1.1. What factors, in what magnitudes, from which sources are causing the decline in the clarity of Lake Tahoe?

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Air Quality Monitoring	10104	ARB, TRPA, USFS, EPA, TRG, UCD	Quantify the direct depoition of phosphorus, nitrogen, and particulates. Identify relative contributions from upwind and in-basin sources. Identify source of phophorus, nitrogen, and particulate emissions. (1.1.7, 8, 9, 10, 11, 12)	Help clarify the relative importance of atomospheric deposition relative to other sources. Help identify and prioritize potentially controllable sources and assess the effect of future controls on total nutrient inputs	Monitoring to begin 2002, complete 2005	Current through 2003: $1,222,000. Need additional $340,000	9 stations, sampling for CO, ozone, and Nox, PM 10 and PM 2.5 by mass. Not all parameters at all sites. Part of the TMDL Program
Ambient Air Quality Modeling: Aircraft and Boat Measurements over Lake Tahoe	01-326	UCD, ARB	Collect air quality and meteorological data by means of airplane and boat on ~40 days (~20 2-day sampling periods); provide data on vertical and horizontal variations above western Sierra Nevada and Lake Tahoe with plane measurements; provide horizontal variations over Lake Tahoe with boat measurements in winter;	Will provide data useful: 1) as initial conditions and validation points for modeling applications to better quantify the impacts of in-basin and out-basin emissions, 2) for characterizing spatial variations in materials over the Lake and what methods are most appropriate for interpolating and extrapolating over and around the Lake, 3) for refining conceptual models of transport and atmospheric mixing processes	6/1/2004	$133,382	Note: this is part of larger Air Quality Monitoring and Modeling work above. Separated this component out to provide a more detailed description
Support for the Lake Tahoe Atmospheric Deposition Study	01-350	UCD, TRG, ARB	Measure deposition in various settings; to measure particulate matter over Lake; to conduct lab analyses of composition; to detect P at low concentrations	Will help quantify the differences between various deposition measurement methods; will help characterize spatial variations in materials over the Lake and what methods are most appropriate for interpolating and extrapolating concentrations of particulate components over and around the Lake; will help improve deposition estimates	12/31/2003	$32,000	Note: this is part of larger Air Quality Monitoring and Modeling work above. Separated this component out to provide a more detailed description

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
UC Peer Review of LTADS Workplan	98-004 TO27-1	UCD	Review LTADS design and scientific approaches	Will help ensure that study results are definitive, defensible, and appropriately guide future management efforts	7/31/2002	$5,000	Part of larger UC review effort for ARB's research and monitoring at Lake Tahoe
Characterization of Aerosols in Ambient Air at South Lake Tahoe		UCD, TRPA	Measurement of aerosols by size and composition with comparison of summer versus winter atmospheric concentrations of fine soils and phosphorus. Include QA/QC testing of instrumentation	Understanding air pollutant sources for use in TMDL and mitigation efforts	6/30/2003		Independent of ARB BCP studies described above
Glorene and 8th BMP pre-project study	10109, 10110, 10111	CSLT, CTC, TRG	Identify erosion sources, target pollutants, assess infiltration concerns, identify dominant veg and soil types. (1.1.1, 2, and 4.3.3)	Provide data regarding pre-project conditions for un-BMPed residential areas.	Began spring 2001, project construction 2003	$60,000 to date, need $120,000 to complete post project monitoring	2 auto samplers. N, P, SS, oil and grease, flow. No particle size.
Lake Tahoe Park BMP pre-project monitoring	10109, 10110, 10111, 220	CTC, PlacerCo	Conduct pre-project monitoring during spring runoff; measure water quality above and below gully and meadow sites. (1.1.1, 2 and 4.3.3)	Provide data regarding pre-project conditions for un-BMPed areas.	Began May 1999, Monitoring postponed until May 2003, will continue through 2005	$74,900 to date	N, P, SS and flow, no particle size. Monitoring plan to be revised.
Upper Truckee River (Lower Reach) pre-restoration monitoring		CTC	Collect pre-project data.	Provide data regarding pre-restoration conditions to evaluate restoration success	GW began 1995; other began fall 2000. Complete 2006	$10,000	New channel scheduled for 2004. Currently only monitoring ground water level
Caltrans Sediment and Sand Analysis	10108, 10111	Caltrans	Determine chemical consituents found in traction sand and collected sediments. (1.1.1, 2, 4)	Help determine highway loading rates and target pollutants for BMPS	ongoing	Part of Runoff Monitoring project (2 million)	Two stations at double sand cans: particle size, TP, TOC, TN and metals

