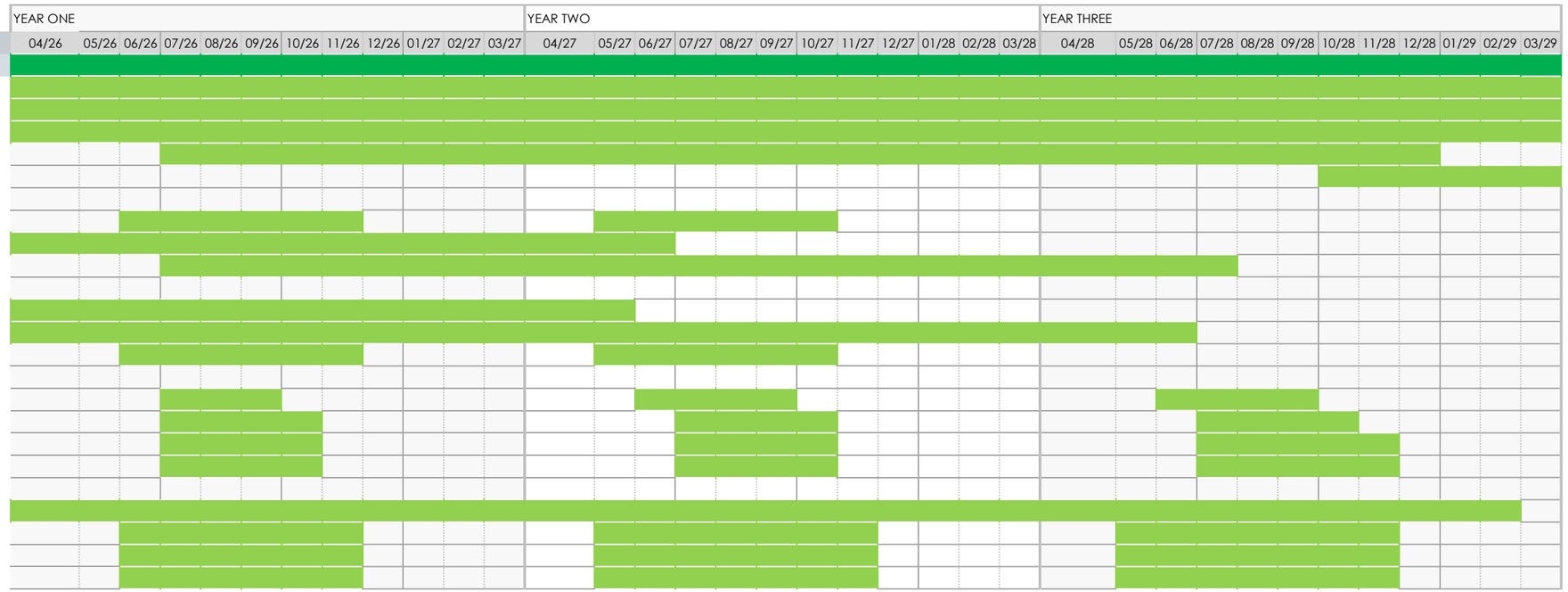
Figure 5 – Lower Sidney Gulch during a storm event, showing very high stream power and turbidity. Note the lack of floodplain connection, even during flood conditions.

Trinity River Watershed Meadows Restoration and Sediment Mitigation Gantt Chart

START DATE

April 01, 2026

PROJECT NAMES + TASK TITLES	START DATE	END DATE
Tasks	**04/01/26**	**04/01/29**
1.1 Grant Administration	04/01/26	03/31/29
1.2 Project Management	04/01/26	03/31/29
1.3 Invoicing and Progress Reporting	04/01/26	03/31/29
1.4 Sub-contract Administration	07/01/26	12/31/28
1.5 Final Reporting	10/31/28	03/31/29
2.1 Road Assessment and Metrics Collection	06/01/26	10/31/27
2.2 Site Specific Designs and Engineering	04/01/26	06/01/27
2.3 Implementation Scheduling	07/01/26	07/01/28
3.1 Validate Programmatic Coverage	04/01/26	05/30/27
3.2 Obtain Required Permits	04/01/26	06/30/28
3.3 Resource Surveys for Permitting and Compliance	06/01/26	10/31/27
4.1 Site Preparation	07/01/26	09/30/28
4.2 Construction Activities	07/15/26	10/31/28
4.3 Process Based Restoration Implementation and Conifer Thinning	07/01/26	11/15/28
4.4 Revegetation Activities	07/15/26	11/15/28
5.1 Monitoring Plan and Report	04/01/26	03/01/29
5.2 Photographic Monitoring	06/01/26	11/15/28
5.3 Hydrologic Monitoring	06/01/26	11/15/28
5.4 Sediment and Geomorphic Monitoring	06/01/26	11/15/28



Applicant **The Watershed Research and Training Center**
Lead Josh Smith, Bridger Cohan
Title Trinity River Watershed Meadows Restoration and Sediment Mitigation
Watersheds Trinity River

Target Pollutant Sediment
Term 3 years, 4/1/2026 - 3/31/2029

Caltrans Mitigation Proposal Budget - Trinity River Watershed Meadows Restoration and Sediment Mitigation

Personnel

Job title	Hourly Rate with Benefits	Project Hours	Total Cost	Budget Justification:
Watershed Stewardship Program Director	$79.61	510.00	$40,601.10	Responsible for overall Watershed Stewardship Program management, coordination, decision-making, and contracts and agreements
Watershed Stewardship Program Associate IV	$61.94	750.00	$46,455.00	Primarily responsible for monitoring, and will assist with Program Director with management and coordination, as well as reporting and implementation oversight
Watershed Stewardship Program Associate III	$50.87	870.00	$44,256.90	Primarily responsible for finalizing project designs, and will assist with project management, monitoring, reporting, implementation, and other tasks as needed.
Watershed Stewardship Program Associate III	$47.54	950.00	$45,163.00	Primarily responsible for compliance and permitting, will assist with reporting, monitoring, and other tasks as needed.
Roads Division Manager (Program Associate III)	$47.71	2160.00	$103,053.60	Develops site-specific implementation metrics, overall scheduluing, and oversees contractors during implementation.
Roads Division Field Technician	$38.44	1210.00	$46,512.40	Assists roads division manager, and other staff as needed.
Restoration Lead	$47.54	1420.00	$67,506.80	Supervises field crew responsible for PBR work and monitoring.
Field Techs	$38.20	3440.00	$131,408.00	Conduct PBR work and monitoring. Hours are for a crew of 3
Botany Specialist	$54.03	60.00	$3,241.80	Manages field crew leads and conducts site botany surveys needed to secure environmental compliance.
Botany Crew Lead	$47.54	160.00	$7,606.40	Supervises botany field crews conducting surveys and assisting with PBR.
Field Techs-Botany	$38.20	480.00	$18,336.00	Conduct botany surveys and PBR. Hours are for a crew of 3
Trail Crew Lead	$47.54	90.00	$4,278.60	Supervises trail crew responsible for road-trail decommissioning and thinning work.
Trail Crew	$38.20	260.00	$9,932.00	Conduct road-trail decommissioning and thinning work. Hours are for a crew of 3
Fuels Crew Lead	$47.54	820.00	$38,982.80	Supervises fuels crew conducting thinning work, and assists with PBR.
Fuels Crew	$38.20	2460.00	$93,972.00	Conduct thinning work and assist with PBR. Hours are for a crew of 3
SUB TOTAL			**$701,306.40**	

Travel

TYPE	Description	Units	Unit Cost	Quantity	Total Cost	Budget Justification:
Travel- WRTC Truck		Hours	$40.51	1913	$77,495.63	WRTC-owned staff vehicles at Caltrans hourly rental rates travel to.from office and within project sites (source Caltrans Rental Rate book 4/1/2025)
Per Diem		person week	$238.00	228	$54,264.00	Travel day $51, full day $68 per CA Travel Rates 2025; calculated for a 4 day week.
SUB TOTAL					**$131,759.63**	

Equipment

Item Name	Description	Quantity	Unit Cost	Total Cost	Budget Justification:
			$ -		N/A No equipment to be purchased.
SUB TOTAL				**$0.00**	

Materials and Supplies

Item Name	Description	Unit	Quantity	Unit Cost	Total Cost	Budget Justification:
Safety Gear			8	$340	$2,720	8 hardhats @$40/per, 8 gloves @$20/per, 8 saftey glasses @$20/per, 2 fire extinguishers @$40/per, 2 boxes KN95 masks @ $20 each, 2 first aid kits @$50/per, 4 chainsaw chaps @$100 each, 4 pairs waders @$249 ea, 4 pairs wading boots @$150ea.
Power tools			3	$1,664	$4,992	Stihl 261 saws $800ea, saw case $100ea, fuel and oil tank $50 ea. Plus fuel costs.
Hand Tools			10	$78	$780	Handsaws, Mcclouds, shovels, loppers, etc.
Monitoring Supplies			8	$657	$5,256	8 monitoring station set ups including piezometers, pressure transducers, and incidentals.
Survey and layout Supplies			5	$248	$1,240	Flagging, spraypaint, and wood stakes
Revegation materials			1	$7,850	$7,850	20 8'x112' jute netting rolls at $138/per, box landscape staples @$90, 250 woodstraw bales @ $20/per shipped
CDFW LSAA			1	$2,100	$2,100	Estimated cost for projects $10k-$25k, projected for 2027 rate
CDFW LSAA			1	$7,385	$7,385	Estimated cost for projects > $350K, projected for 2027 rate
Waterboard SRGO			3	$1,707	$5,121	Projected for 2027 rate
SRGO annual Fee			3	$856	$2,568	Projected for 2027 rate
Waterboard SWPPP			3	$1,300	$3,900	Projected for 2027 rate
SUB TOTAL					**$43,912.00**	

Contractural Services: Subcontract

Contractor Name	Descpription	Unit	Quantity	Unit Cost	Total Cost	Budget Justification:
Heavy Equipment Operator #1		Each	1		$395,918	Mumbo Basin road implementation
Heavy Equipment Operator #2		Each	1		$54,827	Bear Creek road implementation
Heavy Equipment Operator #3		Each	1		$656,101	Picayune Basin road implementation
Engineering Contractor		Each	1		$108,000	Engineering designs as needed for culverts on 'blue line' streams
SUB TOTAL					**$1,214,846**	

Total Direct Costs	**$2,091,824**

Indirect Costs

Explanation of Indirect Costs	RA Expiration Date	NICRA Rate	Total Direct Costs Eligible for Indirect	Total Indirect Costs
NICRA	3/31/2029	20.59%	$976,978	**$201,160**

Total Project Costs	**$2,292,984**

CalTrans Mitigation Funding Proposal

Project Applicant: The Watershed Research and Training Center

Project Title: Trinity River Watershed Meadows Restoration and Sediment Mitigation

Watersheds: Trinity River (HUC8 - 18010211)

Target Pollutant: Sediment

Overall Goals: 1. Improve road drainage and mitigate erosion.

2. Expand and enhance meadow areas and increase sediment retention.

Project Term: Three years, 4/1/2026 - 3/31/2029

Project Cost: $2,292,984 (scalable)

Project Need and Background

The Trinity River Basin was added to the Clean Water Act Section 303(d) list in 1992 for sediment, turbidity, suspended material and settleable material. In 2001, a total maximum daily load (TMDL) for sediment was established by the U.S. Environmental Protection Agency. The TMDL document identifies roads, timber harvest, mining, and natural processes as the major sources of impairment and recommends reducing the sediment loads from these activities and actions. The Trinity River Watershed Meadows Restoration and Sediment Mitigation Project (Project) addresses sediment loading to the tributaries of the Trinity River from public roads and the associated unraveling of wet meadow systems.

Wet meadows are valuable habitats that retain sediment and absorb surface waters to provide cool, clean base flows downstream. They are also impacted by many anthropogenic disturbances, including concentrated flows originating from undersized or poorly-installed culverts and other road-related infrastructure. The Watershed Research and Training Center (WRTC) has been working to develop wet meadow restoration projects throughout the Trinity River watershed for over a decade. This endeavor benefited from extensive involvement with, and training from, the Cal PBR Network, the USFS Region 6 River Action Team, the Salmonid Restoration Federation, and other similar organizations. The experience gained from collaborating with these groups led to WRTC becoming a core member and the fiscal sponsor of the independent Klamath Meadows Partnership (KMP), which was formalized in 2023 with a state grant from the Wildlife Conservation Board.

The Klamath Meadows Partnership's mission is to increase the pace and scale of meadow restoration across the Klamath region. KMP's first major initiative is to model current and likely historic meadow locations across the region using a local version of the "Lost Meadow Model" (LMM; Pope and Cummings 2023). Preliminary LMM results highlight large areas in the Trinity River watershed where conifer forest has encroached into former wet meadow habitats – in many cases this encroachment is enabled by damaged meadow hydrology due to incision, ultimately stemming from poor road drainage. Inventory and assessment work, conducted by WRTC and other KMP member groups to develop a suitable local training dataset for the LMM, identified a large number of degraded meadow complexes with high restoration potential. A watershed assessment (WRTC 2024) completed by the WRTC for the

Bureau of Reclamation also prioritized several large-scale meadow and road related projects in the upper Trinity River watershed.

From these previously identified opportunities, WRTC has developed a suite of wet meadow restoration projects across the Trinity River watershed. The conceptual designs for several of these projects are essentially complete, typically focusing on addressing conifer encroachment and channel incision within meadows, while repairing road-related issues (e.g. undersized or shotgunned culverts, floodplain constriction) that the channel incision may stem from. Specific design metrics (current and proposed culvert sizes, etc.) will be established primarily with secured match funding from the National Fish and Wildlife Foundation, and will adhere to specifications set out in the Rural Roads Handbook (Weaver et al. 2014) for road improvements and the Riverscapes Design Manual (Wheaton et. al. 2019) for in-meadow process-based restoration. This proposal for CalTrans Mitigation Funding will be used to implement six key restoration projects located in the Trinity River watershed. The primary benefits from these projects would be habitat enhancement for native species, reductions in erosion and sediment transport downstream, and increases in summer baseflow and water quality.

Permitting Status and Synergies

In parallel with project identification and development, WRTC has been working with the North Coast Regional Water Quality Control Board (NCRWQCB), the Trinity River Restoration Program (TRRP), California Department of Fish and Wildlife (CDFW) and other relevant regulatory organizations to secure programmatic CEQA, NEPA, and permitting coverage for a wide range of restoration actions; these include conifer removal, common process-based restoration (PBR) tools such as beaver dam analogs (BDAs), and culvert upgrades and other road drainage improvements. Securing programmatic permitting for similar actions performed in multiple locations will lead to substantial cost and time savings for implementation projects moving forward. Specific programmatic coverage avenues are listed below:

- National Environmental Policy Act – The TRRP, in partnership with USFS and BLM, is drafting a NEPA Programmatic Environmental Assessment (PEA) to streamline restoration projects within the Trinity River watershed. It is currently out for public comment - https://www.trrp.net/restoration/watershed-activities/watershed-ea/ (accessed 4/17/25).
- California Environmental Quality Act – The WRTC is working towards obtaining programmatic CEQA coverage through the NCRWQCB Statewide Restoration General Order (SRGO) by tiering off of the SRGO Programmatic Environmental Impact Report.
- Clean Water Act – CWA Section 401 coverage will be secured via the SRGO; Section 404 will be covered through the Army Corps of Engineers Nationwide Permit 27.
- Endangered Species Act (Federal) – Projects in proximity to anadromous fish bearing streams will secure ESA coverage under the TRRP Biological Opinion or the existing NOAA Fisheries BO.
- California Endangered Species Act – WRTC is currently initiating a programmatic Restoration Management Permit (RMP) for meadow restoration with the CDFW Cutting the Green Tape Team. This will provide coverage for incidental take under CESA, and will also cover Lake and Streambed Alteration. The RMP should be ready for use by May 2026.

Specific Projects Proposed

The combination of shovel-ready project designs and limited project-specific permitting needs will allow WRTC to efficiently restore a large array of meadows throughout the Trinity River watershed. WRTC is currently seeking funding for six projects within the Trinity River watershed (Fig. 1, Table 1) with similar methods and goals but covering a wide range of spatial area, complexity, and cost. These projects are also somewhat scalable at an individual level, allowing for flexibility in using available implementation funding or to extend funding into future phases. Each project is briefly described individually below, and full concept designs with maps and figures are included as Appendix A.

Bear Creek Basin: This is a large meadow complex spread across public (USFS) and private lands, largely intact but with degraded hydrology due to a network of closed logging roads. Many meadow basins are also heavily encroached by lodgepole pine. Proposed work would fully recontour 1.58 miles of road segments that disrupt natural meadow hydrology, decommission an additional 1.75 miles of road via ripping and adding dips, upgrade two undersized culverts, and add rolling dips and other drainage features to 0.29 miles of road. Proposed work would also conduct approximately 40 acres of conifer thinning and PBR work[1] in incised channels, to enhance existing meadow habitat and retain sediment.

Upper Picayune Basin: Lost Meadow Model results show 299 acres of potential lost meadow in upper Picayune Basin, compared to 146 acres of currently mapped meadow. Activities to restore lost meadows and improve overall hydrology would focus on a large private parcel, as well surrounding USFS and private roads. Up to 52 culverts would be removed and either upgraded to larger size or replaced with an armored ford or other crossing, in order to alleviate road erosion issues and improve floodplain engagement on Picayune Creek. Culvert upgrade work could also include small reorientations or replacing round pipe with 'squash' culverts. 3.64 miles of road work would focus on improving road drainage by adding rolling dips, additional ditch relief culverts, and other drainage elements. An additional 7.83 miles of problematic road segments would be decommissioned to varying degrees, including 1.58 miles of full recontour where roads cross meadow areas or other sensitive drainages. Up to 42 acres of meadow areas surrounding Picayune Creek would have encroaching conifer trees thinned and the slash used to construct BDAs to retain sediment and further improve floodplain engagement.

Mumbo Basin: A large headwater basin primarily managed by the USFS, Mumbo Basin contains large meadows that suffer from pervasive conifer encroachment, including field-verified 'lost meadow' areas that retain meadow topography and soils but lacks intact hydrology and vegetation. Many meadows are impacted by poor upslope road drainage, which has led to substantial erosion from the roads themselves, and caused incised channels to form at culvert outlets and move down into the meadow areas, accelerating drainage and conversion to conifer forest. Proposed work in Mumbo Basin includes

[1] Process-based restoration encompasses a suite of techniques connected by their relative simplicity (typically implemented with hand crews rather than heavy equipment), exclusive use of natural materials (typically collected on site), and focus on restoration of natural processes rather than prescribed or engineered outcomes. A primary example are beaver dam analogs, which are constructed from woody debris to mimic natural beaver dams. These structures slow and spread streamflows, allowing sediment to drop out of suspension and begin to aggrade. Over time BDAs can capture sediment to repair incised channels, while reengaging floodplains, increasing water table elevations and baseflows, and supporting native wet meadow vegetation. Post-assisted log structures (PALS) are a similar but more robust technique to achieve similar results in higher streampower systems.

70 acres of conifer thinning paired with process-based restoration to arrest incision and enhance meadow health. Up to 36 culverts would be upgraded as in Picayune Basin, and drainage would be improved on 0.97 miles of existing road by adding rolling dips or additional ditch relief culverts. 2.45 miles of closed roads would also be decommissioned by ripping and adding dips, to alleviate flow capture and resultant erosion.

Echo Flat: A large basin located along the middle reach of Mule Creek, Echo Flat is underlain by deep and easily erodible decomposed granite soils. It likely supported large wet meadow and swamp areas in the past, but is currently heavily incised due to a combination of factors, and does not interact with its floodplain even during high flows. The first step in restoring this area would be to install a series of post-assisted log structures (PALS) to slow flows and allow sediment to drop out of the water column and build up the streambed, rather than being exported to Trinity Lake. 24 PALS are planned for a private property reach of Mule Creek totaling just over ¼ mile of Mule Creek that crosses through private property. Smaller-scale PBR work (gully stuffing, BDAs) and supporting conifer thinning work would take place on an additional 12 acres of private land.

