Federal Lands Permit

Attachment C1
Supplemental Monitoring and Reporting Program Findings

This attachment contains Supplemental Monitoring and Reporting Findings pertaining to 1) Federal Best Management Practices Monitoring, and 2) In-Channel Monitoring Objectives, Goals, Questions.

I. FEDERAL BMP MONITORING

The United States Forest Service (USFS) currently utilizes a nationwide best management practices (BMP) program to assess BMP implementation and effectiveness. The Bureau of Land Management (BLM) developed California-specific BMPs for some activities covered under this Order. BMP monitoring is performed on activities conducted by the USFS, including Category A and Category B activities as defined under this Order.

The BLM finalized its BMPs for water quality on September 29, 2022, but those BMPs do not currently have set effectiveness monitoring requirements. Future revisions of this MRP may result in additional BMP evaluation requirements for the BLM.

In 2012, the USFS published the National Best Management Practices for Water Quality Management on Forest System Lands Volume 1: National Core BMP Technical Guide, FS-990a (National BMPs). The National BMPs superseded the existing USFS Pacific Southwest Region's BMPs and include a series of planning-level BMPs for water quality protection nationwide. Volume 1 of the National BMPs did not include an associated BMP effectiveness monitoring program.

In 2015, the USFS released a draft of the National Best Management Practices for Water Quality Management on National Forest System Lands Volume 2: National Core BMP Monitoring Technical Guide, FS-990b (National BMP monitoring program). The National BMP monitoring program was functionally complete in 2015, and National Forests in the North Coast Region have used this draft document to complete National BMP evaluations since its 2015 release.

II. SUMMARY OF EXISTING FEDERAL AGENCY IN-CHANNEL MONITORING PROGRAMS

A. United States Forest Service – In Channel Monitoring

The USFS's Regional Ecosystem Office (REO) in Corvalis Oregon, has been conducting Aquatic and Riparian Effectiveness Monitoring Program (AREMP) monitoring for more than twenty-five years within the National Forests and BLM field offices covered by the Northwest Forest Plan. The AREMP determines the status and trend of in-channel and upslope-riparian watershed condition for sixth-field watersheds (HUC 12). The REO generates five-year monitoring reports on the data collected for the purpose of tracking changes in condition over time. The ongoing AREMP monitoring effort being conducted by the REO provides important information regarding water quality conditions and trends at the National Forest or BLM field-office scale and satisfy the in-channel monitoring requirements of this Federal Lands Permit.

On some National Forests, USFS staff periodically conduct in-channel monitoring at both the region-wide (USFS Pacific Southwest Region and Northwest Forest Plan) and at the National Forest scales, and may include the USFS's Stream Condition Inventory (SCI) or other protocols developed by an individual Administrative Unit, such as monitoring work conducted by the Klamath National under an approved Quality Assurance Project Plan developed pursuant to the requirements of 40 CFR 31.45.

B. Bureau of Land Management – In Channel Monitoring

BLM staff conduct in-channel monitoring within their respective field offices in the North Coast Region. An existing protocol that is utilized by the BLM is the Assessment, Inventory, and Monitoring Strategy (AIMS)[1]. AIMS has three distinct standardized methods including terrestrial, riparian and wetland, and lotic habitats, and utilizes tailored sample designs at different spatial scales to match the agency's monitoring objectives. The objective of the AIMS is to provide a standardized monitoring strategy for assessing natural resource condition and trend on BLM public lands.

The ongoing AREMP monitoring effort being conducted by the REO provides important information regarding water quality conditions and trends at the BLM field-office scale and satisfies the in-channel monitoring requirements of this Federal Lands Permit.

C. National Park Service – In Channel Monitoring

The National Park Service (NPS) oversees three different Administrative Units within the North Coast Region: Redwood National Park, Lava Beds National

[1] Assessment, Inventory, and Monitoring Strategy | Bureau of Land Management (blm.gov): https://www.blm.gov/aim/strategy

Monument, and Tulelake National Monument[2]. Lava Beds and Tulelake National Monuments do not conduct in-channel monitoring due to lack of perennial streams. NPS staff conduct in-channel monitoring within Redwood National Park (as well as Oregon Caves National Monument and Crater Lake National Park) through the Klamath Inventory and Monitoring Network. Ongoing in channel monitoring protocols utilized by NPS include methods derived from the U.S. EPA's NRSA to evaluate the physical, chemical and biological conditions of various waterbodies within the federal park boundaries. First implemented in 2012, the NPS has been implementing these monitoring activities within Redwood Creek on a three-year cycle (i.e., 2012, 2015, 2018, 2022). The protocol measures the ecological condition at a probabilistic sample (random-based) of wadeable stream across the park landscape that are: perennial, accessible, and can be safely sampled. Sampling consists of physical habitat measurements, water quality, water chemistry, riparian measures, and both invertebrate and vertebrate stream communities. Additionally, the NPS has been conducting a range of long-standing geomorphic and sedimentation studies for over four decades.