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Caltrans Runoff monitoring stations	10111	Caltrans, CDM	Evaluate water quality of highway runoff (1.1.1, 2, 12 and 4.3.3, 4.3.4)	Help determine highway loading rates and target pollutants for BMPs	Started Fall 2000, continue through 2003	approx. 2 million	3 autosamplers installed fall 2000, in south shore, 3 more for 2002 west and north shore.
Lake Tahoe Interagency Monitoring Program Data Analysis Project	10110	USGS, TRPA, RWQCB	Estimate monthly loads, yields, and trends in nutrient concentrations for the LTIMP stream network (1.1.1, 2, 3, 12 and 4.3.2, 3)	Help develop TMDLs and identify problem watersheds in the Lake Tahoe Basin	Final report currently being prepared	$496,000	Report will be available on USGS web page soon.
Lake Tahoe Tributary Monitoring Program	626, 429	USGS, TRPA, TRG	Provide long-term database for estimating nutrient and loading trends. (1.1.1, 2, 3, 12 and 4.3.2, 3)	Assess land use and development impacts and management activities. Help prioritize EIP	Ongoing, results published annually	$661, 913 for full USGS program.	Project reduced in FY02. 28 tributaries, flow, nutrients, SSC, ~5-10 particle size samples per year
Lake Tahoe Water Quality Investigations - LTIMP Supplement		TRG, LRWQCB	3. Equipment			$330,000	Data reports submitted to Lahontan
Groundwater monitoring program		TRPA, USGS, TRG	Provide long-term database for nutrient, sediment, and water level for ground water (1.1.1, 2, 3, 4, 10, 12)	Provide valuable background data for setting standards and developming TMDLs. This is the only long-term groundwater data available	Ongoing, results published annually	see above (part of USGS monitoring monies)	31 wells, most deep DW wells sampled once per year. No analysis or trend study has been performed.
Shoreline Erosion Study	429	DRI, TRPA	Determine the extent of shoreline erosion using aerial photos and surveys, characterize shore materials (1.1.6, 13)	Assess nutrient and sediment loading from shorline erosion	Dec. 2001	$64,462	Final report expected 12/01
Fine Sediment Loading Rates	627, 628, 10108	LRWQCB, TRG	Quantify fine sediment loading rates from streams. (1.1.1, 2, 3)	Assist in determining total load rates and appropriate control measures	Must be complete by 2005	preliminary estimate: $66,000	Part of TMDL Program

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Storm Water Monitoring	627, 628, 10111	LRWQCB, TRG, DRI	Establish and maintain monitoring network for overland storm water flow based on land use (1.1.1, 2)	Quantify pollutant loading rates from various land uses to assist in TMDL development	Must be complete by 2005	preliminary estimate: $949,200	Part of TMDL Program
Bioavailable phosphorus study	10107	LRWQCB, UNR	Identify biologically available forms of P; assess the influence of biological cycling and lake hydrodynamics on P transport, fate, and availability (1.1.1, 4, 5)	Identify sources of available P and determine strategies for P control	Must be complete by 2005	preliminary estimate: $200,000	First time that BAP will be directly measured at Tahoe. Part of TMDL program.
Microbial nitrogen transformations		DRI	Details are few - "research will focus on microbial transformations of nitrogen in Lake Tahoe."			$16,000 from Sierra Pacific Power	?
Heavenly Valley Ski Area Water Quality and BMP effectiveness Monitoring		USFS, Heavenly	Implementation of Master WQ Plan, effective soil cover, BMP effectiveness, riparian condition, and watershed condition monitoring requirements (1.1.1, 2, 3, and 1.2.1)	Provide 1-yr and 5-yr compilation of data and attempt correlation of management activities to WQ and cumulative watershed effects	ongoing	?	Monitoring consists of obervations and measurements, and does not provide hard data other than WQ analyses
Groundwater nutrient loading		Corps of Engineers, LRWQCB	Identify remedial measures to reduce groundwater nutrient contributions and provide information on groundwater nutrients for TMDL (1.1.1, 2, and 12)	Provide bulk contribution of nutrients to lake from groundwater. Qualitatively evaluate sources such as fertilizer, infiltration etc.	Mar-03	$450,000	This work does not include specific project planning or design.
Shore Zone Sanitary Sewer Risk Evaluation	638 (WQ)	Corps of Engineers, TRPA, PUDs, GIDs	Identify high risk shore zone sewers and associated remedial measures and provide information on sewer infiltration. (1.1.1, 2, and 12)	Help identify problem areas and recommend corrective actions.	Mar-03	$440,000	Only risk evaluation and recommendations. No project planning or design.