Trust for Public Lands Parcels: Five parcels on the Trinity River side of Scott Mountain were recently purchased from a commercial forestry company by the Trust for Public Lands (TPL), and then acquired by the USFS for management. As part of that process, over 20 miles of road were decommissioned, including many segments crossing creeks and wet meadow. However, while the crossings were recontoured using heavy equipment, they are still heavily channelized compared to historic conditions, and could be further restored using PBR techniques to slow and spread flows. PBR work totaling 30 acres will be performed across approximately 15 decommissioned meadow crossing sites, including one site where a large headcut will be filled using slash and other locally-available material.

Middle Weaver Creek Basin: The Middle Weaver Creek Basin encompasses a mix of federal (BLM and USFS), private timberland, other private lands, and Trinity County lands. This is a critical area for both recreation and fire safety for the town of Weaverville, and contains several streams that support runs of SONCC Coho and wild steelhead despite conditions that are highly degraded due to historic mining and existing road infrastructure. Secured funding from Trinity County Resource Conservation District will be used to complete assessment and design work for a small suite of process-based restoration projects totaling 40 acres, expected to be completed by 2026. CalTrans funding would be used to implement the planned PBR work, resulting in captured sediment and enhanced riparian habitat.

Overall Project Tasks

The specific projects listed above are independent and can be pursued individually depending on funding availability and permitting timelines. They are grouped under one overall funding request due to the similarity of their implementation techniques, and their relative geographic proximity. However, some economies of scale for multiple projects will maximize cost-effectiveness of reporting and monitoring tasks, and possibly implementation by subcontractors who would be able to quickly re-mobilize equipment between adjacent project areas. Tasks for the proposed Project, including all individual projects, are grouped into five task categories, detailed below.

Task 1 – Project Management and Administration

1.1 Grant Administration: WRTC program managers and administrative staff will coordinate with grantors to develop and execute agreements.

1.2 Project Management: WRTC will manage all scheduling of meetings and work with CalTrans, private landowners, USFS and other partner staff, and subcontractors. This task also includes ordering required supplies.

1.3 Invoicing and Progress Reporting: WRTC staff will prepare and submit invoices and progress reports as determined by the Grantor.

1.4 Sub-contract Administration: WRTC staff will develop and execute bidding and sub-contracting for construction or engineering design as needed.

1.5 Final Reporting: For each specific project, WRTC will produce an 'as-built' report describing the work accomplished, listing relevant metrics (number of miles of road recontoured, etc.), and providing pre- and post-implementation photo documentation and other details, including monitoring reports produced as part of Task 5. A Final Report summarizing all project work will be submitted to the Grantor, USFS, and other organizations as determined in the grant agreement.

Task 2 – Project Planning and Design

2.1 Road Assessment and Metrics Collection: WRTC staff will field validate proposed road treatments, including recording current and proposed culvert diameters, estimated cubic yards of fill to be regraded, and other relevant specifications.

2.2 Site Specific Designs and Engineering: Site-specific designs will be finalized using the data collected as part of Task 2.1. Given the large number of similar culvert replacements and other elements, most proposed road work will utilize design 'typicals', with an attached map and metrics sheet. However, proposed culvert upgrades on 'blue line' streams will have engineered designs produced by an approved subcontractor as needed.

2.3 Implementation Scheduling: A schedule of tasks will be established for each project, along with other supporting documentation necessary for contracting and field implementation.

Task 3 – Compliance and Permitting: Proof of permit/compliance attainment will be provided to the funder as it is secured. To the extent possible, specific permitting needs will be addressed using match funding.

3.1 Validate Programmatic Coverage: WRTC expects most of the project sites being largely covered under programmatic agreements or similar general frameworks such as those listed in the previous 'Permitting Status and Synergies' section.

3.2 Obtain Required Permits: Site-specific permits will still be required in order to implement most planned activities. These include CDFW's Lake or Streambed Alteration Agreement (LSAA), Storm Water Pollution Prevention Plan, and other Federal, State, and local permits as needed. WRTC staff will develop and submit permit applications and applicable fees.

3.3 Resource Surveys for Permitting and Compliance: Site-specific surveys (botany, cultural resources, etc.), etc. may be required in order to implement planned activities. WRTC Specialist staff will implement surveys to the extent possible; survey work for resources outside of WRTC staff disciplines will be subcontracted as needed.

Task 4 – Implementation: This task covers direct work done by both WRTC staff and by subcontractors or partners to improve or decommission roads, thin conifers from meadow areas, install PBR structures, and related activities.

4.1 Site Preparation: WRTC staff time will flag work zones and stake road treatments prior to implementation, based on engineered designs (for blue-line stream culvert replacements) or professional judgement. Staging areas for equipment, materials, and tools will also be flagged, as will any equipment exclusion zones.

4.2 Construction Activities: WRTC staff will oversee subcontractor implementation of road treatments, culvert replacements, and other contracted work in the field, to ensure planned project elements are completed efficiently and to specifications. WRTC staff may also assist with manual labor tasks (raking, etc.) associated with contracted heavy equipment work.

4.3 Process Based Restoration Implementation and Conifer Thinning: WRTC staff will remove conifer trees (typically >50% of total stems) from meadow areas, including 'lost' meadow areas, and use the cut materials to install beaver dam analogs, post-assisted log structures, and other process-based restoration features.

4.4 Revegetation Activities: Disturbed slopes shall be revegetated with a native seed mixture and at least 50% covered with wood straw or suitable equivalent approved by USFS staff or private landowner. Certain specific erosion-prone disturbed sloped may be covered with jute netting or other organic fiber.

Task 5 – Monitoring: Monitoring techniques will vary somewhat depending on the specific project and will occur during the summer months at suitable sites due to the remote nature and short accessibility window of most sites, which are located at high elevations in the Trinity River headwaters.

5.1 Monitoring Plan and Report: A detailed monitoring plan with appropriate protocols will be developed as part of this task. A post-project monitoring report will be included in the Final Report (Task 1).

5.2 Photographic Monitoring: Pre- and post-implementation photopoint documentation will be used to detect qualitative changes in habitat condition, and to estimate quantitative changes in wet meadow area, etc. Drone-captured ortho-imagery may be used for this task as appropriate.

5.3 Hydrologic Monitoring: A combination of field-calibrated continuous flow and temperature stream measurements and groundwater level monitoring well transects will be collected at some of the project sites to document potential changes in summer baseflow quality and quantity or increases in groundwater retention. For certain larger meadow areas (e.g. Picayune Basin) groundwater monitoring well transects will be installed to capture changes in groundwater elevations at varying distances from the restored primary channel.

5.4 Sediment and Geomorphic Monitoring: A combination of repeated channel cross-sectional and longitudinal profile measurements may be collected to estimate sediment retention and changes in erosion. In-stream turbidity measurements may be conducted periodically but will not be a primary monitoring tool.

Budget Narrative

The total funding sought through this grant application is $2,292,984 to fund all project activities (including subcontractor costs) over the full grant period. See Table 2 for summaries of per-project costs by task, see attached budget for additional details. The timeline for grant funding expenditure will depend somewhat on subcontractor availability, permitting status, and WRTC staff availability. Currently, the bulk of implementation activities are anticipated to occur in 2027, but expenditure timelines will vary between specific projects.

The total funding request amount is divided between the various specific projects listed earlier in this document, with each having a specific funding amount listed in Table 2. At CalTrans' discretion, certain specific projects could have funding withheld even if the overall proposal is funded. However, the current proposal budget was developed assuming cost-efficiencies gained as a result of securing funding for all specific projects – for example, reporting/scheduling and other administrative tasks will have only a fairly small amount of added complexity for each specific project. Certain projects (e.g. Mumbo Basin, Bear Creek Basin, and Picayune Basin) are in close geographic proximity and have similar activities proposed – substantial cost efficiencies for implementation can be expected if all of these projects are funded, versus just one or two. If only a subset of specific projects are funded, WRTC will account for the effective per-project expense increase by reducing certain specific metrics such as the density of

thinning/BDAs installed; lower-priority culvert replacements may also be deferred until additional funding is available.

Please note that listed match funding (Table 2) is only for implementation work anticipated to be performed during this grant period. However, considerable time and resources from non-CalTrans funding sources (both State and Federal) have already been (or will be by 4/1/26) spent to develop the designs, landowner relationships, and permitting agreements that enable these projects. In some cases (e.g. Trust for Public Lands Parcels) significant implementation work has already been performed using separate funding, but is not accounted for in listed match. Budgets associated with specific tasks are detailed below:

Task 1 – Project Management and Administration: Funding will cover WRTC staff time to administer all aspects of the project, including reporting and contract establishment and management. This also includes Negotiated Indirect Cost Rate (NICRA) of 20.59% on all costs except contractor costs over $25,000 (assumption of three such contracts for implementation and one for engineering design). Total Task 1 funding requested is $257,131.

Task 2 – Project Planning and Design: Funding for this task will cover WRTC staff time, including vehicle-related expenses, to resurvey and record metrics on various restoration elements, develop typicals, and create implementation schedules, etc. It will also cover subcontractor costs to develop and needed engineered designs for culvert replacements on 'blue-line' streams. Total Task 2 funding requested is $153,274.

Task 3 – Compliance and Permitting: Permit fees, including application and annual fees during the course of this grant, will be covered under funding for this task. Task funding will also cover WRTC staff time to secure permitting and compliance for each project (including resource surveys), and for any related reporting to regulatory agencies. Total Task 3 funding requested is $68,170.

Task 4 – Implementation: Funding for this task covers direct work done by both WRTC staff and by subcontractors or partners to improve or decommission roads, thin conifers from meadow areas, install PBR structures, and related activities. Funding for this task also covers transportation costs related to implementation support (e.g. reveg, site flagging, etc.), supplies to perform planned work (including fuel for chainsaws and other consumables), and per diem rates for staff staying overnight at project sites. Total Task 4 funding requested is $1,747,664.

Task 5 – Monitoring: Funding allocated to this task will cover both staff time for monitoring activities, and for related data collation and analysis used to produce final monitoring reports to provide to the funder. It will also be used to cover vehicle transportation to and from sites, and the cost of required monitoring equipment. Total Task 5 funding requested is $66,745.

References

Pope, K.L. and Cummings, A.K., 2023. Recovering the lost potential of meadows to help mitigate challenges facing California's forests and water supply. *California Fish and Wildlife Journal. 109 (1): 977*, *109*(1).

Watershed Research and Training Center. 2024 Upper Trinity Watershed Restoration Assessment and Management Plan. Hayfork, CA. Document available upon request.

Weaver W., Weppner E., Hagans D. 2015. Handbook for Forest, Ranch & Rural Roads: A Guide For Planning, Designing, Constructing, Reconstructing, Upgrading, Maintaining and Closing Wildland Roads. Prepared by Pacific Watershed Associates for Mendocino County Resource Conservation District. Arcata, CA. 420 pp. DOI: https://www.pacificwatershed.com/sites/default/files/RoadsEnglishBOOKapril2015b.pdf

Wheaton J.M., Bennett S.N., Bouwes N., Maestas J.D. and Shahverdian S.M. (Editors). 2019. Low-Tech Process-Based Restoration of Riverscapes: Design Manual. Version 1.0. Utah State University Restoration Consortium. Logan, UT. 286 pp. DOI: 10.13140/RG.2.2.19590.63049/2.

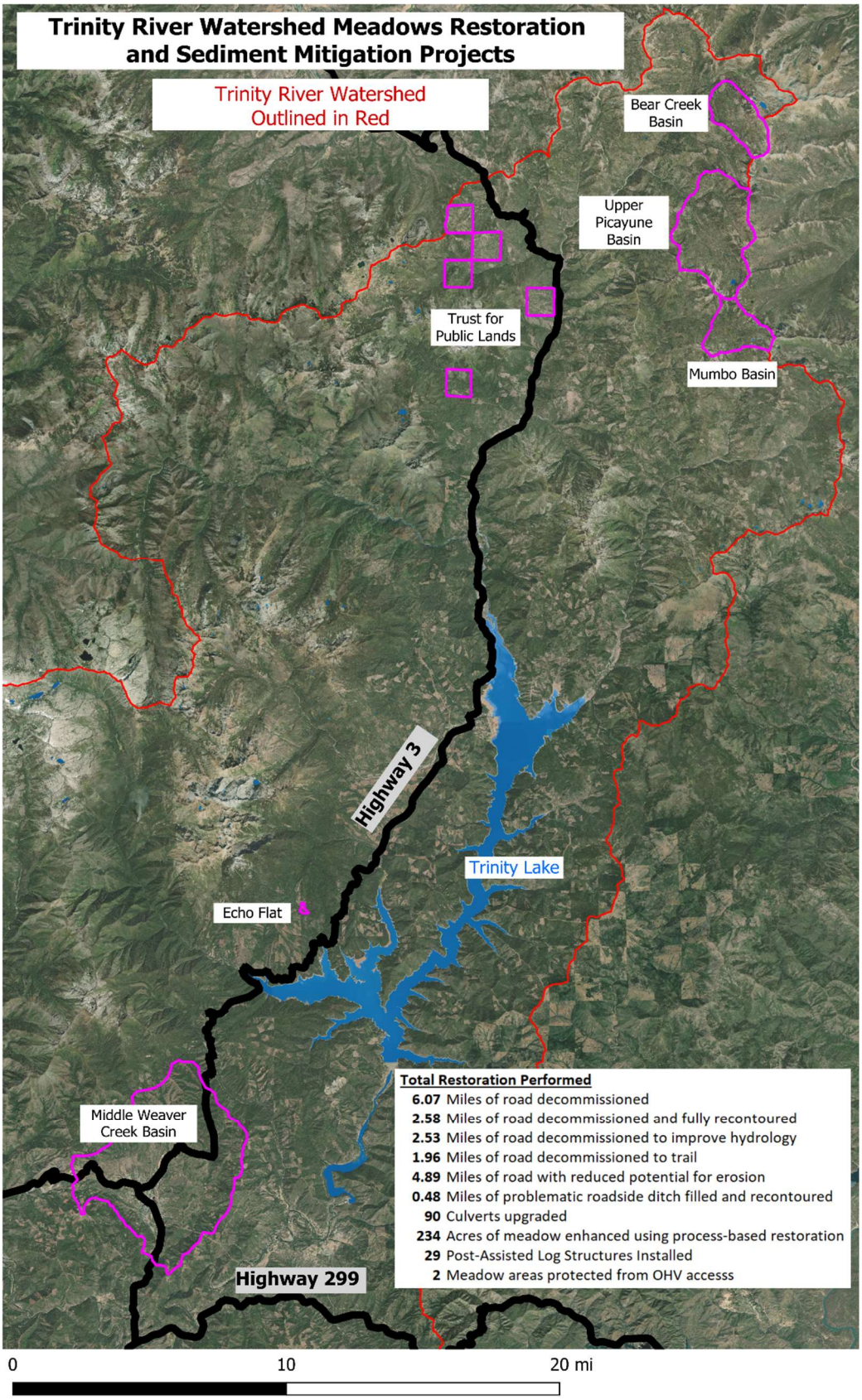


Figure 1 – Proposed restoration projects within the Trinity River Watershed, with overall metrics.

Table 1 – Restoration actions proposed for Trinity River Watershed Meadows Restoration and Sediment Mitigation, categorized by type and listed by specific project.

Restoration Action	Unit	Mumbo Basin	Bear Creek Basin	Picayune Basin	Echo Flat	TPL Parcels	Weaver Basin
Decomission Road - Rip and Dip	Miles	2.45	1.87	1.75			
Decomission Road - Full Recontour	Miles		1.00	1.58			
Decomission Road - Hydroclosure	Miles			2.53			
Decomission Road - Road to Trail	Miles			1.96			
Improve Road Drainage (on top of culvert upgrades)	Miles	0.97	0.29	3.64			
Fill and Recontour Inboard Ditch	Miles			0.48			
Culvert upgrade (small to medium size)	Number	36	2	52			
Typical BDAs (with related thinning)	Acres	70	40	42	12	30	40
Larger PALS etc	Number				24	5	
Road end closure (boulders, tank traps, etc.)	Number	1		1			

Table 2 – Budget summaries by task for each specific project, including total current funding ask and match funding anticipated to be spent between 4/1/2026 - 3/31/2029. NFWF match funding is secured, NRCS match funding represents private landowner cost-share that has been applied for in consultation with local NRCS staff, but not officially secured at this time.

	Mumbo Basin	Bear Creek Basin	Picayune Basin	Echo Flat	TPL Parcels	Weaver Basin	Task Total
Task 1 - Project Management and Administration	$71,805	$44,580	$80,486	$15,682	$22,300	$22,277	**$257,131**
Task 2 - Project Planning and Design	$56,443	$18,485	$69,668	$1,649	$3,950	$3,079	**$153,274**
Task 3 - Compliance and Permitting	$16,501	$16,501	$16,501	$4,095	$7,286	$7,286	**$68,170**
Task 4 - Implementation	$579,462	$145,000	$860,075	$39,046	$64,917	$59,163	**$1,747,664**
Task 5 - Monitoring	$17,357	$12,172	$18,583	$5,663	$6,443	$6,527	**$66,745**
	$741,568	$236,739	$1,045,312	$66,136	$104,897	$98,333	
Total Grant Ask			**$2,292,984**				
Match Funding	$50,000	$50,000	$50,000	$24,883			
Source	NFWF	NFWF	NFWF	NRCS			

Van Duzen River TMDL
Sediment Reduction Project

Project Watershed: **Van Duzen**

Target Pollutant: Sediment

INTRODUCTION: The Trinity County Resource Conservation District (TCRCD) has a cooperating agreement with Six Rivers National Forest (SRNF) to conduct road maintenance activities to reduce road-related sediment delivery and retain public access. The TCRCD, located in Weaverville, CA which has extensive experience in various road-related restoration activities on National forest roads proposes road maintenance level work on USFS roads along 31 miles of USFS Maintenance Level 1 thru 3 roads in the Van Duzen River watershed near Dinsmore off Buck Mountain Road. The vast majority of the project area is federal land managed by SRNF, there are some limited private in-holdings. This project lies immediately south of Dinsmore along the west side of the Van Duzen River with multiple named tributaries, including Mill and Kuntz Creek and several un-named tributaries, all between 1-3 miles from the river. This project will be limited to work on USFS roads and not include work at 1N10 Kuntz Canyon stream crossing where Six Rivers National Forest expects federal funding to rehabilitate that specific site.

There are at least 30 stream crossings in the project area, including 15 bluelines; we will prioritize roads by number of stream crossings, inlet basin condition/ culvert capacity for large storm events, disconnecting road surface/ditch delivery where needed and eliminating diversion potential at stream crossings. *Every road* will be looked at to assure that the culverts are open, there is limited diversion potential at stream crossings and adequate road drainage.

The TCRCD will be limited to activities listed in Forest Lands permit CAT A.

CONTACT INFORMATION: Cynthia Tarwater, Roads Program Manager at the **Trinity County Resource Conservation District** by email at ctarwater@tcrcd.net

PROPOSED STATEMENT OF WORK: The TCRCD proposes, in coordination with SRNF, to conduct road maintenance activities on 31 mile**s** in project area within the Van Duzen River project area identifying and improving crossings to reduce potential sediment delivery at 45 spring, swale or stream crossings. All Forest BMPs will be utilized and all disturbed areas near or draining to watercourses will be seeded and mulched after treatment.

This work will include activities listed in Category A under the Federal Lands Permit and may include the following activities if needed:

- Stream crossings, Cleaning inlet basins at culverted water crossings where needed.
- Stream crossings, Constructing Critical dips with diversion potential utilizing rock armor of outlet where needed, forwarding information of crossings where our remedial work will not be sufficient long term and upsizing is needed.

- Stream crossings, Installation of flared end sections, drop inlets or cutting bevel on culvert inlets to increase culvert capacity and reduce plugging potential.
- Stream crossings, Rock armoring of inlets and outlets where active scouring is occurring.
- Cleaning of inboard ditches if the action can reduce sedimentation or installation of ditch relief culverts.
- Cleaning inlets of ditch relief culvert inlets where action will reduce road related sediment delivery
- Construction of rolling dips to alleviate road surface erosion or to disconnect inboard ditch from watercourses and the cleaning outlets of existing rolling dips.
- Minor brushing, grading and spot rock surfacing of area with poor soils.
- Removal of and safe disposal of slide material blocking access
- Stabilization of road fill failures

COST ESTIMATE NARRATIVE/SOW: Expenditures would cover reviewing inventories and past activities, prioritize road maintenance projects and implement road improvements on 31 miles, TCRCD project management including recon, layout and design, procurement of local contractors for equipment work, purchasing culvert hardware/erosion control supplies and staffing required for oversite of construction activities, labor, critical area treatments, reporting, and administrative expenses.