The ongoing AREMP monitoring effort being conducted by the NPS provides important information regarding water quality conditions and trends and satisfies the in-channel monitoring requirements of this Federal Lands Permit.

III. GOALS AND MONITORING QUESTIONS

The North Coast Regional Water Quality Control Board supports the implementation of in-channel monitoring activities designed to evaluate whether the physical, chemical, and biological conditions of a waterbody are supporting beneficial uses, and whether land use activities are sufficiently protective of water quality. Robust and sustained water quality monitoring programs can also provide insights into watershed impairments and whether a waterbody is suitable for listing or delisting under Section 303(d) of the Clean Water Act[3]. To succeed with these objectives, in-channel monitoring programs must be conducted by trained individuals utilizing standardized and precise monitoring parameters, at a sufficient scale, frequency, and duration.

The overall health and function of a waterbody is dependent upon the interplay of its physical, chemical, and biological conditions. Natural and anthropogenic stressors can affect the function and integrity of an aquatic ecosystem in diverse ways across these three attributes. Therefore, in-channel monitoring programs that include

[2] The Berryessa Snow Mountain National Monument is also located in the North Coast Region but is administered partially by the USFS and partially by the BLM.
[3] Clean Water Action Section 303(d): Impaired Waters and Total Maximum Daily Loads (TMDLs): https://www.epa.gov/tmdl.

parameters to assess different aspects of the physical, chemical, and biological conditions are preferred.

At times, well-intended monitoring programs fail to achieve their intended objectives due to a range of vulnerabilities, including but not necessarily limited to funding constraints, imprecise monitoring parameters, data collection and processing issues, staff turnover, lack of statistical power, and insufficient spatial and temporal scales. These vulnerabilities present significant challenges, and to be successful, in-channel monitoring programs must be carefully designed and sufficiently supported with sustained resource investments and technical expertise.

Complicating data analyses are the confounding effects of both anthropogenic and natural stressors, the signal from which can manifest over different time scales or in varying ways. Differentiating contemporary impacts from legacy impairments can also be challenging for those attempting to isolate and adaptively manage around modern land use activities.

A. In-Channel Monitoring Protocols

Water quality monitoring programs designed to evaluate aquatic habitat conditions of streams and wetlands come in many different forms, and are sometimes grouped into different classification “levels”, or categories, as described below:

- Level 1, “landscape assessment” relies on coarse, landscape scale inventory information, typically gathered through remote sensing and preferably stored in, or convertible to, a geographic information system (GIS) format.

- Level 2, “rapid assessments” includes data, indicators, and methods for rapid field assessments of wetlands and streams. Rapid assessments typically require less than a day to apply at least once, and do not rely on the collection of field materials or any laboratory analysis. Most Level 2 methods are qualitative or semi-quantitative.

- Level 3, “intensive site assessment” are typically quantitative, research-derived, and more precise monitoring programs that require experienced practitioners. Level 3 includes field data to quantify one or more aspects of aquatic resource condition or stress, relative to other aspects, or per unit time or space. Level 3 data may include any measures of specific ecosystem parameters, including physical, chemical, and biological data.

Monitoring costs, data precision, depth of information, and technical needs each generally increase with the level of monitoring. Therefore, it is essential to explore how these different monitoring categories can be used to address the data needs, achieve monitoring objectives, and answer specific questions. To

comprehensively characterize the health of a waterbody, some monitoring programs are able to collect a mix of both precise quantitative data and rapid qualitative information about a stream or wetland condition to characterize waterbody health, provide insights into changes over time, and to help direct land management and restoration decisions.

The Water Boards utilize specific monitoring protocols to evaluate the health of waterbodies throughout the state. Often these protocols are linked to regional or statewide targets (thresholds) to identify whether a waterbody is properly functioning, sub-optimally functioning, or impaired. Some examples of monitoring protocols used to evaluate waterbody health include California's Surface Water Ambient Monitoring Program (SWAMP), the California Rapid Assessment Method (CRAM), the U.S. EPA's National River and Stream Assessment (NRSA), and the U.S. Forest Service's Aquatic and Riparian Effectiveness Monitoring Plan (AREMP). SWAMP (Level 3 assessment) and CRAM (Level 2 assessment) monitoring are often done in conjunction to provide additional level of insights into waterbody conditions.