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Urban Storm Water Plan		Corps of Engineers, TRPA	Develop elements of urban storm water master plan to complement on going basin efforts.	Provide a coordinated approach to address management of urban storm runoff.	Ph 1 May 02 Ph 2 2003-04 (rough estimate)	Ph 1 $? Ph 2 $250,000 (rough estimate)	
Nutrient and Sediment Loading Due to Stream Channel Erosion		Corps of Engineers, LRWQCB, EPA, USDA	Identify typical stream erosion processes with associated sediment loading. (1.1.1, 2, &12)	Provide bulk contribution of nutrients and sediment to the lake from active stream erosion and evaluate relative priority of stream restoration.	3-Aug	$200,000	Part of TMDL Program
Lake Tahoe Watershed Monitoring Program		NDEP	Provide long-term data base necessary for assessing water quality and identifying impaired waters	Help identify problem sub-watersheds within Nevada; help in trend analysis and loading estimates	ongoing	approximately $21,000 annually	9 stream sites and 2 Lake sites sampled 6 times per year; sites may be changed or dropped in the future
Lake Tahoe Watershed Citizen Monitoring Project		IVGID, NDEP	Provide data base necessary for assessing water quality and identifying impaired waters	Help identify problem sub-watersheds within Incline Village sub-watersheds; help in trend analysis and loading estimates	12/31/2002	$24,854	Monthly sampling at 7 sites on Deer, Third and Rosewood Creeks; contract may be renewed
Source Water Assessment Program		NV Bureau of Health Protection Services; UNR	Monitor and assess surface and groundwater drinking sources for contaminants	Help identify contaminants of concern; may provide information regarding loading estimates.	April-03	$1,200,000	
Statistical Analysis of LTIMP and TMDL Stormwater Monitoring Data		Hydrokios, DRI, TRG, LRWQCB	Develop statistical relationships between land-use and water quality in runoff	Used as input data for TMDL to better determineN, P and sediment loading from urban and other land uses	September-02	$106,325	Will interface with TMDL Stromwater Monitoring and Watershed Modeling. Part of TMDL Program.

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Reconstruction of Historical Atmospheric Data Over Lake Tahoe Watersheds		UCD, LRWQCB	Using the MM5, the following parameters will be reconstructed at 12-hr increments, at 3 km intervals for the period 1958-2000: precipitation, wind speed, air temperature, ratiation and relative humidity	This product will be used in both the watershed and clarity modeling	May-03	$100,000	Downscales coarse time-space global atmospheric data of NCEP and NCAR. Part of TMDL Program.
Rainfall Simulation Pilot Study		USFS, UCD, Caltrans	Use simulated rainfall to determine real-time erosion and runoff on native and treated sites throughout the Basin 1.2.1, 1.2.3, 1.2.6, 1.2.8	Help determine actual effects of treatments for sediment source control rather than relying on models for prediction. The information produced will guide future approaches to sediment source control by determining how treatments actually reduce sediment and pollutant run-off	2002	$50,000	This project was funded to develop application of rainfall simulation techniqes. This project is transferring directly into the Long Term nutrient and mulch study
Edgewood Creek Golf Course Monitoring Program		Edgewood GID	Provide long-term data base necessary for assessing water quality of Edgewood Creek	Surface and groundwater monitoring data will help evaluate specific land-use water quality impacts, trends, and help with loading estimates	ongoing	$10,000/yr	working with TRPA to develop a comprehensive monitoring program
Incline Championship Golf Course Monitoring Program		IVGID	Provide long-term data base necessary for assessing water quality impacts of specific land use to Third Creek	Surface and groundwater monitoring data will help evaluate specific land-use water quality impacts, trends, and help with loading estimates	ongoing		sampling conducted before fertilization, then 7 days after fertilizers are applied (# of applications vary)
Mountain Golf Course Monitoring Program		IVGID	Provide long-term data base necessary for assessing water quality impacts of specific land use to Third Creek	Surface water monitoring data will help evaluate specific land-use water quality impacts, trends, and help with loading estimates	ongoing		sampling conducted before fertilization, then 7 days after fertilizers are applied (# of applications vary)