Project Start Date: Spring 2026 continuing until complete.

Total Estimated Project Budget: **$400,000**

PROJECT SCHEDULE: Start Spring/Summer 2026

PROJECT SCHEDULE:

TCRCD PROJECT SCHEDULE

TASK	DURATION	EST. START	EST. END	2026												2027												2028											
	Months			Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Cal Trans Agreement	2	1/1	3/1																																		
Review/Contracting	2	3/1	4/30																																		
Implementation	6	5/1	10/30																																		
Reporting	2	11/1	12/31																																		

Note: Implementation will take place during summers months when creeks are dry or at low flow.

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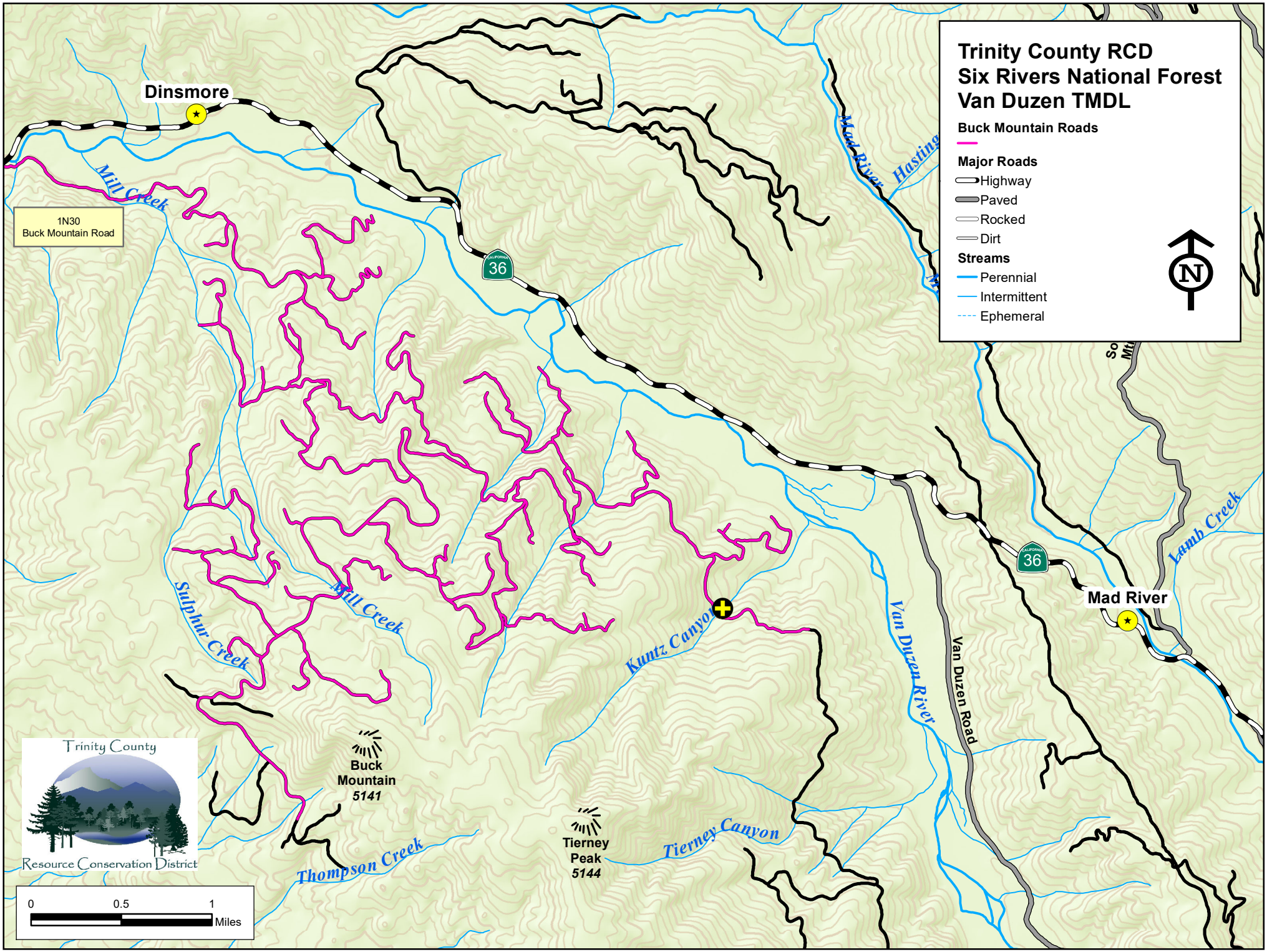
Trinity County RCD
Six Rivers National Forest
Van Duzen TMDL
Buck Mountain Roads
Major Roads
Highway
Paved
Rocked
Dirt
Streams
Perennial
Intermittent
Ephemeral
N
Dinsmore
1N30
Buck Mountain Road
Mill Creek
36
Mad River
Hasting
Sulphur Creek
Mill Creek
Kuntz Canyon
Van Duzen River
Van Duzen Road
Lamb Creek
Mad River
Buck
Mountain
5141
Tierney
Peak
5144
Tierney Canyon
Thompson Creek
Trinity County
Resource Conservation District
0
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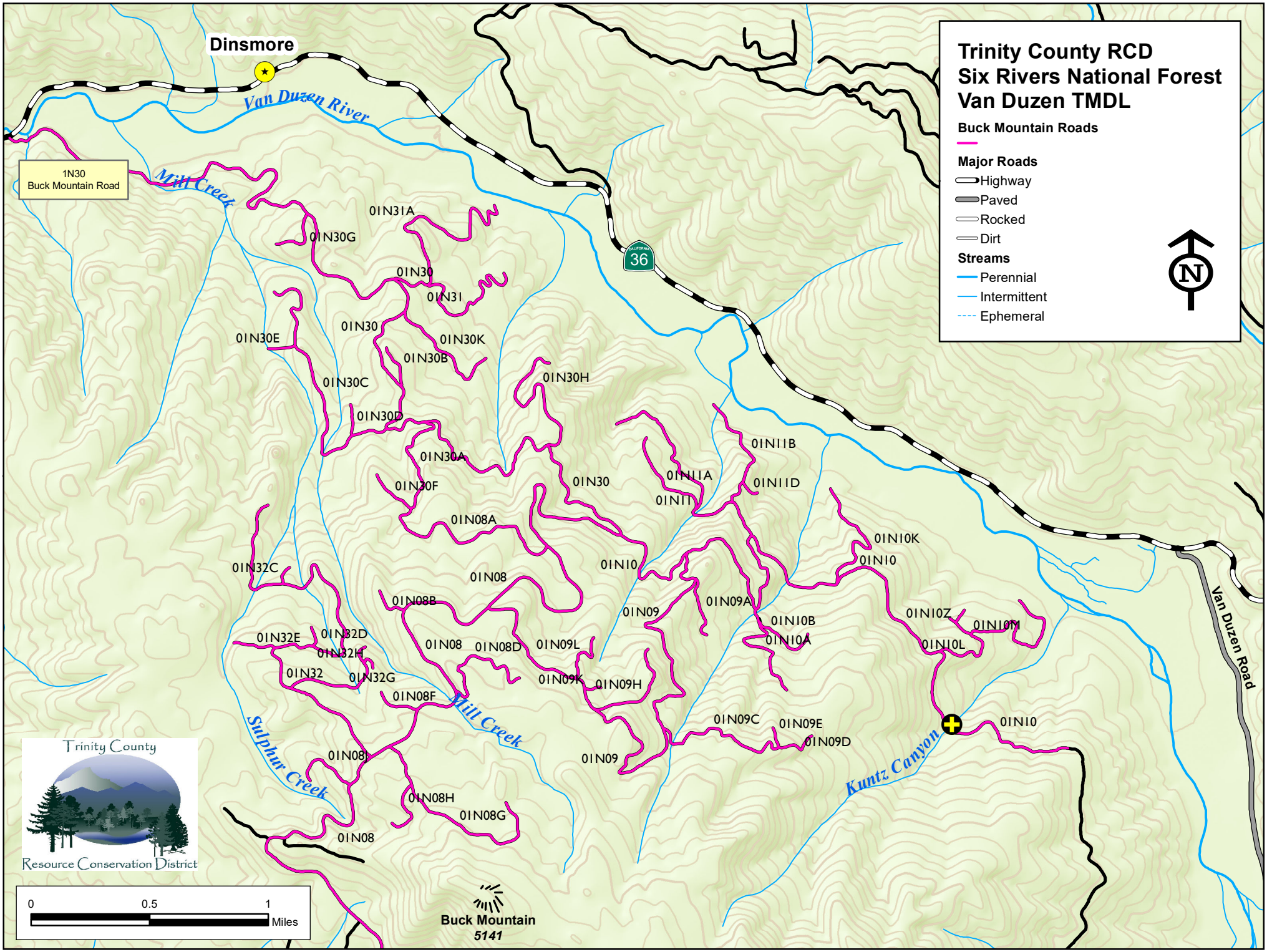
1
Miles


Trinity County RCD
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Intermittent
Ephemeral
N
Dinsmore
Van Duzen River
1N30
Buck Mountain Road
Mill Creek
36
01N31A
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01N30E
01N30
01N30K
01N30B
01N30C
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01N30D
01N30A
01N30F
01N30
01N08A
01N11B
01N11A
01N11D
01N11
01N10K
01N10
01N32C
01N08
01N10
01N08B
01N09
01N09A
01N10B
01N10A
01N10Z
01N10M
01N10L
01N32E
01N32D
01N32H
01N08
01N08D
01N09L
01N32
01N32G
01N09K
01N09H
01N08F
Mill Creek
Sulphur Creek
01N09C
01N09E
01N09D
01N10
Kuntz Canyon
Van Duzen Road
01N08I
01N09
01N08H
01N08G
01N08
Trinity County
Resource Conservation District
0
0.5
1
Miles
Buck Mountain
5141

Van Duzen River TMDL Sediment Reduction Project- TCRCD

Salaries/Labor					
Standard Calculation					
Job Description		Cost/Day	# of Days		Total
District Manager		$960.00	4		$3,840.00
Project Manager Rds		$940.00	45		$42,300.00
Project Coordinator Rds		$510.00	40		$20,400.00
Project Manager Botany		$600.00	5		$3,000.00
Project Coordinator Botany		$500.00	7		$3,500.00
Conservation Tech II/III		$450.00	40		$18,000.00
Non-Standard Calculation					
Total Salaries/Labor					**$91,040.00**

Travel					
Standard Calculation					
Travel Expense	Persons	Cost	# of		Total
Mileage Reimbursement (2 crew trucks)		$0.700	11000	miles	$7,700.00
PerDiem - Meals (Spike Camping)		$68.00	100	days	$6,800.00
Total Travel					**$14,500.00**

Equipment					
Standard Calculation					
Piece of Equipment	# of Units	Cost	# of Days		Total
Non-Standard Calculation					
Total Equipment					**$0.00**

Supplies/Materials				
Standard Calculation				
Supplies/Materials		# of Items	Cost/Item	Total
Native Straw	Bales	32.0	$25.00	$800.00
Tires for Ford 4x4/Oil change/Tune Up	Set	4.0	$700.00	$2,800.00
Culverts, Drop Inlets, FES, flumes, other	items	6.0	$1,000.00	$6,000.00
Biaxial Geo Grid	Rolls	6.0	$550.00	$3,300.00
Native Grass Seed	lbs.	15.0	$35.00	$525.00
Solar Generator/Solar Panel	item	1.0	$1,450.00	$1,450.00
Coconut Fiber Blanket	rolls	8.0	$170.00	$1,360.00
Misc Hardware/Safety Gear	n/a	77.0	$9.90	$762.30
Geotextile Non Woven Felt GT180	rolls	1.0	$750.00	$750.00
Rock and Delivery	transfers	20.0	$600.00	$12,000.00
Propane	gal	20.0	$6.60	$132.00
Non-Standard Calculation				
Total Supplies/Materials				**$29,879.30**

Printing					
Standard Calculation					
		# of Units	Cost/Unit		Total
Printer Cartridges		4.00	$50.00		$200.00
Paper Material for reports	sheets	311.86	$0.23		$71.73
Non-Standard Calculation					
					$0.00
Total Printing					**$271.73**

Other Expenses					
Standard Calculation					
Item		Unit	Cost/Unit		Total
Contracting: Grader/Dozer/Skippy	Days	30	$1,800.00		$54,000.00
Contracting: Excavator	Days	25	$2,000.00		$50,000.00
Contracting:Mini Excavator/Backhoe	Days	35	$1,600.00		$56,000.00
Contracting: Dump Truck	Days	8	$1,500.00		$12,000.00
Contracting: Mobilization	Moves	12	$1,000.00		$12,000.00
Contracting: Federal Audit	Year	3	$4,000.00		$12,000.00
Water Truck Rental/Fuel/Del	monthly	1.5	$5,600.00		$8,400.00
Vibatory Roller Rental/Fuel/Del	monthly	1.5	$5,500.00		$8,250.00
Total Other					**$212,650.00**

Subtotal Direct Costs	**$348,341.03**

Cooperator Indirect Costs				
Current Overhead Rate	Subtotal Direct Costs			Total
14.83%	$348,341.03			$51,658.97
Total Coop. Indirect Costs				**$51,658.97**

TOTAL COST	**$400,000.00**

Caltrans Mitigation Funding Proposal

Project Applicant: The Watershed Research and Training Center (WRTC)

Project Title: Weaver Creek Sediment Reduction Project

Project Watershed: Trinity River

Target Pollutant: Sediment

Project Start and End: May 2026 - May 2029

Project Cost: $517,986 (scalable)

Project Overview:

The Weaver Creek Sediment Reduction Project (Project) will reduce road-related fine sediment delivery to Weaver Creek, Little Browns Creek and the Trinity River by evaluating and identifying road infrastructure controllable sediment discharge sources on 50 miles of existing system roads on Bureau of Land Management (10.7 miles) and U.S. Forest Service (39.5 miles) managed lands. The project will also implement Category A road maintenance activities on approximately 25 miles of identified high priority roads and verify 5.9 miles of Forest Service Road Maintenance Level 1 roads are sufficiently closed with physical barriers.

Project Location and Need

The Weaver Creek watershed is a tributary to the Trinity River surrounding the community of Weaverville in Trinity County. The watershed contains the following main streams: East Weaver Creek, West Weaver Creek, Sidney Gulch, Weaver Creek, Little Browns Creek and Democrat Gulch. West Weaver and East Weaver Creeks originate within US Forest Service (USFS) lands, some of which are within the Trinity Alps Wilderness area. Little Browns Creek originates within private lands but flows through USFS and Bureau of Land Management (BLM) lands before its confluence with Weaver Creek. Democrat Gulch flows though a matrix of private lands and BLM lands before its confluence with Weaver Creek. The land ownership within the watershed is 55% public, 25% private timber, 17% private, and 3% municipal or State of California.

The fishes within the Weaver Creek watershed include anadromous fall Chinook salmon, winter steelhead trout, coho salmon, and resident rainbow trout. The Southern Oregon Northern California Coastal (SONCC) coho salmon have been listed as threatened under the Endangered Species Act (ESA). All stream areas accessible to anadromous fish have been listed as critical habitat. Due to the long-term overall decline of Chinook and steelhead runs, the USFS Pacific Southwest Region has put them on a regional sensitive species list to help ensure that USFS activities do not result in a trend towards listing them under the ESA. In addition to the fisheries needing cool, clean waters, several streams within the watershed are used as domestic water supply for residents of Weaverville either through the community service district or on an individual riparian water right.

The Trinity River is listed as sediment impaired by the Environmental Protection Agency (EPA) under the Clean Water Act section 303(d) and a Total Maximum Daily Load for sediment was

established in 2001. The Weaver Creek watershed is included within the TMDL for the Trinity River. Multiple watershed assessments for the area have identified road infrastructure and forest practices as significant sources of sediment to the local waterways (EPA 2001, Madej 2007). Additionally, the underlying geology within this watershed is a mixture of decomposing granite and the Weaverville Formation, a clay dominant geology, both of which are highly erosive and prone to mass wasting.

Catastrophic fire events in the area's granitic soils and fine textured sediments would cause rill and gully erosion. The area has had large fires including the Browns Fire (1994), Junction Fire (2006), Oregon Fires (2001 and 2014) and a small portion burned in the Monument Fire (2021). Wildfire is part of the natural forces that shape the ecology of the area. However, with the proximity of communities and the wildland interface, road networks need to be retained and maintained to assist with battling wildfire when it strikes.

This Project proposes to evaluate up to 50 miles of USFS and BLM system roads to identify and prioritize controllable sediment discharge sources. On approximately 25 miles of road, work plans will be developed for Category A (CRWQCB-NCR 2024) road maintenance and implemented to improve drainage function and reduce sediment delivery to creeks.

This project will complement the existing efforts by community members who are developing and maintaining a trail system within the Weaver Community Forest and other public lands. This trail system will increase user access for non-motorized recreation such as hikers and mountain bikers.

Project Description

Sites will be inventoried and cataloged using such techniques as laid out in the Handbook for Forest, Ranch and Rural Roads manual (Rural Roads Manual; Weaver et al. 2015). Each site will be given a GPS point, mile marker, and a unique ID that will correspond with the work plan. Also data such as culvert size, percent culvert plugged, diversion potential, and immediate road drainage maintenance needs will be collected to allow for road and site prioritization. Photographs for each site identified needing treatment will be acquired for pre-project baseline condition reporting.

Once the road inventory has been completed, Shasta-Trinity National Forest Engineering and BLM Redding Field Office Roads Department staff will be consulted and given the opportunity to review the inventory and work plans prior to implementation work. Sites identified with more complex issues such as undersized culverts, fish passage problems, and landslides or mass wasting would be outside the scope of this Project. These sites will be documented and provided to the appropriate land owner's (USFS or BLM) Engineering and Roads Department due to treatments likely being considered Category B or requiring additional environmental compliance and engineering. The WRTC will assist the USFS or BLM as needed to complete the steps required to fix the identified issues outside of this road maintenance project.

All road maintenance work will be conducted to the USFS and BLM standards and guidelines. Road maintenance activities and techniques from the Rural Roads Manual will be used to treat each site. This will include drainage structure maintenance, such as cleaning inlets and outlets

to allow water to drain freely. Undersized culverts, and crossings showing signs of past stream diversion, will have critical dips constructed to reduce stream diversions and erosion. Slides and slumps will be cleared and perched fill will be trimmed back to a stable angle.

Techniques such as cutting bevels, installing drop inlets, upgrading or replacing ditch relief culverts, and installing flared end sections will be used to increase flow capacity and reduce stream diversions. Ditches will be cleaned and rolling dips will be constructed to break up road surface runoff and direct discharge into streams and creeks. Roads will be cleared of vegetation to gain access to sites inaccessible due to brush and downed trees.

Rock armoring will be placed in areas of active erosion to stabilize banks, fill slopes, and cut slopes. Armoring will also be used to direct flow back into natural channels or drainage features. Where applicable, rocking of the road surfaces will be used to reduce controllable sediment delivery.

Any spoils generated during the road maintenance activities will be deposited in hydrologically safe areas and all disturbed sites will have native grass seed and certified weed free straw or wood straw spread to stabilize and revegetate the surface.

Blocked roads will be assessed for remaining piped stream crossings behind the road closure. If piped crossings are located, the site will be cataloged and brought to the USFS or BLM Engineering and Road Department staff's attention. We will conduct hand work on bermed or blocked roads to improve erosion control where practical.

Additional environmental compliance will not be required for the maintenance activities proposed in this Project. All treatments will fall within the Water Board General Order for Forest Roads Category A maintenance. Stream crossings identified as needing an upgrade will be documented and provided to the USFS or BLM Road departments for future replacement.