California also relies on the use of monitoring protocols that are compatible with its own standards for data collection and reporting, so that the Water Boards can make important decisions regarding a waterbody's impairment status on the Section 303(d) of the Clean Water Act. Information regarding the Water Board's Water Quality Control Policy for developing California's Clean Water Act Section 303(d) List can be found here[4]. The California Environmental Data Exchange Network (CEDEN) only allows some types of water quality monitoring data to be entered, and therefore limits what can be used for waterbody listing and delisting decisions. Data not compatible with CEDEN (e.g., continuous data) is submitted to the Integrated Report Upload Portal. Whether the data type or information should be submitted through the CEDEN or the Integrated Report Upload Portal, the data and information must meet the Integrated Report submission requirements, including the minimum data elements[5]. Information can also be

[4] Water Board's Water Quality Control Policy for developing California's Clean Water Act Section 303(d) List: https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2015/020315_8_amendment_clean_version.pdf.

[5] Data and information submittal requirements for CEDEN can be found here: https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/data_requirements.html.

uploaded into the U.S. EPA's Water Quality Exchange (WQX), which provides a mechanism for data partners to submit water monitoring data to the agency.

The table below loosely categorizes the type and function of monitoring programs used in California:

Protocol	Level	Attributes	CEDEN Compatible
U.S. Forest Service Aquatic and Riparian Effectiveness Monitoring Plan	2 and 3	Quantitative, semi-quantitative, and qualitative measures of physical, chemical, and biological conditions	Yes
U.S. EPA National River and Stream Assessment (NRSA)	2 and 3	Quantitative, semi-quantitative, and qualitative measures of physical, chemical, and biological conditions	Yes
CA Surface Water Ambient Monitoring Program (SWAMP)	2 and 3	Quantitative, semi-quantitative, and qualitative measures of physical, chemical, and biological conditions	Yes
California Rapid Assessment Method (CRAM)	2	Rapid assessments of the overall condition or function of wetlands/steams	No
U.S. Forest Service Stream Condition Inventory (SCI)	3	Quantitative and semi-quantitative measures of physical, chemical, and biological conditions	No

B. In-Channel Water Quality Monitoring Goals

In-channel water quality monitoring programs should be developed to meet specific, pre-defined goals and to be able to answer certain questions and/or test hypotheses. The following general monitoring goals are described below for the Federal Lands Permit's in-channel water quality monitoring program:

1. Monitoring parameters and collection protocols should include enough sampling precision to support collection of high-quality data capable of identifying water quality conditions.
2. Monitoring programs should be as cost-effective, staff efficient, and repeatable, as possible.
3. Monitoring protocols that collect information regarding the physical, chemical, and biological conditions of a waterbody are preferred.
4. Federal lands monitoring programs should promote the use of existing, well-established monitoring programs as opposed to the creation of new protocols.
5. Monitoring programs that include parameters with established conditions thresholds or numeric targets should be prioritized over programs that lack them.
6. In-channel monitoring programs should be sufficiently robust to support ambient conditions assessments, and possibly trend assessments, within a reasonable timeframe (i.e., 5-10 years).
7. Monitoring programs should be able to support Clean Water Act Section 303(d) listing and delisting decisions[6].
8. Where monitoring occurs within a TMDL watershed, monitoring parameters should consider the numeric targets identified in the Action Plan or EPA established TMDL.
9. Monitoring programs should collect data that is compatible with the California Water Board's monitoring requirements, including the ability to have monitoring information entered into portals such as the CEDEN, the Surface Water Ambient Monitoring Program (SWAMP) database, and/or the U.S. EPA

[6] State Water Board Section 303(d) Listing Policy: https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2015/020315_8_amendment_clean_version.pdf.

Water Quality Exchange (WQX). Data not compatible with these portals must be submitted directly via the Integrated Report Upload Portal.

C. In-Channel Water Quality Monitoring Questions

The following general monitoring questions can provide the basis for an in-channel monitoring program and hypotheses to be tested:

1. Are waterbody conditions meeting identified targets to fully support beneficial uses (e.g., domestic water supply, recreational contact, cold-water fisheries, wildlife, etc.)?

2. Are physical habitat conditions (e.g., thalweg profiles, residual pool depths, pool frequency, large woody material, width-to-depth ratios, relative bed stability, etc.) showing an improving trend over time?

3. Are waterbody conditions meeting sediment particle size objectives based on comparable regional references or other identified numeric targets?

4. Is median particle size diameter (d50) showing an increasing trend over time?

5. Are waterbody conditions relative to instream channel cover and large woody material meeting recovery targets as identified in State and/or Federal Recovery Plans for listed anadromous salmonids?

6. Are waterbody riparian conditions relative to canopy cover and structure improving over time?

7. Are waterbody temperatures meeting specified maximum weekly maximum temperature (MWMT) and maximum weekly average temperature (MWAT) targets for optimal salmonid rearing conditions?

8. Are benthic macroinvertebrate populations meeting the “likely intact” condition identified in the California Stream Conditions Index (CSCI) or other similar measure of biological assemblages?

9. Are waterbody conditions suitable for waterbody delisting under Section 303(d) of the Clean Water Act?

10. Are riparian- and in-channel conditions supported by the current suite of Federal Agency BMPs?