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Lake Tahoe Resort Association Storm Water Study		STPUD, TRPA, LTRA, TRG, CLST			Start - 10/15/02 Finish 10/04	$150,000 - LTRA $150,000- STPUD	Currently in the process of selecting a contractor

1.2 What methods are available for reducing sediment inputs into the lake, and how can the greatest reduction be accomplished in the shortest time period?

State Route 28 BMP effectiveness study - sediment traps, treatment basin, Stormceptor vault	10109, 10111	NDOT, DRI, USFS, Carson City, NDSL	Monitor effectiveness of listed BMPs for removal of fine sediment, nutrients, and traction sand. Estimate traction sand transport downstream of roadway using trace chemistry. (1.2.1, 2, 3, 5, 6, 7 and 4.3.3, 5)	Guide future BMP and erosion control projects	Monitoring to begin spring 2002, final report may be available Fall 2003	USFS CURTEM funding $178,537, Carson City Burton Santini - $100,000, $95,000 NDSL	
Apalachee BMP effectiveness study - treatment basin	10109, 10111	ElDoCo, CTC	Monitor effectiveness of listed BMPs for nutrient removal and groundwater impacts. (1.2.2, 3, 6, 8, 10 and 4.3.3, 5)	Guide future BMP and erosion control projects	Pre-project monitoring began fall 2000, will continue through 2005	$148,000 to date	1 Auto sampler and 9 groundwater wells. Focus on nitrogen and phosphorus species. No flow, no particle size.
Park Avenue/Rocky Point BMP effectiveness study - infiltration basin	10109, 10111	CSLT, CTC, USFS	Monitor effectiveness of listed BMP in decreasing subsurface migration of contaiminents to groundwater. (1.2.1, 2, 3, 8, 9, 10 and 4.3.3, 5)	Determine if storm water infiltration has potential to contaminate municipal groundwater supplies	Fall 2001 - pre-project data. To continue through 2004	$150,000 to date	1 Auto sampler at inlet, 4 ground water wells. N, P, oil and grease, SS, hydrocarbons. Flow, no particle size
Hekpa BMP effectiveness study - Revegetation success	10109, 10111	ElDoCo, CTC	Monitor vegetation survival to assess reveg seed mix and application rates. (1.2.1)	Guide future revegetation projects	Started Oct 1998, complete 2001	$28,200	Project contructed 1998, measurments taken once per year since.