Project Tasks

1.0 Project Management and Administration

1.1 Grant administration: WRTC program managers and administrative staff will coordinate with grantors to develop and execute agreements.
1.2 Sub-contract administration: WRTC staff will develop and execute bidding and sub-contracting for construction.
1.3 Invoicing and Progress Reporting: WRTC staff will submit invoices and progress reports as determined by the Grantor.
1.4 Final Reporting: A final report will be submitted to the grantor, USFS, BLM, and other organizations as determined in the grant agreement.
1.5 Project Management: WRTC staff will manage work schedules for assigned staff, contractors, and coordination with USFS and BLM staff.

2.0 Road Inventory and Planning

2.1 Pre-field preparation: WRTC staff will create georeferenced maps of the project area and develop field forms for ESRI Field Maps and Avenza software for data collection.
2.2 Field Inventory: WRTC staff will collect georeferenced field data and photographs of inventoried sites. Sites identified for treatment will be staked on the ground with an identifying marker.
2.3 Planning: WRTC staff will develop construction/treatment plans for the roads inventoried to address the sediment sources and hydrologic connectivity of the road system. Plans will be shared with USFS and BLM hydrologists and/or engineers for approval.
2.4 Permitting: WRTC staff will coordinate with USFS and BLM staff and appropriate agencies on environmental compliance and permitting as needed to meet road maintenance objectives.

3.0 Implementation

3.1 Road Maintenance Activities: WRTC staff and contractors will coordinate and implement the work plans approved by the USFS and BLM staff.
3.2 Contracting oversight: WRTC staff will guide and oversee on the ground contractor work to verify implementation and appropriate BMPs are being utilized.
3.3 Erosion control: disturbed sites with exposed soils will be seeded and strawed immediately after implementation is completed.
3.3 As-Built Documentation: All maintenance activities will be documented in georeferenced data collection devices, photographs of post-implementation of each treatment site obtained, and data collaborated into a post-implementation As-built report.

4.0 Post implementation monitoring

4.1 Storm Patrol: all treated sites will be monitored during or soon after a triggering precipitation event (typically considered a precipitation event that approaches a 5-yr recurrence interval in burned areas) including “Atmospheric River Systems”.
4.2 Annual Monitoring: Treatment areas will be monitored for up to 3 years post implementation depending on available funding and weather conditions.
4.3 Monitoring Reporting: Documentation of monitoring events and treatment areas will be shared with USFS and BLM staff and appropriate agencies.
4.4 Adaptive Treatment: should a treatment show signs of failure during a monitoring event, WRTC staff will document the failure, perform any immediate remedial hand-work if possible, and share the results with USFS and BLM staff. If treatment requires more than hand-work, staff will coordinate with USFS and BLM staff to develop a treatment plan.

Deliverables:

- ●Miles of road inventoried
- ●Miles of road maintained
- ●Number of sites treated
- ●Photographs (before and after)
- ●GIS maps of maintenance completed
- ●List of sites needing future funding and/or NEPA compliance
- ●Project Reports (interim and final)

References

California Regional Water Quality Control Board North Coast Region, 2024. General Waste Discharge Requirements for Nonpoint Source Discharges Related to Certain Land Management Activities on Federal Lands in the North Coast Region Order No. R1-2024-0012.

Madej, M.A. 2007. A Strategy to Reduce Fine Sediment from Tributaries in the Trinity River Basin. A Report in Fulfillment of the Trinity River Restoration Project Agreement #04AA202062. U.S. Geological Survey Western Ecological Research Center Redwood Field Station, Arcata, CA.

U.S. Environmental Protection Agency. 2001. Trinity River Total Maximum Daily Load for Sediment. U.S. Environmental Protection Agency, Region IX. San Francisco, CA.

Applicant	**The Watershed Research and Training Center**
Title	Weaver Creek Sediment Reduction Project
Watershed	Trinity River/ Weaver Ck and Little Browns Ck
Target Pollutant	Sediment
Term	3 years, 4/1/2026 - 3/31/2029
Deliverables	

25 mi road maintenance activities (Cat A Rd Maintenance)
50 miles of road evaluation/ survey
75 road crossings

Caltrans Mitigation Roads Proposal Budget

Personnel

Job title		Hourly Rate with Benefits	Project Hours		Total Cost	Budget Justification:
Watershed Stewardship Program Director		$ 79.61	120		$ 9,552.98	Responsible for overall Watershed Stewardship Program management, coordination, decision-making, and contracts and agreements
Watershed Stewardship Program Associate IV		$ 61.94	250		$ 15,486.07	Responsible for grant management, budget tracking, project coordination, Road Program staff oversight decision-making, reporting
Roads Division Manager (Program Associate II)		$ 47.71	1600		$ 76,335.32	Responsible for road program management, office and field based, road inventory, work plan development, logistics, supplies and materials purchasing, photo documentation, GIS mapping, monitoring and in field construction oversight, reporting
Roads Division Field Technician		$ 38.44	600		$ 23,065.00	In field, assists with road inventory, staking and layout, photo documentation, monitoring, seed and mulching of project sites
SUB TOTAL					**$ 124,439.37**	

Travel

Type	Purpose	Units	Unit Cost	Quantity	Total Cost	Budget Justification:
Travel- WRTC Truck #101	Road Program Mgr/ Tech	Hours	$ 40.51	700	$ 28,357.00	WRTC-owned staff vehicles at Caltrans hourly rental rates travel to.from office and within project sites (source Caltrans Rental Rate book 4/1/2025)
Travel- WRTC Truck #50	Road Program Mgr/ Tech	Hours	$ 40.51	600	$ 24,306.00	WRTC-owned staff vehicles at Caltrans hourly rental rates travel to.from office and within project sites (source Caltrans Rental Rate book 4/1/2025)
SUB TOTAL					**$ 52,663.00**	

Equipment

Item Name	Description	Quantity	Unit Cost	Total Cost	Budget Justification:
				$ -	
SUB TOTAL				**$ -**	

Materials and Supplies

Item Name	Description	Unit	Quantity	Unit Cost	Total Cost	Budget Justification:
Field notebooks and paper	Project tracking and notes	Each	1	$ 15.00	$ 15.00	Supplies necessary to record field notes and data for stream monitoring and surveying
Wood Lathe	Site markers	Bundle (50)	10	$ 37.00	$ 370.00	For marking sites in the field
Native weed-free seed	1 pound per mile	Pounds	25	$ 30.00	$ 750.00	For revegetating disturbed surfaces to reduce erosion
Weed-free staw mulch	4 bales per mile	Bale	100	$ 15.00	$ 1,500.00	For mulching disturbed surfaces to reduce erosion
Avenza mapping app subscription	Field maps and inventory	Per Year	3	$ 120.00	$ 360.00	Track and inventory project data
Garmin inReach handhelddevice subscription	Crew and job safety	Per Month	9	$ 19.95	$ 179.55	Satellite communication device subscription for staff to use in project areas without cell service for safety
SUB TOTAL					**$ 3,174.55**	

Contractural Services: Subcontract

Contractor Name	Descpription	Unit	Quantity	Unit Cost	Total Cost	Budget Justification:
TBD Heavy Equip/ Operator Year 1	10 miles of road maintenance	Each	1	$ 100,000.00	$ 100,000.00	Contractor costs for project implementation
TBD Heavy Equip/ Operator Year 2	10 miles of road maintenance	Each	1	$ 100,000.00	$ 100,000.00	Contractor costs for project implementation
TBD Heavy Equip/ Operator Year 3	5 miles of road maintenance	Each	1	$ 50,000.00	$ 50,000.00	Contractor costs for project implementation
TBD Rock and Delivery		Each	1	$ 30,000.00	$ 30,000.00	Contractor costs for project implementation
SUB TOTAL					**$ 280,000.00**	
				Total Direct Costs	**$ 460,276.92**	

Indirect Costs

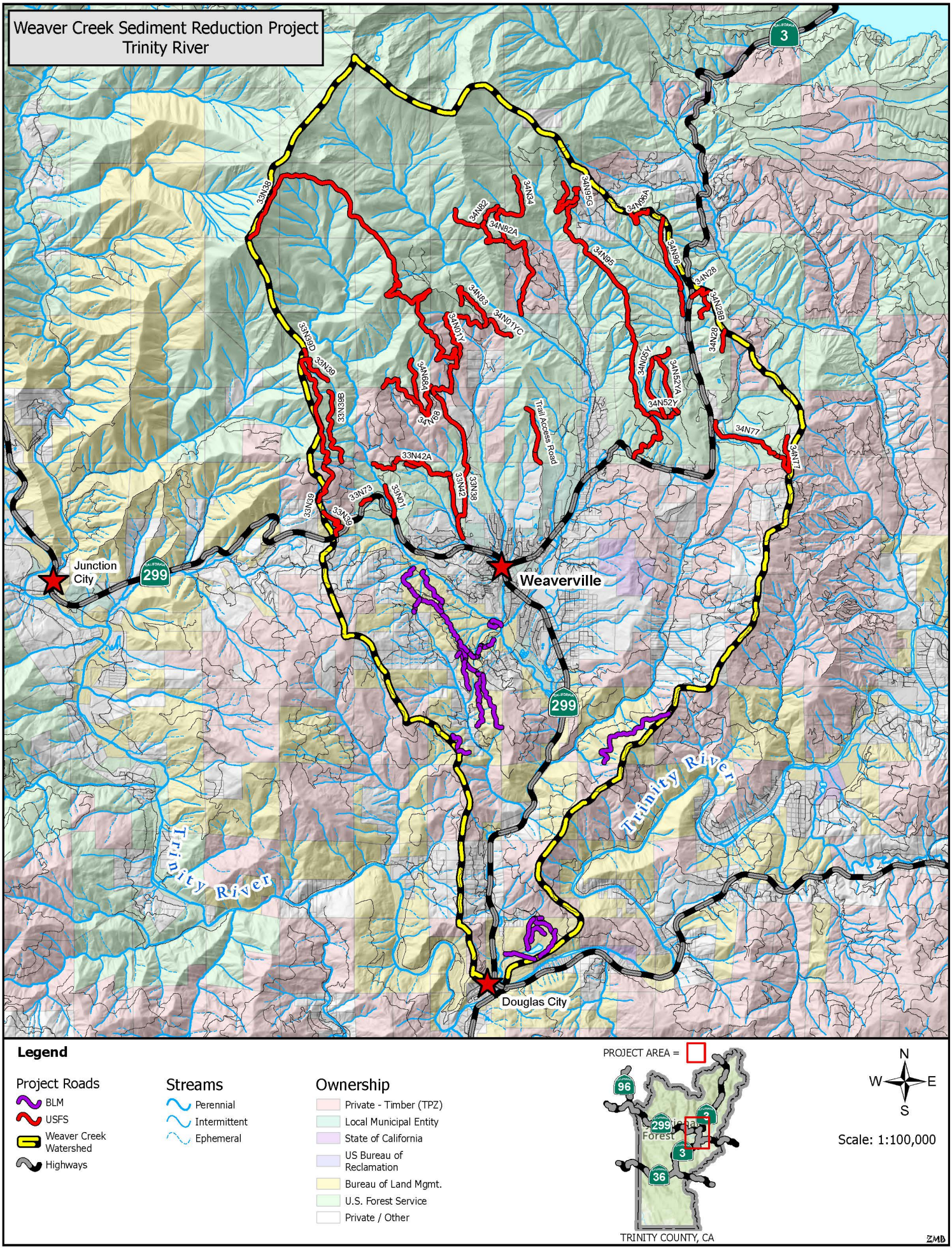
Explanation of Indirect Costs	NICRA Expiration Date	NICRA Rate	Total Direct Costs Eligible for Indirect	Total Indirect Costs
NICRA	3/31/2026	20.59%	$ 280,276.92	**$ 57,709.02**
		Total Project Costs		**$ 517,985.94**

Weaver Creek Sediment Reduction Project Gantt Chart

START DATE

January 01, 2026

PROJECT NAMES + TASK TITLES	START DATE	END DATE
2026 Tasks	**01/01/26**	**12/01/26**
Identify Sediment Sources / Inventory	06/01/26	08/30/26
Work Plan Development and Maps	07/01/26	08/30/26
Contractor Implementation (20 Miles)	08/30/26	11/15/26
Revegetation/Stabilization of Project Sites	08/30/26	11/15/26
Monitoring/Storm Patrol of Sites	11/15/26	12/30/26
2027 Tasks	**01/01/27**	**12/01/27**
Identify Sediment Sources / Inventory	03/15/27	07/01/27
Work Plan Development and Maps	07/01/27	07/30/27
Contractor Implementation (20 Miles)	07/15/27	11/15/27
Revegetation/Stabilization of Project Sites	07/15/27	11/15/27
Monitoring/Storm Patrol of Sites	11/15/27	12/31/27
2028 Tasks	**01/01/28**	**12/01/28**
Identify Sediment Sources / Inventory	03/15/28	07/01/28
Work Plan Development and Maps	07/01/28	07/30/28
Contractor Implementation (10 Miles)	07/15/28	11/15/28
Revegetation/Stabilization of Project Sites	07/15/28	11/15/28
Monitoring/Storm Patrol of Sites	11/15/28	12/31/28
2029 Tasks	**01/01/29**	**05/30/29**
Final Reporting and Project Closeout	01/01/29	05/30/29


Weaver Creek Sediment Reduction Project
Trinity River
Junction City
Weaverville
Douglas City
Trail Access Road
Trinity River
Trinity River
299
3
33N39B
33N39D
33N39
33N38
33N42
33N42A
33N73
33N01
34N68A
34N69
34N01Y
34N01YC
34N83
34N82
34N82A
34N34
34N95G
34N95
34N96A
34N96
34N26
34N26B
34N28
34N06Y
34N52YA
34N52Y
34N77
Legend
Project Roads
BLM
USFS
Weaver Creek Watershed
Highways
Streams
Perennial
Intermittent
Ephemeral
Ownership
Private - Timber (TPZ)
Local Municipal Entity
State of California
US Bureau of Reclamation
Bureau of Land Mgmt.
U.S. Forest Service
Private / Other
PROJECT AREA =
96
299
3
36
Forest
TRINITY COUNTY, CA
N
W
E
S
Scale: 1:100,000
ZMB

Weaver Creek Road Maintenance List
Caltrans Mitigation Proposal

USFS Roads

3/11/2024

Road Name / Number	Miles	Area/Road Name	Maintenance Level
33N01	0.44	W WEAVER CREEK	1 - BASIC CUSTODIAL CARE (CLOSED)
33N38	7.21	WEAVER BALLY	2 - HIGH CLEARANCE VEHICLES
33N38	2.16	WEAVER BALLY	3 - SUITABLE FOR PASSENGER CARS
33N39	2.29	GLENNISON GAP	2 - HIGH CLEARANCE VEHICLES
33N39	1.20	GLENNISON GAP	2 - HIGH CLEARANCE VEHICLES
33N39B	1.17	GLENNISON GAP	2 - HIGH CLEARANCE VEHICLES
33N39D	0.14	GLENNISON GAP	2 - HIGH CLEARANCE VEHICLES
33N42	0.42	MC KINZEY	2 - HIGH CLEARANCE VEHICLES
33N42	0.61	MC KINZEY	2 - HIGH CLEARANCE VEHICLES
33N42	0.93	MC KINZEY	2 - HIGH CLEARANCE VEHICLES
33N42A	0.18	MC KINZEY	1 - BASIC CUSTODIAL CARE (CLOSED)
33N73	0.15	GLENNISON DITCH	1 - BASIC CUSTODIAL CARE (CLOSED)
34N01Y	1.49	GARDEN GULCH	2 - HIGH CLEARANCE VEHICLES
34N01YC	0.50	GARDEN GULCH	1 - BASIC CUSTODIAL CARE (CLOSED)
34N05Y	1.17	MUSSER HOME SITE	2 - HIGH CLEARANCE VEHICLES
34N28	0.29	OLD COUNTY	1 - BASIC CUSTODIAL CARE (CLOSED)
34N28	0.34	OLD COUNTY	1 - BASIC CUSTODIAL CARE (CLOSED)
34N28B	0.43	OLD COUNTY	1 - BASIC CUSTODIAL CARE (CLOSED)
34N34	2.79	EAST BRANCH	2 - HIGH CLEARANCE VEHICLES
34N52Y	0.47	LONG GULCH	2 - HIGH CLEARANCE VEHICLES
34N52YA	0.85	LONG GULCH	2 - HIGH CLEARANCE VEHICLES
34N68	1.61	SIDNEY	1 - BASIC CUSTODIAL CARE (CLOSED)
34N68A	0.65	SIDNEY	1 - BASIC CUSTODIAL CARE (CLOSED)
34N77	0.81	CHINA	2 - HIGH CLEARANCE VEHICLES
34N77	0.06	CHINA	2 - HIGH CLEARANCE VEHICLES
34N77	1.04	CHINA	2 - HIGH CLEARANCE VEHICLES
34N82	0.46	MONUMENT	2 - HIGH CLEARANCE VEHICLES

34N82	0.56	MONUMENT	1 - BASIC CUSTODIAL CARE (CLOSED)
34N82A	0.56	MONUMENT	1 - BASIC CUSTODIAL CARE (CLOSED)
34N83	0.95	SIPHON	2 - HIGH CLEARANCE VEHICLES
34N95	0.70	MUSSER HILL	2 - HIGH CLEARANCE VEHICLES
34N95	3.57	MUSSER HILL	2 - HIGH CLEARANCE VEHICLES
34N95	0.89	MUSSER HILL	2 - HIGH CLEARANCE VEHICLES
34N95	0.29	MUSSER HILL	2 - HIGH CLEARANCE VEHICLES
34N95G	0.19	MUSSER HILL	1 - BASIC CUSTODIAL CARE (CLOSED)
34N96	0.35	LA GRANGE	2 - HIGH CLEARANCE VEHICLES
34N96	1.05	LA GRANGE	2 - HIGH CLEARANCE VEHICLES
34N96A	0.51	LA GRANGE	2 - HIGH CLEARANCE VEHICLES
Trail Access Road	2.35	JACKASS RIDGE	U - Unclassified
Total Miles	41.83		

BLM Roads

Road Name / Number	Miles	Area/Road Name	Maintenance Level
BLM 102	0.85	Weaver Creek Watershed	NA
BLM 105	0.07	South Ridge Rd	NA
BLM 106	0.23	Upper Democrat Gulch Rd	NA
BLM 106	0.09	Upper Democrat Gulch Rd	NA
BLM 106	0.11	Upper Democrat Gulch Rd	NA
BLM 106	0.38	Upper Democrat Gulch Rd	NA
BLM 106	0.01	Upper Democrat Gulch Rd	NA
BLM 107	0.51	Weaver Creek Watershed	NA
BLM 107	0.14	Weaver Creek Watershed	NA
BLM 107	0.57	Weaver Creek Watershed	NA
BLM 107	0.07	Weaver Creek Watershed	NA
BLM 107	0.18	Weaver Creek Watershed	NA
BLM 107	0.27	Weaver Creek Watershed	NA
BLM 107	0.02	Weaver Creek Watershed	NA

BLM 107	0.50	Weaver Creek Watershed	NA
BLM Road (No Name)	0.15	Weaver Creek Watershed	NA
BLM Road (No Name)	0.29	Weaver Creek Watershed	NA
BLM Road (No Name)	0.12	Weaver Creek Watershed	NA
BLM Road (No Name)	0.09	Weaver Creek Watershed	NA
BLM Road (No Name)	0.07	Weaver Creek Watershed	NA
BLM Road (No Name)	0.04	Weaver Creek Watershed	NA
BLM Road (No Name)	0.01	Weaver Creek Watershed	NA
BLM Road (No Name)	0.02	Weaver Creek Watershed	NA
BLM Road (No Name)	0.16	Weaver Creek Watershed	NA
BLM Road (No Name)	0.40	Weaver Creek Watershed	NA
BLM Road (No Name)	0.37	Weaver Creek Watershed	NA
BLM Road (No Name)	0.11	Weaver Creek Watershed	NA
BLM Road (No Name)	0.03	Weaver Creek Watershed	NA
BLM Road (No Name)	0.07	Weaver Creek Watershed	NA
BLM Road (No Name)	0.87	Weaver Creek Watershed	NA
BLM Road (No Name)	0.23	Weaver Creek Watershed	NA
BLM Road (No Name)	1.48	Weaver Creek Watershed	NA
BLM Road (No Name)	0.12	Weaver Creek Watershed	NA
BLM Road (No Name)	0.18	Weaver Creek Watershed	NA
BLM Road (No Name)	0.45	Weaver Creek Watershed	NA
BLM Road (No Name)	0.45	Weaver Creek Watershed	NA
BLM Road (No Name)	0.16	Weaver Creek Watershed	NA
BLM Road (No Name)	0.40	Weaver Creek Watershed	NA
BLM Road (No Name)	0.35	Weaver Creek Watershed	NA
BLM Road (No Name)	0.06	Weaver Creek Watershed	NA

Total Miles 10.65

Grand Total Miles 52.48

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Redding Field Office
6640 Lockheed Drive
Redding, CA 96002
www.blm.gov/office/redding-field-office

To Whom It May Concern,

The Bureau of Land Management (BLM), Redding Field Office writes this letter supporting the Watershed Research and Training Center (Watershed Center) project proposal for the CalTrans sediment reduction funding in the Weaver Creek watershed of the Trinity River. The Watershed Center has a record of success in partnering on projects with the BLM and other land management agencies. Their roads program is actively working in the Trinity County area to maintain and improve natural surface roads to reduce sediment loads and simultaneously protect sensitive habitats like streams.