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Ski Run Blvd. BMP effectiveness study - treatment basin	10109, 10111	CSLT, CTC	Monitor effectivenss of listed BMP for improving water quality. (1.2.2, 3, 4, 5, 6, 8, 9, 10 and 4.3.3, 5)	Guide future BMP selection and evaluate success of current BMP methods	Started Oct. 2000, to continue through fall '03	$52,900 to date	Samples taken at 3 inlets and 1 outlet. N, P, SS, and flow. No particle size.
Glorene and 8th BMP effectiveness study - treatment basin, C&G, etc.	10109, 10111	CSLT, CTC, TRG	Monitor effectiveness of BMP project implementation (pre and post project runoff monitoring) (2.1.2, 3, 5, 6, 8, 9 and 4.3.5)	Estimate potential BMP pollutant reduction based on pre and post project monitoirng data	Began spring 2001, project construction 2003	$120,000 (see pre-project study listed under 1.1)	2 of 3 auto samplers installed. N, P, SS, turbidity, oil and grease. No flow or particle size.
Angora BMP effectiveness study - SEZ treatment.	10071, 10109, 10111	ElDoCo, CTC, USFS	Monitor meadow treatment system. Expand current monitoring to include soil, veg, and additional groundwater wells. (1.2.2, 3, 4, 6, 8, 9, 10 and 4.3.3,5)	Assess the ability of SEZs to treat urban runoff.	Began fall 1997, will continue through 2003	$440,000 to date	5 autosamplers, 6 flow meters, ~10 gw wells. N, P, SS, flow, fecal. No particle size.
Angora Creek Water Quality Monitoring		USFS, El Dorado Co.	Monitor overall effectiveness of multi-phase residential BMP project by monitoring Angora Creek above and below the subdivision. (1.2.1, 2, 3, 4, 5, 6, 8)	WQ Dataset from 1994 through 2004 will bracket three projects from forest health to urban BMPs	2004		SW stations above and below neighborhood. Flow, P, N, SS, Turb. Re-evaluting monitoring USFS locations against planned expansion.
Cattlemans BMP effectiveness study - treatment basin	10109, 10111	ELDoCo, CTC, USGS	Monitor fate of contaminants in surface runoff, sediment, and shallow groundwater passing through a treatment basin. (1.2.2, 3, 6, 8, 9, 10, and 4.3.3, 5)	Estimate potential BMP pollutant reduction based on pre and post project monitoirng data	began 1997 (sfc water) and 2000 (gw) will continue through 2005	$511,000 CTC, $135,000 USGS	1st year - 25 wells sampled. N, P, Fe, SS, pH, soil type, bacteria, flow. No particle size.
Tahoe City BMP effectiveness study - 2-cell wet basin.	10071, 10109, 1011, 1, 796	PlacerCo, CTC, TRG, USFS	Monitor effectiveness of listed BMP, develop maintenance plan for optimal performance, determine if groundwater flux is effecting monitoring activities. (1.2.2, 3, 4, 5, 6 and 4.3.5)	Guide future BMP selection and evaluate success of current BMP methods	Started Spring 2000, will continue through 2004	$207,000 -CTC and USFS Curtem Funding	2 auto samplers, some grab samples, gw wells may be installed. N, P, SS, pH, flow, veg and soil types. Some particle size

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Roundhill Urban BMP Effectiveness Study - dry basins and residential BMPs		USFS, Roundhill GID, NTCD, UCD, DRI, NDSL	Monitor effectiveness of listed BMPs for improving water quality. (1.2.1, 2, 3, 5, 6, and 4.3.5)	Guide future BMP selections and evaluate success of current BMP methods	2002 through 2003	$422,000 -USFS Curtem Funding, NDSL - $110,000	8 auto samplers, N, P, and Sed. No particle size distribution
Stateline Stormwater BMP Monitoring - treatment vaults and basins		USFS, TRPA, Douglas County, DRI, NDSL	Monitor effectiveness of Urban BMPs for improving water quality. (1.2.1, 2, 3, 5, 6, and 4.3.5)	Guide future BMP selections and evaluate success of current BMP methods	2002 through 2003	$190,000 USFS Curtem Funding, $60,000 DRI and NDSL match	3 auto samplers, 4 grab sample stations, 4 GW wells. N, P, and Sed, includes particle size distribution.
Cave Rock Monitoring - Revegetation		USFS, Cave Rock GID, NDLS	Develop standardized protocols for determining effectiveness of Revegetation on cutslopes within Urban Subdivision. (1.2.1, 8, 9, and 4.3.3, 5)	Guide future BMP revegetation efforts and evaluate success of current BMP methods	2002 through 2003	$28,000 USFS Curtem Funding, $23,000 State Match.	Soils, plants, and cover evaluations.
Kings Beach BMP effectiveness study - comparison analysis for two treatment basins	10109, 10111, 15, 733, 787, 10060	PlacerCo, CTC, USGS, WestBotan, TRG, USFS	1. Compare reveg success. 2. evaluate various solid media liners for removal of bioavailable P, determine benefit of regular sweeping (1.2.1, 2, 3, 5, 6, 8)	Guide future BMP selection, evaluate success of current methods and maintenance practices.	1. Start 1997, finish 2001. 2. Start 2001, finish 2003	1. $43,000 - CTC, 2. $412,820- CTC and USFS Curtem Funding	Auto samplers installed 2002, veg transects established. N,P, SS, particle size, veg type, flow
Revegetaion and slope stabilization success criteria	10109, 10111	Caltrans, USFS, UCD	Develop improved techniques for slope stabilization and revegetation. Determine revegetation success criteria. (1.2.1, 8, 9, and 4.3.3, 5)	Determine specificaitons, plans, and length of contract required for a successful revegetation project		$400,000	Plots are currently being monitored, new veg is being established. Mulch is being applied.
Small scale pilot project for highway treatment BMPs	10109, 10111	Caltrans	Determine which treatment methods will remove nutrients in a cost effective manner. Studying various filters, media, etc. (1.2.1, 3, 5, 6, 8, and 4.3.3, 5)	Determine which BMPs to insatll as part of Caltrans EIP projects		Est. $1.5 million	Bench scale and jar tests under way.