The BLM supports the Watershed Center in this project proposal and will work collaboratively with the Watershed Center to execute these projects on BLM managed lands in the Weaver Creek watershed. This work directly supports the goals and objectives of the BLM in this area which are detailed in the Northwest California Integrated Resource Management Plan, including "SOIL-GO-08: Prioritize road maintenance activities to reduce sediment and promote resiliency to storm impacts, administrative and public use" and "WTR-MA-14: Where practicable, maintain/construct existing/new roads and trails to be "hydrologically invisible" with frequent drainage, surface runoff dispersal and appropriate surfacing".

If you have further questions, please reach out to Laura Brodhead, Assistant Field Manager for Recreation, at lbrodhead@blm.gov.

Sincerely,

Jennifer Mata
Field Manager

Forest Service

Shasta-Trinity National Forest
Supervisor's Office

3644 Avtech Parkway
Redding, CA 96002
530-226-2500
TDD: 530-226-2490

File Code: 2500
Date: March 17, 2025

Nick Goulette
Michelle Medley-Daniel
Executive Directors
Watershed Research and Training Center
PO Box 356
Hayfork, CA 96041

Letter of Support to Improve Roads in Impaired Watersheds of the North Coast Waterboard Region

Dear Mr. Goulette & Ms. Medley-Daniel,

The Shasta-Trinity National Forest promotes watershed restoration and road improvement work within our watersheds. We understand that WRTC is seeking funding from the Caltrans Sediment Reduction to complete the planned improvements which would be complimentary to the Forest's restoration objectives. Road improvement work proposed is in Rattlesnake Creek and Weaver Creek; both drain to the Trinity River Watershed of the Klamath River Basin.

These streams in these watersheds are on the impaired watershed 303d list in the North Coast Water Quality Control Board Region (Board). This work is required by the Board to reduce sedimentation and better meet Total Maximum Daily Loads Objectives and to meet direction of the Board under the Watershed Restoration Action Plan (WARP) of the North Coast Waterboards Order No. R1-2024-0021.

It is gratifying to have the opportunity to partner with our local WRTC cooperators that continually promote road improvement and watershed restoration within Forest boundaries. WRTC has successfully restored forest areas with diligent service over the last 30+ years.

Collaborative support is always stronger when we work together and connect our restoration efforts. We understand that WRTC is seeking funding from the Caltrans Sediment Reduction to complete the planned improvements and believe this type of a restoration effort would be complimentary to the Forest's restoration objectives.

We are hopeful that you will find this proposed work meaningful and important to protecting our many forest resources including water quality. If you have any questions or concerns, please contact Keli McElroy, Ecosystems Staff Officer at keli.mcelroy@usda.gov.

Sincerely,

RACHEL A. BIRKEY
Forest Supervisor

Project Scope Summary Report and Project Waste Load Reduction Analysis Report

Brookside Park Stormwater Capture Project

Version 1, March 2025

1.0 Project Scope

- Watershed: Upper Los Angeles River
- Reach Discharged: Arroyo Seco Channel
- Key Stakeholders: City of Pasadena; Unincorporated Los Angeles County
- Cost Estimate: $22.5M
- Type of Treatment System: Subsurface Storage Reservoir and Infiltration Gallery, Biofiltration

Brookside Park is a public park owned and operated by the City of Pasadena and is located within the Upper Los Angeles River (ULAR) watershed. Runoff within this corridor drains to a storm drain system managed by the City, the Arroyo Seco, the Los Angeles River and ultimately the Pacific Ocean. The drainage area for the project (1,165.84) acres) is located within the City of Pasadena (96.7%) and the County of Los Angeles (3.3%).

This project has the potential to address the additional needs for stormwater management identified to achieve compliance in the ULAR Watershed Management Program (WMP), as well as assist with water resilience, utilize nature-based processes, and provide multiple community benefits.

The Brookside Park Project objectives include:

Primary

- Improve the water quality within the Arroyo Seco and Upper Los Angeles River
- Reduce local and downstream flooding
- Restore/rehabilitate parking facilities on the project site

Secondary

- Supplement the Raymond Groundwater Basin and increase available water supply
- Educate the public on the local water supply and demands

The primary mechanisms by which the Project will achieve the primary objectives are through runoff/pollutant capture and infiltration. The storage will alleviate flooding during storm events. The excavation area will refresh an existing parking lot, providing improved pavement and new native vegetation, bioretention areas and new shade trees to treat surface runoff. Above ground recreational amenities are also being considered in the final design.

The ULAR Watershed is a largely built-out, urbanized watershed of approximately 485 square miles or 310,400 acres. One major tributary to the Upper Los Angeles River is the Arroyo Seco that drains multiple cities including portions of the City of Pasadena. The development of the Brookside Park Stormwater Capture Project in the ULAR watershed by the City of Pasadena represents an opportunity to continue the progress to achieve pollutant load reductions in the ULAR Watershed.

The ULAR WMP designated pollutants into three categories with the following descriptions:

- Category 1: Waterbody-pollutant combinations for which water quality-based effluent limitations and/or receiving water limitations are included in the MS4 Permits to implement TMDLs
- Category 2: Waterbody-pollutant combinations for which data indicate water quality impairment in the receiving water according to the State's Listing Policy and for which MS4 discharges may be causing or contributing to the impairment.
- Category 3: Waterbody-pollutant combinations for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable

receiving water limitations contained in this Order and for which MS4 discharges may be causing or contributing to the exceedance.

The Brookside Park Stormwater Capture project storm drains ultimately drain to the Arroyo Seco. **Table 1-1** displays the wet and dry weather waterbody-pollutant categories for the Arroyo Seco.

Table 1-1. Wet and Dry weather waterbody/pollutant categories

Category	Analyte	Weather Designation
1	Trash	---
	E. coli	Dry/Wet
	Cadmium	Wet
	Copper (Dissolved/Total)	Dry/Wet
	Lead (Dissolved/Total)	Dry/Wet
	Zinc (Dissolved/Total)	Wet
	Ammonia as N	Dry/Wet
	Nitrate as N	Dry/Wet
	Nitrite as N	Dry/Wet
	Nitrate-N and Nitrite-N	Dry/Wet
3	pH	Dry
	Benthic Macroinvertebrates	---
	Bis(2-ethylhexyl) Phthalate	Wet
	Mercury (Total)	Wet

Project Schedule

Figure 1-1 includes a summary of the project schedule.

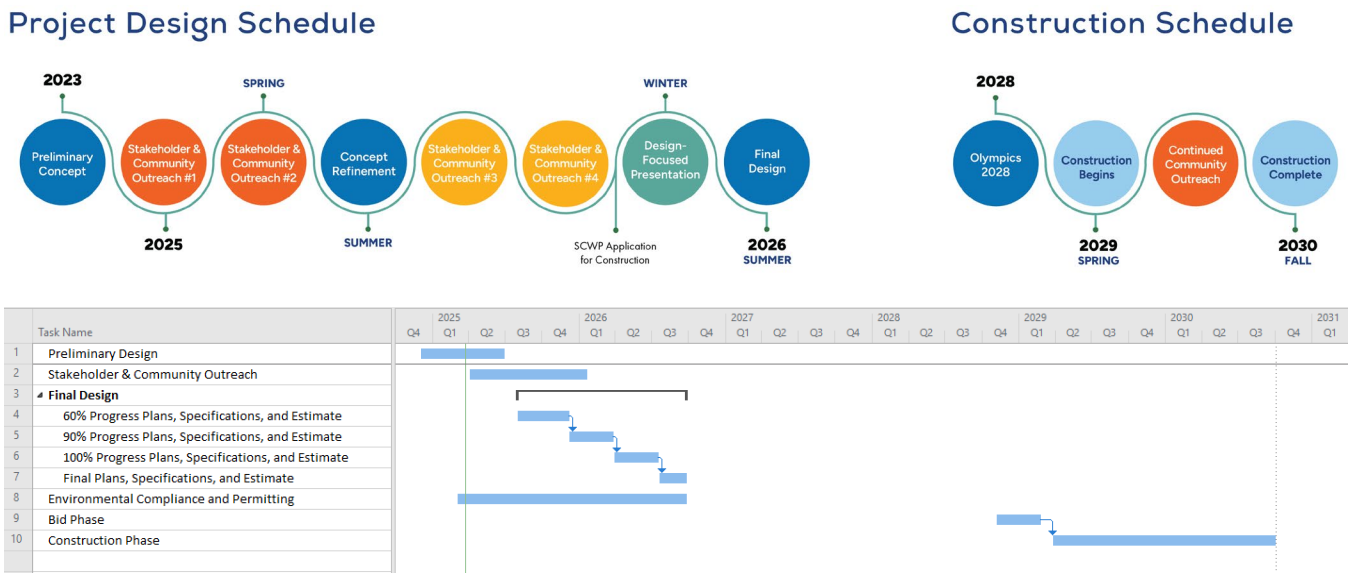


Figure 1-1. Project Schedule

Project Cost Estimate

Table 1-2 provides an estimated cost for the Brookside Park Stormwater Capture Project. The Construction Cost Estimate is a rough order of magnitude preliminary opinion of probable construction costs only. This estimate will be updated during detailed design as the project advances.

Table 1-2. Cost Estimate for Brookside Park Stormwater Capture Project.

Phase	Description	Cost
Planning	Feasibility Study	$100,000
Design	Final Design (30/60/90/100)	$1,813,787
Design	Public Outreach during Design	$50,000
Design	Environmental Planning (CEQA) and Permitting	$181,379
Design	Agency Management (Design)	$153,447
Construction	Construction Surveying	$20,000
Construction	Construction Cost	$18,137,869
Construction	Construction Administration and Design Support	$1,813,787
Construction	Agency Management (Construction)	$300,000
	Total	**$22,570,269**

Drainage Details

The site has the potential to provide significant water quality benefits for the City of Pasadena due to the drainage area size, location of the adjacent storm drain, and available development space. The drainage area for the project (1,166 acres) predominantly includes the City of Pasadena with a portion of Unincorporated Los Angeles County drainage as well. This project has the potential to offer runoff storage and water quality benefits for the City and can address the additional needs for stormwater management identified to achieve compliance in the WMP. The drainage area land cover has been summarized in **Table 1-3** and shown in the map in **Figure 1-2**.

Table 1-3. Land use characteristics of the contributing drainage area for Brookside Park Stormwater Capture Project (based on WMMS 2.0 Mapped HRUs layer).

Land Use Type	Percent of Total	Total Area (acres)
Commercial (Impervious)	1.0%	12.1
Industrial (Impervious)	1.0%	12.2
Institutional (Impervious)	4.3%	50.5
Residential (Impervious)	9.1%	106.0
Roads (Impervious)	12.6%	146.4
Roof (Impervious)	18.8%	219.1
Pervious	14.5%	169.5
Vegetation	38.6%	450.0
Total	**100%**	**1,165.8**

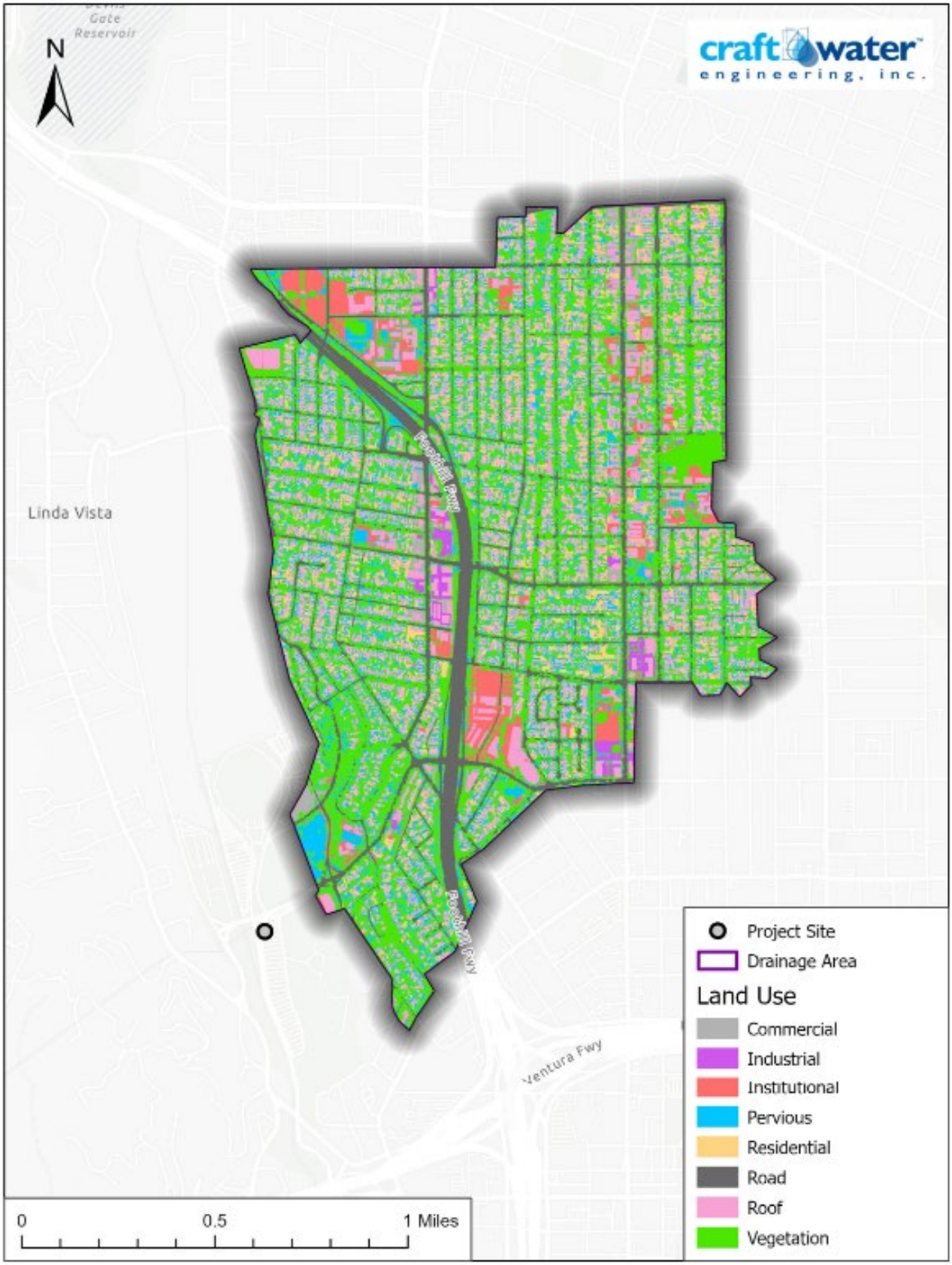


Figure 1-2. Land use characteristics of the contributing drainage area for Brookside Park

2.0 Approach

2.1 Models Used:

For this study, the regionally calibrated Los Angeles County Watershed Management Modeling System 2.0 (WMMS 2.0) was used within the Loading Simulation Program C++ (LSPC) to simulate the contaminant loading, runoff volume, and flow rate associated with a long-term, 10-year continuous time series (Water Year 2009 to Water Year 2018). The below schematic (**Figure 2-1**) illustrates how key hydrologic variables are simulated within LSPC. The most recent LSPC User Manual (Version 5.0) is available for download on the WMMS 2.0 website, which describes how interflow and groundwater are simulated. This model has been listed as an appropriate model for use in simulating current baseline loadings, required load reductions, and analysis of water quality outcomes of selected BMPs by the Los Angeles Regional Water Quality Control Board in their document, Guidelines For Conducting Reasonable Assurance Analysis in a Watershed Management Program. Specifically, WMMS 2.0 was used for this analysis to align with the model used in the revised Reasonable Assurance Analysis (RAA) submitted to the Los Angeles Regional Water Quality Control Board on June 30, 2021.

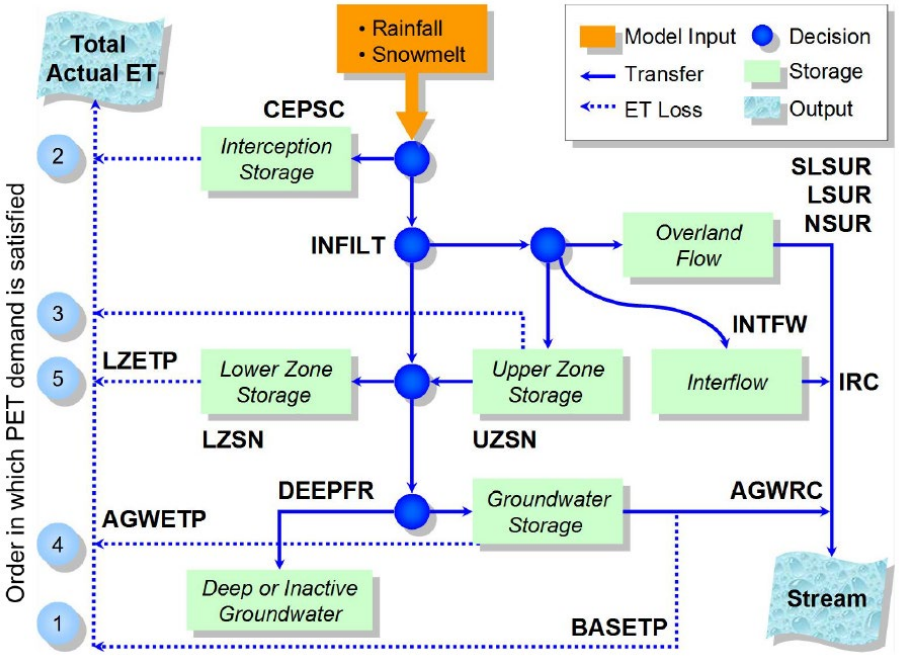


Figure 2-1. LSCP Model Flow Chart

A custom BMP model was used to improve upon certain modeling limitations in EPA's System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN). This custom model is grounded in the physical BMP representations used in SUSTAIN, and it provides built-in optimization algorithms to more systematically automate the process of evaluating many different BMP configurations to select a cost-effective solution related to project goals. The model was run using 10 years of runoff and pollutant loading time-series data generated by LSPC at an hourly time step. During this preliminary decision-support modeling, the discharge alternatives were simulated using certain site constraints to capture approximate BMP throughflow rates at the same time as varying the diversion rate and storage volume. These preliminary optimization model runs produced a point cloud from which the optimal cost-effectiveness curves were extracted. Subsequent targeted modeling then provided a clear decision pathway for the development of optimal project alternatives.

2.2 Assumptions & Limitations:

The assignment of Caltrans proportional baseline loadings and loading reductions from the total project baseline loading and loading reductions is based on the proportion of the pollutant contributions of the Caltrans-owned area to the total project pollutant baseline loading.

The LSPC model does not explicitly model all TMDL constituents including pesticides, PCBs, organic toxics, and trash. Included in the model and relevant to the applicable TMDLs are nutrients (Total Nitrogen and Total Phosphorus), sediment (Total Suspended Solids), and heavy metals (Cadmium, Copper, Lead, and Zinc). These constituents will be evaluated as they pertain to Caltrans-area contributions and proportional BMP reduction contributions at a future date.

2.3 Validate approach against Caltrans Statewide Permit and applicable RAA, WMP, and TMDL Staff Report:

The watershed modeling approach discussed herein is consistent with the models used to develop several of the applicable TMDLs as well as the WMP's Reasonable Assurance Analysis (RAA) for compliance strategies and planning. The watershed models utilized have been properly parameterized to accurately reflect physical conditions in the watershed and calibrated and validated against observed flow and monitoring data such that relevant statistics are considered satisfactory under the Los Angeles Regional Water Quality Control Board's RAA guidelines.

3.0 Baseline Hydrology and Water Quality

3.1 Scenarios Modeled

Design storm and long-term conditions were modeled for the Brookside Park Stormwater Capture Project since the waste load allocations (WLA) in the applicable TMDLs are derived from long-term observed and modeled timeseries. Documentation on the initial model conditions assumed and water quality calibration can be found in the WMP, which contains more information that further describes the model used and calibration approach. Each of the water quality constituents were individually parameterized in the model based on the watershed water quality calibration, so there are differences for each model based on the observed monitoring data. Model results for the baseline runoff and water quality to the project diversion have been summarized in the following subsections for average annual loadings to the project.

3.2 Baseline Results

Table 3-1 and **Table 3-2** summarize the baseline hydrology and relevant water quality results for the project regional drainage area under the long-term scenario and design storm critical conditions, respectively.

Table 3-1. WMMS 2.0 simulated long-term runoff, sediment, nutrients, and metals loads for the Brookside Park Stormwater Capture Project drainage area.

10-yr Long-Term Model	Baseline Loading
Runoff (ac-ft/yr)	264.66
TSS Load (ton/yr)	64.32
TZn Load (lbs/yr)	119.61
TN Load (lbs/yr)	1,209.54
TP Load (lbs/yr)	171.98
TCd Load (lbs/yr)	0.25

10-yr Long-Term Model	Baseline Loading
TCu Load (lbs/yr)	25.14
TPb Load (lbs/yr)	7.10

Table 3-2. 85th percentile design storm and 90th percentile bacteria storm runoff for the Brookside Park Stormwater Capture Project drainage area.

Storm Type	Drainage Area Characteristic	Brookside Park
85th Percentile 24-hour Design Storm	85th 24-hr Storm Peak Flow (cfs)	22.8
	85th 24-hr Storm Volume (ac-ft)	14.9
90th Percentile 24-hour Bacteria Storm	90th 24-hr Storm Depth	0.53
	90th 24-hr Storm Peak Flow (cfs)	3.16
	90th 24-hr Baseline Runoff Volume (ac-ft)	2.73

3.3 Discussion

Results of the baseline modeling represent the maximum possible pollutant reductions that could be achieved by the Brookside Park Stormwater Capture Project, however, capture for all runoff events is unlikely and only a portion of these baseline loads will be reduced. Different sizing scenarios are discussed below to demonstrate how much pollutant credit could be obtained for this project under different sizing scenarios.

4.0 Project Conditions

4.1 Scenarios Modeled

Design storm (85th percentile design storm and 90th percentile bacteria storm) and long-term conditions (WY 2009 to 2018) were modeled for the Brookside Park Stormwater Capture Project. The BMP performance under those three critical conditions is summarized in the following section.

4.2 Load Reductions for Mass-Based WLAs

Table 4-1. WMMS 2.0 simulated long-term runoff, sediment, nutrients, and metals load captured for the Brookside Park Stormwater Capture Project.

Category	Parameter	Results
Drainage Area	Drainage Area (ac)	1,165.84
BMP Sizing	Diversion Rate (cfs)	23
	Storage Size (ac-ft)	4.86
	Ponding Depth (ft)	6

Category	Parameter	Results
	Footprint (ac)	0.81
	Filter Discharge Rate (cfs)	5.76
	Infiltration Rate (in/hr)	1.26
85th Percentile Design Storm and Performance	85th Percentile Peak Flow Rate (cfs)	22.8
	85th Percentile Storm Volume (ac-ft)	14.9
	Volume Captured (ac-ft)	11.4
	Volume Infiltrated (ac-ft)	2.0
	Volume Filtered (ac-ft)	9.4
	Percent Capture of 85th Percentile Storm (%)	100
90th Percentile Bacteria Storm and Performance	90th Percentile Peak Flow Rate (cfs)	3.16
	90th Percentile Bacteria Storm Volume (ac-ft)	2.73
	Volume Captured (ac-ft)	2.73
	Volume Infiltrated (ac-ft)	1.99
	Volume Filtered (ac-ft)	0.00
	Percent Capture of 90th Percentile Bacteria Storm (%)	100
Long Term LSPC Time Series WY 2009 to 2018 (Baseline WMMS 2.0 Model)	Avg Annual Runoff (ac-ft)	264.66
	Avg Annual TSS (tons/yr)	64.32
	Avg Annual Total Zinc Load (lb/yr)	119.61
	Avg Annual Total Copper Load (lb/yr)	25.14
	Avg Annual Total Lead Load (lb/yr)	7.10
	Avg Annual Total Cadmium Load (lb/yr)	0.25
	Avg Annual Total Nitrogen Load (lb/yr)	1,209.54
	Avg Annual Total Phosphorus Load (lb/yr)	171.98
Long Term LSPC Time Series WY 2009 to 2018 (Baseline WMMS 2.0 Model) - Performance	Runoff Treated (ac-ft/yr)	173.2
	Runoff Treated by Infiltration (ac-ft/yr)	66.2
	Runoff Treated by Filtration (ac-ft/yr)	107.0
	Total Suspended Solids Reduction (ton/yr)	39.4
	Total Nitrogen Reduction (lb/yr)	769.4
	Total Phosphorus Reduction (lb/yr)	115.5
	Total Cadmium Reduction (lb/yr)	0.11
	Total Copper Reduction (lb/yr)	16.4
	Total Lead Reduction (lb/yr)	4.8
	Total Zinc Reduction (lb/yr)	73.5

4.2.1 Discussion

The results in **Table 4-1** summarize the design storm sizing credits and the average annual pollutant load reduction credits that is expected from this project.

5.0 Conclusions

5.1 Caltrans and non-Caltrans Credits

The analysis to split the credits will be completed at a future date. The current evaluation has looked at the overall impacts within the watershed and the splitting between agencies will be further analyzed in the upcoming design phases.

5.2 Final Thoughts

This Project represents a good opportunity for Caltrans to contribute to their overall pollutant reduction goals, but it is presently not quantified by specific pollutants. The full dry-weather capture and wet weather capture of the 85th percentile design storm from the 1,165.8 acre drainage area yields significant pollutant capture that can be shared between the City and Caltrans.

TECHNICAL MEMORANDUM

Date: October 22, 2024

From: CDM Smith TOS-58 Design Team

To: Fa Wichianchan, PE (wirikit.wichianchan@lacity.org)

Subject: Recommendation for Incorporation of Additional Work Areas for the Lankershim Blvd. Stormwater Improvements Project to Take Advantage of Caltrans Funding Opportunities

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Background

On March 6, 2024, members of the CDM Smith TOS-58 Design Team met with representatives of Caltrans District 7 in the district offices in downtown Los Angeles. CDM Smith was represented by Scott Dellinger, project manager, Michelle Ma, project engineer, and Lawrence Magura, project technical advisor. Caltrans District 7 was represented by Andy Liao, Chief of Stormwater and Landscape Architecture, Prakash Yadau, Hydraulics Section, and Kris Venkat, Maintenance Shop Supervisor.

The purpose of the meeting was to discuss ongoing concerns about the adequacy of Caltrans' stormwater collection and conveyance system in the vicinity of the Interstate 5 freeway and Lankershim Blvd. Caltrans has had to deal with two freeway closures at this location within the past year or so due to flooding on the freeway. During freeway flooding events, water overflowed from the City's right-of-way onto the Caltrans freeway, carrying significant amounts of debris and trash, greatly exacerbating the flooding problem on the freeway. Mr. Liao acknowledged that these problems were attributable to two primary factors: (1) the existing pump station was designed as part of the original design of the I-5 freeway back in 1959, and although it met design standards in place at that time, design standards have changed dramatically since then; and (2) extreme trash and debris accumulations from nearby homeless encampments that clog City storm drain inlets and conveyance pipes both inside and outside of the Caltrans right-of-way, forcing runoff to run directly onto the freeway. Caltrans maintenance staff have significantly increased the frequency of their trash pickup efforts in the area, but they acknowledged that they can't seem to get on top of this issue. During the meeting Caltrans staff noted that existing drainage problems are exacerbated by the limited capacity of the main culvert crossing under I-5 which has an adverse grade (probably at least partially due to a combination of poor design and settlement over time) which significantly reduces its discharge capacity to around 44.2 cfs, where the design capacity should be in the vicinity of 124.7 cfs. Excess flows have no place to go except back over the overpass at Lankershim and onto the freeway. During the meeting a third contributing cause was also agreed upon: the impacts of rapidly evolving climate change which results in much more frequent high-intensity precipitation events that produce runoff in excess of the existing system's design capacity. It was also acknowledged at the meeting that the current City drainage system on Lankershim Blvd near I-5 seemed to be at or near maximum capacity and cannot handle additional discharge from the freeway.

During the meeting, Mr. Liao noted that Caltrans has been internally discussing upgrading the 1959 vintage pumping station with new pumps of about the same capacity and adding a new 31,000 CF storage tank to increase the ability to manage higher peak inflows , but at present there are no detailed plans or schedule for when this project might be implemented. Mr. Liao also discussed Caltrans' ongoing Local MS4s & Caltrans Partnership Opportunities Program, which has been used to fund construction of several joint stormwater improvement projects with both the City and County of Los Angeles in recent years. Caltrans provides substantial funding for this program every budget cycle. When we briefed Mr. Liao and his team on the Lankershim stormwater improvement project, he agreed that extending the project to the north could be highly beneficial to both Caltrans and the city. It was noted that the Caltrans program covers construction costs only. The local participating municipality must cover all other project costs (design, environmental permitting, public involvement, etc.)

Based on recent discussions between the CDM Smith design team and the City of LA Bureau of Engineering, we have reviewed the following four potential alternatives for alleviating the flooding issues near the intersection of I-5 and Lankershim Blvd. These alternatives appear on Exhibit 1 to this technical memorandum.

Alternative #1 – No Action Alternative

Under this alternative, the existing project limits for the Lankershim Blvd. project would remain unchanged, and the existing periodic flooding would continue every time precipitation rates exceed the capacity of the existing Caltrans stormwater collection and conveyance system (both the inadequate pumping station capacity, and the deficient culvert under I-5).

Eventually, Caltrans will probably develop a design and funding package for upgrading the existing stormwater pumping station within the Caltrans right-of-way, which would partially alleviate flooding in the freeway corridor, but if the project includes an increase in the discharge from the pumping station onto Lankershim Blvd., this would significantly increase flooding in this area. Obviously, this is not a desirable situation which could conceivably lead to litigation between the two parties as well as impacted private parties, unless the proposed stormwater collection and conveyance improvements to Lankershim Blvd. were upsized and extended to accommodate this potential future flow contribution. Due to the complexities (and costs) associated with replacing or upgrading the existing inadequate culvert under I-5, Caltrans has not announced any plans at present to proceed with this option. Culvert reconstruction is a separate project from the proposed upgrade to the Lankershim pumping station. For these reasons, the No Action Alternative does not address either agency's needs or objectives.

If Caltrans, at some point, decided to proceed with upgrading the Lankershim pump station, the increased discharge onto Lankershim Blvd. would greatly exacerbate flooding conditions on the road. At present, CDM Smith's charge is to design stormwater conveyance system improvements based on *current conditions*, and not on what Caltrans might or might not do at some unknown future date.

A Rough Order of Magnitude (ROM) for Caltrans portion of the construction costs is approximately **$18,400,000**. No source of funds for this improvement has been identified at present, but Caltrans has several potential funding sources that could be utilized. This cost covers the increased size of storm drain to convey Caltrans flows, pretreatment and drywell costs for Caltrans flows, and associated roadway demo and restoration. To determine the portion of these costs which can be attributed to the increased flow from Caltrans, the total flow captured within the project area (431.1 cfs) was compared to the Caltrans flow volume (206.6 cfs) which showed that 48% of the total system flow is Caltrans flow. Using this calculation, 48% of the total costs of the mainline storm drain installation, excavation for storm drain installation and trench patching, and traffic control were designated as Caltrans costs. Additionally, certain items within the area north of the Lankershim Blvd and Tuxford St intersection were also determined to be Caltrans contributions. This includes the 20 drywells and associated excavation, the 175 linear feet of catch basins and associated curb and gutter demolition, 2 pretreatment units, and 2 catch basin diversion structures.

Alternative #2 – Extend Stormwater Collection and Conveyance System Northward to Lankershim Blvd. to Intercept Caltrans Discharge From I-5

This improvement would extend the northern limits of the existing CDM Smith project approximately 1000 LF to the southern edge of the Lankershim Blvd. overpass over I-5. This additional work would consist of approximately 1000 linear feet of additional 48-inch reinforced concrete pipe (RCP), catch basins and maintenance holes spaced at typical intervals, diversion structures, and relocation of some proposed stormwater treatment units and dry wells. This would allow the new Lankershim Blvd. stormwater improvements to collect and convey discharges from the existing Caltrans pumping station *and* the existing bypassing flows that go over the freeway on the existing Lankershim Blvd. overpass. A portion of the discharge would be diverted to treatment units and dry wells to meet project water quality goals (80% zinc reduction).

All costs for constructing this improvement would be funded by Caltrans from their Local MS4s & Caltrans Partnership Opportunities Program. A Rough Order of Magnitude (ROM) for these additional construction costs is approximately **$2,900,000.** This would bring the total Caltrans contribution to **$21,300,000** including costs for Alternative 1. In addition to the costs detailed in alternative 1, this alternative includes the cost of installing 1000 linear feet of 48” mainline storm drain, as well as the associated excavation and trench patching costs of the additional storm drain. The City of Los Angeles would be responsible for providing funding to the CDM Smith Team to cover all design, permitting, and contract administration costs. A Rough Order of Magnitude (ROM) for these additional costs to the City is approximately **$75,000** (assumes 4 additional design drawings).

Alternative #3 – Extend Stormwater Collection and Conveyance System Northeast on Tuxford St. To Pickup Caltrans Flows From the Existing Culvert Under I-5

This improvement would extend the Tuxford St. stormwater conveyance and collection system to the northeast to collect approximately 44.2 cfs of flow under existing conditions that is contributed

by the existing Caltrans culvert under I-5 which discharges to Tuxford St. at this location. Under existing conditions, this would require approximately 1300 linear feet of 36-inch RCP. These pipe sizes would need to be adjusted upwards if Caltrans decided to upgrade the culvert to handle the full 127 cfs design flow that could be delivered by the tributary watershed area. This alternative includes new catch basins and maintenance holes spaced at typical intervals, diversion structures, and potential relocation of stormwater treatment units and dry wells in this area. A portion of the discharge would be diverted to treatment units and dry wells to meet project water quality goals (80% zinc reduction).

All costs for constructing this improvement, if added to the additional CDM Smith Lankershim Blvd.project could be funded by Caltrans from their Local MS4s & Caltrans Partnership Opportunities Program. A Rough Order of Magnitude (ROM) for these additional construction costs is approximately **$3,000,000,** which would bringthe total Caltrans contribution to **$21,400,000** including costs for Alternative 1. In addition to the costs detailed in alternative 1, this alternative includes the cost of installing 1300 linear feet of 36" mainline storm drain, as well as the associated excavation and trench patching costs of the additional storm drain. The City of Los Angeles would be responsible for providing funding to the CDM Smith Team to cover all design, permitting, and contract administration costs. A Rough Order of Magnitude (ROM) for these additional costs to the City is approximately **$90,000** (assumes 5 additional design drawings).

Alternative #4 – Extend Stormwater Collection and Conveyance System on Lankershim Boulevard and Tuxford Steet (Combination of Alternatives 2 & 3)

This alternative combines all improvements from Alternatives 2 & 3 as described above. This would extend the stormwater collection and conveyance systems on Lankershim Blvd. and Tuxford St. to reduce flooding on both roadways caused by Caltrans discharges. Caltrans' Andy Liao, who is the responsible official at District 7 for approving Caltrans funding contributions under this program, has indicated to the CDM Smith design team that while he can never guarantee funding will be available when needed, he would nonetheless strongly endorse this alternative to solve the ongoing Caltrans-created flooding problems on Lankershim Blvd.

All costs for constructing this improvement could be funded by Caltrans from their Local MS4s & Caltrans Partnership Opportunities Program. A Rough Order of Magnitude (ROM) for these additional construction costs is approximately **$5,900,000** for a total Caltrans contribution of **$24,300,000** including costs for Alternative 1. In addition to the costs detailed in alternative 1, this alternative includes the cost of installing 1300 linear feet of 36" mainline storm drain, 1000 linear feet of 48" mainline storm drain, and the associated excavation and trench patching costs of the additional storm drain segments. The City of Los Angeles would be responsible for providing funding to the CDM Smith Team to cover all design, permitting, and contract administration costs. A Rough Order of Magnitude (ROM) for these additional costs to the City is approximately **$151,250** (assumes 9 additional design drawings).

Recommendation

Alternative #4 is clearly the preferred alternative for resolving the drainage and flooding problems at Lankershim Boulevard that are discussed in this technical memorandum. It is the only alternative that fully addresses both the worsening flooding impacts on I-5 at Lankershim Boulevard created by the deterioration and capacity problems with the existing Caltrans drainage system at this location, which are a source of considerable angst to Caltrans staff and the offsite impacts these drainage problems create for the Lankershim Boulevard project.

Closure

While Caltrans's Andy Liao is the action officer in Caltrans District 7 for the Caltrans's Local MS4s & Caltrans Partnership Opportunities program, he is only responsible for identifying potential partnership opportunities within his District and making appropriate recommendations to Caltrans headquarters in Sacramento for funding. He admitted that he also engages in lobbying within his agency for his recommended projects with some success. He also told us that since the proposed additional work at Lankershim Boulevard solves a major drainage problem for Caltrans, he was very optimistic about successfully obtaining funding approval for project construction.

Since Caltrans has just started a new fiscal year on July 1st, now is the preferred time to put together a funding request package to Caltrans for the Lankershim project before all available partnership funds have been obligated for this fiscal year. The CDM Smith team is available to work with BOE staff to assemble a funding request package for this expanded project. Furthermore, since the Lankershim project is now approaching the 50% design submittal stage, if BOE would increase our project scope and budget to incorporate these two additional work areas, we could merge this additional work into our existing work plans with minimal delay in our existing delivery dates. A detailed proposal for this additional work can be prepared quickly if requested by BOE.

TECHNICAL RESPONSE MEMORANDUM

Date: Feb 7, 2025

Introduction

This memorandum has been prepared as a clarification requested by City of Los Angeles (LASAN) - Safe Clean Water Implementation Division asking for a rough order of magnitude (ROM) estimate of the pollutant load removal that Caltrans will receive from the expanded Lankershim Boulevard Local Area Urban Flow Management Network Project. These pollutant loads are based on the first flush table shown within the technical response memo on Drainage Area Runoff Flow Clarification dated December 11, 2024. The rough pollutant load removal estimate serves as an initial basis for the Caltrans team to move forward with the next phase of discussion with LASAN on their funding contribution for project construction pending the submission of a new and expanded water quality report.

Caltrans Discharge Flow and Water Quality Assessment:

The pollutant table from *Caltrans 1999-2000 First Flush Study Report, June 2000* in the previous technical memo presents first flush roadway stormwater pollutant concentration data extracted from the District 7 report with actual data from 25 years ago (with some pollutants no longer being of concern, and with new ones such as PFAS which were not included in the analysis). This data provides perspective on the expected pollutant concentrations from Caltrans discharges to the Lankershim Boulevard Urban Flow Project. However, we recommend consulting with Caltrans District 7 staff and requesting any recent water quality data they may have collected from their operation of the Lankershim Boulevard Interstate 5 Pump Station. We also recommend obtaining information about pump run times and start-up/shut-off control sequencing/parameters to help determine the pump discharge flow rates and patterns of discharge for the pollutant loads attributable to Caltrans.

A new study specifically targeting the collection of additional stormwater quality data from the Caltrans Pump Station discharge flow is proposed to be included in the additional scope of work that CDM Smith has been requested to prepare for this project. This information will be utilized to help refine the water quality treatment approach for the project within the final designs.

The goal of the project is to capture and reduce 80% of zinc loads via dry well infiltration from the design storm event. Based on the runoff data from tributary areas FW-01, 02, 03, 05 and 06 shown in **Figure 1**, we have made a preliminary determination that an additional 19 dry wells will be required to capture 80% of the total runoff discharged from Caltrans Pump Station with a peak flow rate of 10.3 cubic feet per second. However, the designed

treatment flow rate would be determined by the actual pump discharge rate with the number of required dry wells adjusted accordingly. Surge flows that exceed the infiltration limits will be bypassed directly into the storm drain system or as part of surface runoff if the drainage system is already at capacity at the time the runoff appears.

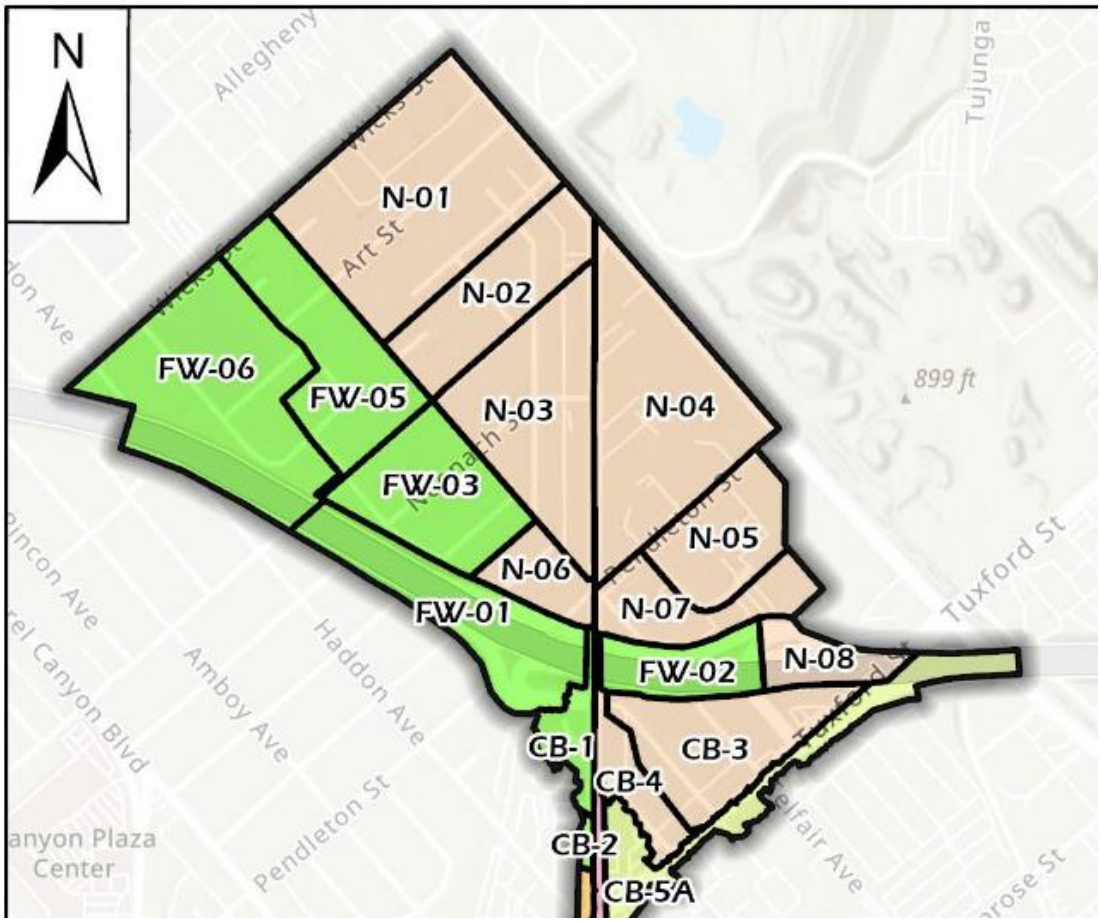


Figure 1, Caltrans runoffs being collected at the pump station (shown in Green)

(*from Craftwater Hydrology and Hydraulics Memo, November 6, 2023)*. No scale

Pollutant loading analysis performed by Craftwater simulates the contaminant loading, runoff volume, and flow rates associated with a long-term, 10-year continuous time series (Water Year 2008 to Water Year 2018), with an estimated annual runoff volume of 25.86 acre-feet per year for the "first flush" flow (the 85th percentile 24-hr design storms). Based on these flows, the pollutant goal of 80% zinc removal will capture an average of 14.02 pounds of zinc annually and require 19 additional dry wells. For total zinc removal (i.e. 96.4% removal) of the "first flush" flow, the estimated number of dry wells would increase to 37 as shown in **Table 1**.

Table 1 . WMS Outputs for an 85th Percentile 24-hr Design Storm (1.1 inches)

Catch Basin/ Subwatershed	Area (ac)	Imperviousness*	Time of Concentration (min)	Subwatershed Peak Flow (cfs)	Subwatershed Runoff (ac-ft)
FW-01	15.4	0.90	62	2.5	1.1
FW-02	7.1	0.90	29	1.7	0.5
FW-03	14.3	0.41	74	1.1	0.5
FW-05	16.4	0.42	90	1.2	0.6
FW-06	28.1	0.65	52	3.8	1.6
			Each Event:	10.3	4.3

Zinc removal with 19 dry wells:

Avg Ann Runoff (ac-ft/yr)	Avg Ann Zinc (lb/yr)	Avg Ann Zinc Rdx (lb/yr)	% Rdx
25.86	17.53	14.02	80.0%

Zinc removal with 37 dry wells:

Avg Ann Runoff (ac-ft/yr)	Avg Ann Zinc (lb/yr)	Avg Ann Zinc Rdx (lb/yr)	% Rdx
25.86	17.53	16.90	96.4%

Please note that the estimates for zinc removal provided from the original modeling work performed by Craftwater potentially understate actual zinc loadings if Caltrans completes the proposed modifications to the Caltrans Pump Station. They are included here to serve as initial pollutant load estimates only. Doubling these estimated loads should be considered as placeholders until the results of the proposed new modeling work become available.

Confirm Treatment Flows from Caltrans Discharge Contribution

During our meeting with Caltrans District 7 stormwater staff on March 6, 2024, we were made aware of Caltrans' preliminary plans to upgrade the Caltrans Pump Station capacity from the current 23 cfs to 46 cfs. Doubling of its discharge capacity along with increased wet well storage capacity, will significantly impact the pump operation and discharge patterns. At present, this project is in the early planning stages and has not been approved for design and construction. However, since Caltrans has made their plans known to us, we recommend consideration of these proposed plans in our designs for the expanded Lankershim Boulevard Urban Flow Project. The proposed storm drain conveyance system in Lankershim Boulevard will be sized to capture the additional 206.6 cubic feet per second peak flow, a 48% flow increase from tributary areas shown on **Table 2** for a 10-year 24-hr design storm event.

Table 2 . WMS Outputs for a 10-year 24-hr Design Storm (5.02 inches)

Catch Basin/ Subwatershed	Area (ac)	Time of Concentration (min)	Subwatershed Peak Flow (cfs)	Subwatershed Runoff (ac-ft)
FW-01	15.4	23	18.8	5.2
FW-02	7.1	11	12.4	2.4
FW-03	14.3	26	9.6	2.5
FW-05	16.4	30	10.1	3.0
FW-06	28.1	18	31.0	7.2
N-01	32.3	25	26.9	7.3
N-02	13.6	24	10.1	2.6
N-03	20.3	25	16.1	4.3
N-04	26.3	28	28.7	8.7
N-05	10.3	13	16.1	3.4
N-06	5.2	16	4.5	0.9
N-07	8.8	19	11.9	3.0
N-08	5.1	8	10.4	1.8
Caltrans	203.2		206.6	52.3
Total	**401.8**		**431.1**	**108.2**
	50.6%		47.9%	48.3%

Aside from the need to design an appropriate stormwater pretreatment system before infiltration, we also need to consider the impacts of receiving the Caltrans Pump Station discharges under both current and proposed future configurations. We also recommend considering the stormwater flow contributions from the Interstate 5 culvert as well as excess surface stormwater flows produced by runoff that cannot enter the culvert collection system due to debris blockage . Finally, we suggest assessing increased runoff from higher intensity precipitation events resulting from weather variability associated with climate change. In order to achieve these cumulative impacts, we suggest using a continuous simulation runoff model to determine peak runoff quantities within the revised piped drainage system. The stormwater collection system should be sized to convey the 85% runoff capture from the 10-year precipitation event. This type of modeling will be essential to evaluate the slug flow contributions from the Caltrans Pump Station under both existing and proposed conditions.

From a water quality modeling perspective, evaluation of Caltrans pollutant removal from the Caltrans Pump Station will require a detailed study of the impact of comingled contributions from adjacent residential areas (i.e. sub areas FW-06, FW-05, and FW-03) contributing to the freeway runoff impacting sub areas FW-06, FW-01 and FW-02. It is

anticipated that the pollutant load generated from the freeway will dominate the overall pollutant contributions from these subareas.

Without current water quality and flow data, it is extremely difficult to size and design an appropriate pretreatment system prior to infiltrating stormwater runoff within dry wells. A significant amount of additional data is needed to adequately consider the best pretreatment option and number of dry wells needed. In assessing “first flush” contributions, we recommend that a flow-paced automatic water quality sampling collection system be temporarily installed near the pump station outflow and at one other location (to be determined) within the watershed to specifically assess the pollutant loads attributable to Caltrans. Data should be collected and analyzed from a minimum of two storm events of a specified minimum size and intensity.

END

Ladera Heights – W Centinela Ave Green Improvement Project – Project Summary

Prepared for Caltrans Funding Partnership

1. **Project Scope:**
   The Ladera Heights – W Centinela Ave Green Improvement Project (Project) is located within public road right-of-way in the unincorporated community of Ladera Heights, within the Ballona Creek Watershed. The Project will improve water quality, increase local water supply through groundwater recharge, increase green infrastructure, and enhance the community.

   The Project will capture, treat, and infiltrate the 85th percentile, 24-hour storm event runoff volume of approximately 19.9 acre-feet of stormwater from a 357-acre tributary area of mostly residential and commercial land uses. The Project consists of diversion structures, pretreatment systems, dry wells, and flow through biofiltration systems. Above ground amenities include low impact development (LID) components, such as bioswales, drought-tolerant landscaping, permeable pavement, and interpretive signage. A preliminary breakdown of the project components is provided below and is subject to change.

Components	Quantities
Dry wells	77 EA
Diversion Structures	2 EA
Pre-Treatment Systems	15 EA
Biofiltration Units	19 EA
Bioswales	5 EA
Pervious Pavement	1760 LF

2. **Cost Estimate:**
   The total project budget is currently estimated to be $28 million, which includes a construction budget of $19.55 million. A preliminary breakdown of project costs is provided below and is subject to change.

Description	Cost
Construction	$ 19,550,000
Design Plans and Specifications	$ 2,356,000
Consultant Services (CEQA, Investigations, Monitoring)	$ 2,385,000
Miscellaneous	$ 131,000
Jurisdictional Approvals	$ 195,000
County Services (Contract Administration, Project Management)	$ 3,060,000
Total:	**$ 27,677,000**

3. **Project Schedule:**
   The Project is currently in the planning phase, and design is slated to start by summer 2025. Construction of the Project is estimated to be finalized in the fourth quarter of 2029. A preliminary breakdown of project schedule is provided below and is subject to change.

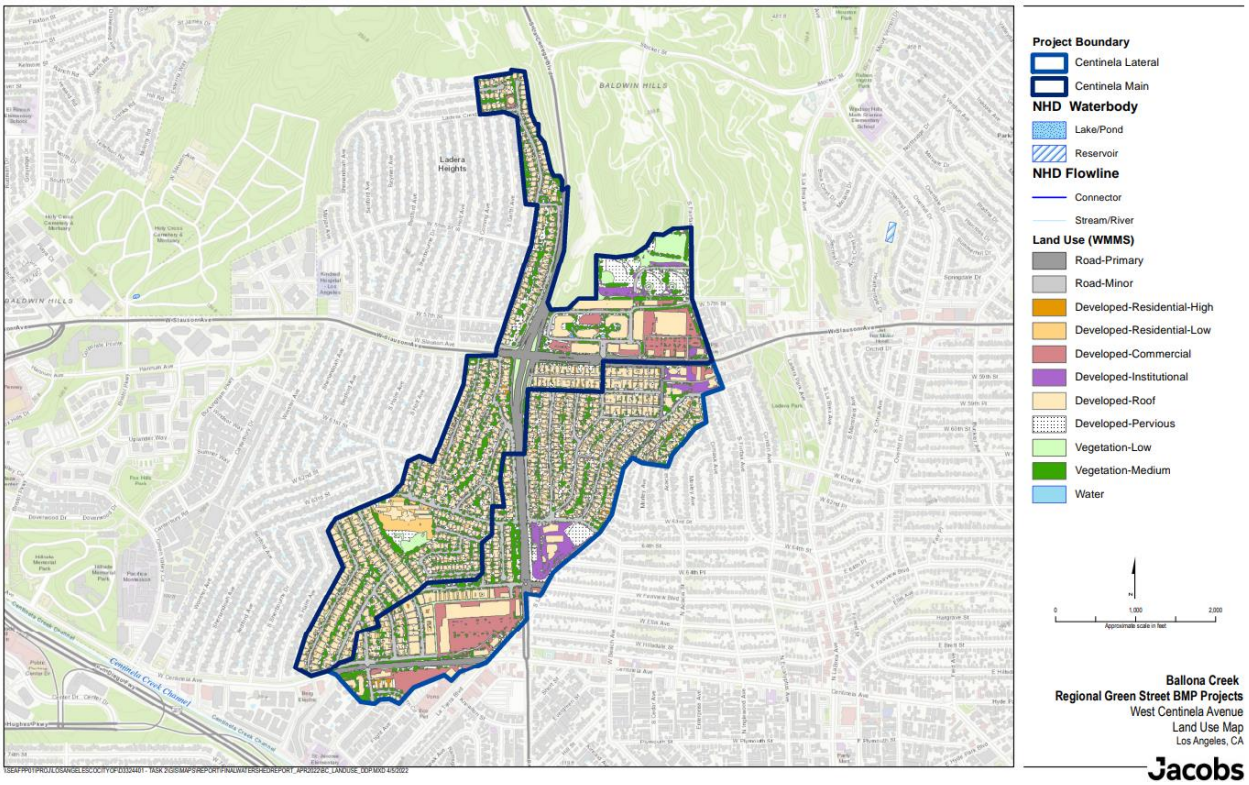
Task	Milestone Date
PCR Completion	June 2025
Complete Design	January 2027
Construction Contract Award	July 2027
Construction Start	October 2027
Construction End	June 2029

4. **Pollutant Reduction Analysis:**
   The Project's potential water quality benefits and pollutant load reductions were evaluated using Los Angeles County's Watershed Management Modeling System, version 2 (WMMS2). Based on an average annual rainfall year, the Project is estimated to treat up to 134 acre-feet of stormwater annually and remove approximately 96 pounds of zinc each year. The table below summarizes the estimated average annual pollutant capture over a 10-year simulation period for wet-weather events within the Project drainage area.

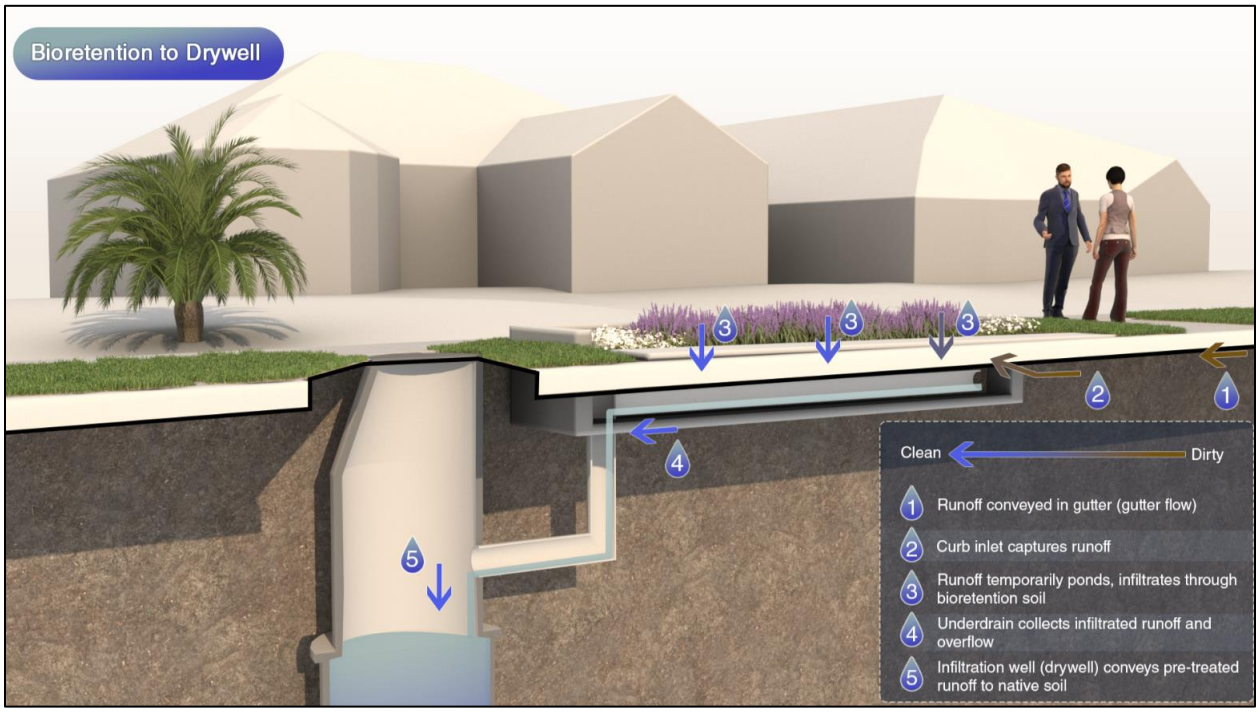
BMP Type	Volume Captured (ac-ft)	TSS (tons/yr)	Copper (pounds/yr)	Lead (pounds/yr)	Zinc (pounds/yr)
Infiltration BMPs	134.83	18.87	22.37	4.77	96.16

5. **Drainage Map:**
   The total tributary drainage area of the project is 357 acres and consists of mixed land uses as shown in Table below. The primary land use within the project drainage area is single-family residential. Other land uses include commercial properties (large retail parking), major arterials, open space, parking, and some multi-family residences.

Land Use Type [a]	Drainage Area (acres)	Impervious Area (acres)	Percent of Total Impervious Acreage
Developed – Commercial	20.7	20.7	6%
Developed – Institutional	8.5	8.5	2%
Developed – Pervious	65.6	0.0	0%
Developed – Residential-High	2.9	2.9	1%
Developed – Residential-Low	19.9	19.9	6%
Developed – Roof	98.7	98.7	28%
Road – Minor	41.4	41.4	12%
Road – Primary	26.2	26.2	7%
Vegetation – Low	19.5	0.0	0%
Vegetation – High	53.2	0.0	0%
Water	0.1	0.1	0%
Total	357	218	61%



6. **Project Renderings:**
   Graphic rendering of the proposed BMPs are provided below.



July 14, 2025

Hardeep Takhar, Chief Environmental Engineer
California Department of Transportation
1120 N Street
P.O. Box 942873, MS-27
Sacramento, CA 95814
hardeep.s.takhar@dot.ca.gov

Subject: Final Approval for Full Trash Capture Device Installations Implemented per the Cooperative Agreement Partnership between the City of Oakland and California Department of Transportation

Dear Mr. Takhar:

Consistent with the requirements of the Department of Transportation's (Caltrans or Department) Statewide NPDES Municipal Stormwater Permit (Order No. 2022-0033-DWQ) (Permit) and the Statewide Trash Amendments to the Water Quality Control Plans for Ocean Waters and for Inland Surface Waters, Enclosed Bays, and Estuaries, Caltrans must control discharges of trash from significant trash generating areas (STGAs) of its right-of-way (ROW) by no later than 2030. The San Francisco Bay Regional Water Quality Control Board (San Francisco Bay Water Board) regulates Caltrans trash discharge through Cease and Desist Order (CDO) (Order No. R2-2019-0007 as amended by R2-2021-0030).

Under CDO provision 1, Caltrans may coordinate installation of trash devices with municipalities as follows:

> *The Regional Water Board commits to working with the Department to identify opportunities for cooperative projects with local municipalities to implement trash controls. To the extent possible, the Department will prioritize cooperative projects with disadvantaged communities.*

Under CDO provision 5.c.i, Caltrans may claim alternative compliance credits through demonstration of infeasibility:

> *If the Department and Regional Water Board agree that it is infeasible to implement trash controls sufficient to reach full trash capture equivalency within significant trash generating portions of ROW or in areas managed by municipalities or local agencies to which trash from Department ROW is discharged, or other trash control projects within watersheds that reduce trash discharges from Department ROW, the Department may seek alternative compliance credits. Two acres of local ROW or watershed area treated will yield one acre of alternative compliance credit based on similar trash*

generation rating, i.e., the non-Department ROW treated area must be of equivalent trash generation to the ROW determined to be infeasible to treat.

On June 3, 2025, Caltrans submitted a request for final approval of the multi-pollutant removal full trash capture device installations, which have been implemented by the cooperative agreement partnership between Caltrans and the City of Oakland (City). Caltrans will generate trash control compliance credit from the installation of two certified full trash capture devices, as described in Table 1, below. Caltrans is also requesting the alternative compliance credits be granted which were approved early in the concept phase to substantiate the Caltrans allocation to fully fund the capital and support costs of the projects.

Table 1 – Trash Control Compliance Summaries

No.	Project Location	Total Area Treated (Acres)	Caltrans Area Treated (Acres)	Device Type
1	Mandela Parkway	626	31	DSBB[1]
2	Cary Ave	777	38	DSBB
3	Alternative Compliance Credit[2]	-	200	-

Polychlorinated Biphenyls (PCBs) and Mercury Total Maximum Daily Load (TMDL) Credit

Caltrans will generate waste load reduction compliance credit from the installation of the two full trash capture devices, as described in Table 2, associated with the San Francisco Bay Water Board PCBs and mercury TMDLs. The Caltrans NPDES Permit allows an acreage credit of three times the credit recognized for Caltrans funded regional partnership projects that reduce PCB and Mercury loading in old urban and industrial areas.

Table 2 – Mercury & PCB Compliance Summaries

No.	Project Location	Caltrans Area Treated (Acres)	Removal Efficiency	3X Credit for Old Urban & Industrial Land Use	Mercury & PCB Credit (Acres)
1	Mandela Parkway	31	20%	X3	18.6
2	Cary Ave	38	20%	X3	22.8
3	Additional	-	-	-	88

The Department confirmed the following information, as requested in the concept phase, has been developed and will be provided upon request:

1. Final design plans;
2. Documentation (maps showing both Association of Bay Area Governments (ABAG) landuse layers and the treated drainage area) confirming that the treated area is old industrial landuse.
3. Hydraulic calculations showing that full trash capture devices are appropriately sized

[1] Debris separating baffle box (DSBB) or gross solids removal device (GSRD)
[2] Demonstration of infeasibility to be provided in the FY 2025 CDO Annual Report.

to the 1-year and 1-hour storm standard;

4. Final project agreements between Caltrans and the City of Oakland; and
5. Identification of the party responsible for ongoing operation and maintenance of the full trash capture devices.

Based on the information provided, the San Francisco Bay Water Board approves the reported trash control and TMDL load reduction credits from the installation of two full trash capture devices in the City Oakland. This is a step towards meeting Caltrans trash discharge CDO compliance benchmarks and waste load reduction requirements in the San Francisco Bay area. Alternative compliance credit will only be granted toward CDO benchmark acreages in areas where Caltrans demonstrates infeasibility of both structural and non-structural trash controls within its ROW due to safety, maintenance, accessibility, or other justifiable reasons. The Department must exhaust all treatment opportunities within its ROW through structural controls or enhanced maintenance, or off its ROW through cooperative implementation projects that treat discharges from its ROW. The San Francisco Bay Water Board will work separately with Caltrans to determine the appropriate application of alternative compliance credits based on the corridor-based trash control feasibility assessments that are currently in progress.

If you have any questions regarding this approval, please contact Qi Yan at (510) 622-2329 or via email to Qi.Yan@waterboards.ca.gov

Sincerely,

Eileen M. White

Eileen M. White, P.E.
Executive Officer
San Francisco Bay Water Board

Cc (by email only)

Ken Johansson, Statewide Stormwater Program Manager ken.johansson@dot.ca.gov
Jagjiwan Grewal, Supervising Transportation Engineer Jagjiwan.Grewal@dot.ca.gov
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CALIFORNIA Water Boards

GAVIN NEWSOM
GOVERNOR

YANA GARCIA
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Sent via email – no hard copy to follow.

August 21, 2025

California Department of Transportation
Attn. Hardeep Takhar, Chief Environmental Engineer
1120 N Street
P.O. Box 942873, MS-27
Sacramento, CA 95814
hardeep.s.takhar@dot.ca.gov

Subject: Conceptual Approval of Multi-benefit Cooperative Agreement with City of Oakland; Trash Discharge Cease & Desist Order and Statewide Municipal Stormwater Permit, California Department of Transportation

Dear Mr. Takhar:

Consistent with the requirements of the Department of Transportation's (Caltrans' or Department's) Statewide NPDES Municipal Stormwater Permit (Order No. 2022-0033-DWQ) (Permit) and the Statewide Trash Amendments to the Water Quality Control Plans for Ocean Waters and for Inland Surface Waters, Enclosed Bays, and Estuaries, Caltrans must control discharges of trash from significant trash generating areas (STGAs) of its right-of-way (ROW) by no later than 2030. The San Francisco Bay Regional Water Quality Control Board (Water Board) also regulates Caltrans trash discharges through Cease and Desist Order (CDO) (Order No. R2-2019-0007 as amended by R2-2021-0030).

CDO provision 1 allows Caltrans to coordinate trash device installation with municipalities as follows:

> *The Regional Water Board commits to working with the Department to identify opportunities for cooperative projects with local municipalities to implement trash controls. To the extent possible, the Department will prioritize cooperative projects with disadvantaged communities.*

CDO provision 5.c.i allows Caltrans to claim alternative compliance credits through demonstration of infeasibility:

> *If the Department and Regional Water Board agree that it is infeasible to implement trash controls sufficient to reach full trash capture equivalency within significant trash generating portions of ROW or in areas managed by municipalities or local agencies to which trash from Department ROW is discharged, or other trash control projects within watersheds that reduce trash discharges from Department ROW, the Department may seek alternative*

compliance credits. Two acres of local ROW or watershed area treated will yield one acre of alternative compliance credit based on similar trash generation rating, i.e., the non-Department ROW treated area must be of equivalent trash generation to the ROW determined to be infeasible to treat.

On July 21, 2025, Caltrans requested conceptual approval of full trash capture device installations that are under consideration for implementation via cooperative agreement partnerships between Caltrans and the City of Oakland (City). Caltrans will generate trash control compliance credit from the installation of three certified full trash capture devices, as described in Table 1, below. Caltrans is also requesting conceptual approval for alternative compliance credits to be granted toward CDO benchmark acreages in areas where Caltrans demonstrates infeasibility of implementing trash controls.

Table 1 – Trash Control Compliance Summaries

No.	Project Location	Total Area Treated (Acres)	Caltrans Area Treated (Acres)	Device Type
1	45th & San Leandro	1,679	66	DSBB[1]
2	47th & UPRR	751	33	DSBB
3	G & 85th	802	7	DSBB
4	Alternative Compliance Credit[2]	-	350	-

[1] Debris-separating baffle box (DSBB) or gross solids removal device (GSRD)

[1] Demonstration of infeasibility to be provided in the FY 2025 CDO Annual Report.

Alternative Compliance Credit

Alternative compliance credit will only be granted toward CDO benchmark acreages in areas where Caltrans demonstrates infeasibility of both structural and non-structural trash controls within its ROW due to safety, maintenance, accessibility, or other justifiable reasons. Prior to alternative compliance credit being granted, the Department must exhaust all trash control opportunities within its ROW through structural controls or enhanced maintenance, or off its ROW through cooperative implementation projects that treat discharges from its ROW. Ultimately, Caltrans cannot offset the discharge of trash from STGAs by controlling trash from non-Caltrans ROW or non-STGAs unless trash control opportunities within Caltrans ROW have been fully evaluated, identified, documented, and deemed infeasible.

The Water Board is giving our conceptual approval of the three projects shown in Table 1, conditioned on submittal of the following information by the City and/or Caltrans once project planning and design are finalized, and prior to construction:

- Map(s) delineating the area draining to the trash capture devices. Maps should identify the areas and trash generation rating of Caltrans and municipal ROW to be controlled for trash by the device.
- Documentation (maps showing both ABAG land use layers and the treated drainage area) confirming that the treated area is old industrial land use.
- Final design plans and calculations, including a breakdown of Caltrans and City ROW acres controlled by the devices and the areas' trash generation rating(s).

- Confirmation that the device meets the requirements of Municipal Regional Stormwater NPDES Permit (MRP) (Order No. R2-2022-0018, as amended) Provision C.10 and is on the State Board list of approved trash capture devices.
- Final project agreements between Caltrans and the City. These should include identification of the party responsible for ongoing operation and maintenance of the device once installed. If operation/maintenance responsibilities are not described in the final agreements, provide this information in a separate document.

Polychlorinated Biphenyls (PCBs) and Mercury Total Maximum Daily Load (TMDL) Credit

Caltrans will generate waste load reduction compliance credit from the installation of the three certified full trash capture devices, as described in Table 2, associated with the Water Board's PCBs and mercury TMDLs. The Caltrans NPDES Permit allows an acreage credit of three times the credit recognized for Caltrans-funded regional partnership projects that reduce PCB and mercury loading in old urban and industrial areas.

Table 2 – Mercury & PCBs Compliance Summaries

No.	Project Location	Caltrans Area Treated (Acres)	Removal Efficiency	3X Credit for Old Urban & Industrial Land Use	Mercury & PCB Credit (Acres)
1	45th & San Leandro	66	20%	X3	39.6
2	47th & UPRR	33	20%	X3	19.8
3	G & 85th	7	20%	X3	4.2
4	Additional				Up to 190

The Water Board will work with Caltrans to determine appropriate PCBs and mercury TMDL reduction crediting toward their respective stormwater NPDES permit requirements based on the land uses within the treatment catchment, supporting information documenting PCBs concentrations/loads in the contributing catchment, and removal efficiencies of the installed devices. As all three trash control units will be receiving runoff from over 3,000 acres of tributary drainage area, additional documentation about the facility capacity and pollutant removal efficiency will be necessary for determining the PCBs and mercury compliance credits. Specifically, the following information should be provided when project construction is completed:

1. Design plans showing these large facilities are appropriately sized to the 1-year and 1-hour storm standard, and there is no significant bypass during high flow events.
2. Documentation demonstrating PCBs concentrations/loads in the contributing catchment and verifying PCBs removal efficiency as at least 20 percent for all trash control measures; this can be addressed by stormwater sampling of PCB concentrations in the influent and outflow of runoff treated by the trash capture devices.

We appreciate Caltrans' significant engagement with Bay Area municipalities to develop multi-benefit trash control solutions that also provide PCBs and mercury load reduction benefits. However, Caltrans should continue to maximize on-system and/or offsite

implementation of green stormwater infrastructure in old industrial areas as the primary compliance strategy for PCBs and mercury TMDL compliance. We will meet with Caltrans separately to discuss Caltrans compliance strategies for meeting PCBs and mercury load reduction requirements.

Based on the information provided, Water Board staff believes these projects will contribute toward Caltrans demonstration of compliance with the trash discharge CDO and PCBs and mercury control requirements. We will work separately with Caltrans to determine the appropriate application of alternative compliance credits based on the corridor-based trash control feasibility assessments that are currently in progress.

If you have any questions regarding this approval, please contact Qi Yan at (510) 622-2329 or via email to Qi.Yan@waterboards.ca.gov.

Sincerely,

Digitally signed by Keith H. Lichten, Division Manager
Date: 2025.08.21 15:35:40 -07'00'

Water Boards

Keith H. Lichten, P.E.
Division Manager

cc (by email):
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CALIFORNIA Water Boards

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SECRETARY FOR
ENVIRONMENTAL PROTECTION

Sent via email: no hard copy to follow

August 21, 2025

California Department of Transportation
Attn. Hardeep Takhar, Chief Environmental Engineer
1120 N Street
P.O. Box 942873, MS-27
Sacramento, CA 95814
hardeep.s.takhar@dot.ca.gov

Subject: Conceptual Approval of Multi-benefit Cooperative Agreement with City of Richmond; Trash Discharge Cease & Desist Order and Statewide Municipal Stormwater Permit, California Department of Transportation

Dear Mr. Takhar:

Consistent with the requirements of the Department of Transportation's (Caltrans' or Department's) Statewide NPDES Municipal Stormwater Permit (Order No. 2022-0033-DWQ) (Permit) and the Statewide Trash Amendments to the Water Quality Control Plans for Ocean Waters and for Inland Surface Waters, Enclosed Bays, and Estuaries, Caltrans must control discharges of trash from significant trash generating areas (STGAs) of its right-of-way (ROW) by no later than 2030. The San Francisco Bay Regional Water Quality Control Board (Water Board) also regulates Caltrans trash discharge through Cease and Desist Order (CDO) (Order No. R2-2019-0007, as amended by R2-2021-0030).

CDO provision 1 allows Caltrans to coordinate trash device installation with municipalities as follows:

> *The Regional Water Board commits to working with the Department to identify opportunities for cooperative projects with local municipalities to implement trash controls. To the extent possible, the Department will prioritize cooperative projects with disadvantaged communities.*

CDO provision 5.c.i allows Caltrans to claim alternative compliance credits through demonstration of infeasibility:

> *If the Department and Regional Water Board agree that it is infeasible to implement trash controls sufficient to reach full trash capture equivalency within significant trash generating portions of ROW or in areas managed by municipalities or local agencies to which trash from Department ROW is discharged, or other trash control projects within watersheds that reduce trash discharges from Department ROW, the Department may seek alternative*

compliance credits. Two acres of local ROW or watershed area treated will yield one acre of alternative compliance credit based on similar trash generation rating, i.e., the non-Department ROW treated area must be of equivalent trash generation to the ROW determined to be infeasible to treat.

On July 22, 2025, Caltrans submitted a request for final approval of the multi-pollutant removal full trash capture device installations, which have been implemented by the cooperative agreement partnership between Caltrans and the City of Richmond (City). Caltrans will generate trash control compliance credit from the installation of four certified full trash capture devices, as described in Table 1, below. Caltrans is also requesting conceptual approval for alternative compliance credits to be granted toward CDO benchmark acreages in areas where Caltrans demonstrates infeasibility of implementing trash controls.

Table 1 – Trash Control Compliance Summaries

No.	Project Location	Total Area Treated (Acres)	Caltrans Area Treated (Acres)	Device Type
1	Burlingame & Montgomery St.[a]	81	16	TBD
2	S 51st St & Bayview Ave.[a]	63	28	TBD
3	700 W Cutting Blvd.[a]	196	23	TBD
4	7th St.[b]	159	0	GSRD[1]
5	Alternative Compliance Credit[2]	-	100	-

[a] 10 acres of duplicative Caltrans operational structural control treatment has been identified through the screening process.

[b] The 7th St. GSRD is an existing device that has already been installed in the City. Due to frequent vandalism, the device is currently non-operational. The goal of including this site is to work with Caltrans to redesign and repair the GSRD, including additional fencing and/or other measures to prevent future vandalism.

[1] Debris-separating baffle box (DSBB) or gross solids removal device (GSRD)

Alternative Compliance Credit

Alternative compliance credit will only be granted toward CDO benchmark acreages in areas where Caltrans demonstrates infeasibility of both structural and non-structural trash controls within its ROW due to safety, maintenance, accessibility, or other justifiable reasons. Prior to alternative compliance credit being granted, the Department must exhaust all treatment opportunities within its ROW through structural controls or enhanced maintenance, or off its ROW through cooperative implementation projects that treat discharges from its ROW. Ultimately, Caltrans cannot offset the discharge of trash from STGAs by controlling trash from non-Caltrans ROW or non-STGAs unless trash opportunities within Caltrans ROW are fully evaluated, identified, documented, and deemed infeasible.

The Water Board is giving our conceptual approval of the four projects shown in

[1] Gross Solids Removal Device (GSRD)

[2] Demonstration of infeasibility to be provided in the FY 2025 CDO Annual Report.

Table 1, conditioned on submittal of the following information by the City and/or Caltrans once project planning and design are finalized, and prior to construction:

- Map(s) delineating the area draining to the trash capture devices. Maps should identify the areas and trash generation rating of Caltrans and municipal ROW to be controlled for trash by the device.
- Documentation (maps showing both ABAG land use layers and the treated drainage area) confirming that the treated area is old industrial land use.
- Final design plans and calculations including a breakdown of Caltrans and City ROW acres controlled by the devices and the trash generation rating of those areas.
- Confirmation that the device meets the requirements of MRP Provision C.10 and is on the State Board list of approved trash capture devices.
- Final project agreements between Caltrans and the County. These should include identification of the party responsible for ongoing operation and maintenance of the device once installed. If operation/maintenance responsibilities are not described in the final agreements, provide this information in a separate document.

Polychlorinated Biphenyls (PCBs) and Mercury Total Maximum Daily Load (TMDL) Credit

Caltrans will generate waste load reduction compliance credit from the installation of the four certified full trash capture devices, as described in Table 2, associated with the Water Board's San Francisco Bay PCBs and mercury TMDLs. The Caltrans NPDES Permit allows an acreage credit of three times the credit recognized for Caltrans-funded regional partnership projects that reduce PCB and mercury loading in old urban and industrial areas.

Table 2 – Mercury & PCB Compliance Summaries

No.	Project Location	Caltrans Area Treated (Acres)	Removal Efficiency	3X Credit for Old Urban & Industrial Land Use	Mercury & PCB Credit (Acres)
1	Burlingame & Montgomery St.	16	20%	X3	9.6
2	S 51st St & Bayview Ave.	28	20%	X3	16.8
3	700 W Cutting Blvd.	23	20%	X3	13.8
4	7th St.	0	-	-	0
5	Additional	-	-	-	Up to 50

We will work with Caltrans to determine appropriate PCBs and mercury TMDL reduction crediting toward their respective stormwater NPDES permit requirements based on the land uses within the treatment catchment, supporting information documenting PCBs concentrations/loads in the contributing catchment, and removal efficiencies of the installed devices. Specifically, the following information should be provided when project

construction is completed:

1. Design plans showing these large facilities are appropriately sized to the 1-year and 1-hour storm standard, and there is no considerable bypass during high flow events.
2. Documentation demonstrating PCBs concentrations/loads in the contributing catchment and verifying PCBs removal efficiency as at least 20 percent for all trash control measures; this can be addressed by stormwater sampling of PCB concentrations in the influent and outflow of runoff treated by the trash capture devices.

We appreciate Caltrans' significant engagement with Bay Area municipalities to develop multi-benefit trash control solutions that also provide PCBs and mercury load reduction benefits. However, Caltrans should continue to maximize on-system and/or offsite implementation of green stormwater infrastructure in old industrial areas as the primary compliance strategy for PCBs and mercury TMDL compliance. We will meet with Caltrans separately to discuss Caltrans compliance strategies for meeting PCBs and mercury load reduction requirements.

Based on the information provided, San Francisco Bay Water Board staff believes these projects will contribute toward Caltrans demonstration of compliance with the trash discharge CDO and PCB and mercury pollutant control requirements. The San Francisco Bay Water Board will work separately with Caltrans to determine the appropriate application of alternative compliance credits based on the corridor-based trash control feasibility assessments that are currently in progress.

If you have any questions regarding this approval, please contact Qi Yan at (510) 622-2329 or via email to Qi.Yan@waterboards.ca.gov.

Sincerely,

Digitally signed by Keith H. Lichten, Division Manager
Date: 2025.08.21 15:43:33 -07'00'

Water Boards

Keith H. Lichten, P.E.
Division Chief

cc (via email):

Caltrans

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