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Beecher/Lodi BMP effectiveness study - Vortechnics vault	10109, 10111	CSLT, CTC	Monitor effectiveness of listed BMP in capturing sediment. (1.2.1, 3, 5, 6, 8, 9)	Guide future projects in BMP selection and determine appropriate vault maintenance.	Started Oct. 1999, finish Spring 2002	$30,000 to date	N, P, SS and flow, no particle size. Early data suggest the vault is not an effective BMP without regular maintenance.
Tahoe Research Group BMP effectivness contract	10071 10109, 10111	TRG, CTC	Support CTC staff and grantees in developing BMP monitoring plans, analyzing data, and evaluatating project effectiveness. (1.2.1, 2, 3, 4, 6, 8, 9, 10 and 4.1.2, 4.3.3)	Guide future BMP selection and evaluate success of current and proposed BMPs	Started fall 2000, continue through 2003	$280,000 to date	Submitted progress report fall 2001, provided preliminary results from selected projects.
Efficiency of wetlands for treating urban storm water	10071, 10110, 628	TRPA, NV State Lands, EPA, Swanson Hyd.	Evaluate natural and artificial wetland systems for runoff treatment (1.2.2, 4, 10, and 1.1.4)	Guide future BMP selection and evaluate success of current and proposed treatment practices	Fall 2003	Total - $300,000 Need $20,000 additional	4 autosamplers installed fall 2001, at two basins, conductance on inlets, some grab sampling at basins and Angora St. Park.
Upper Truckee River/Barton Meadows Restoration		UCD, CTC	Use sequence stratigraphy to investigate pre-historic and historic sedimentation and Phosphorus accumulation rates on the floodplain	Understanding marsh and floodplain development will help guide restoration approach and project objectives.	Approx. June 2003	CA Tahoe Conservancy	
Long Term nutrient and mulch study plots		USFS, UCD, Caltrans, Local Alpine Resorts (TBD)	Long term study plots for determination of fate of soil amendments, mulches, plant materials and their effect(s) on control of erosion and runoff and restoration trajectory on previously disturbed sites 1.2.1, 1.2.3, 1.2.6, 1.2.8	This program will help determine what components are required for **sustainable** sediment source control, restoration of disturbed soils and maximum infiltration on severely disturbed sites. Most studies are 1-2 years. This project is designed to identify longer-term trends (5 yrs+)	2003	$200,000	The funding for this project will construct long-term study/research plots. Funding for the long term monitoring has not been identified or secured.

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Chemical Treatment Methods Pilot for Treatmentof Urban Runoff. Phase I. Feasibility and Design		Phil Bachand, TRG, UCD Civil Engineering, USFS, CSLT, CalTrans	Advance testing the feasibility and application of chemically enhanced best management practices (CEBMPs) for use in the Tahoe Basin to treat urban runoff. Tasks include, formation of CEBMP Working Group, literature review, chemical dosing bench studies, settling studies site selection and monitoring, pilot study design, and preliminary ecotoxicity experiments (1.2)	Current research by CalTrans in concert with this study are testing the feasibility of using chemically enhanced treatment at Tahoe. Currently agencies have no means to access this new technique	31-Dec-03	Funded jointly by CalTrans May 02-June 02 ($200,000) and CSLT (with USFS funding) for $173,760	Will complement current CalTrans efforts with CEBMPs. Phase II expected to involve construction and field testing
BMP effectiveness modelling and feasibility study	628, 10109, 10111	LRWQCB, GeoSyntec	Assess ability of existing and new technologies to reduce sediment and nutrient loading rates from urban runoff. (1.2.1, 2, 3, 5, 6, 8, 9)	Guide future BMP implementation toward the most effective methods. Evaluate potential load reduction from EIP	15-Mar-05	202,500	Part of TMDL Program

2.1 What constitutes "healthy" and ecologically sustainable forest ecosystem that most closely reflects pre-settlement conditions and how do we best achieve it?

Ecosystem impact of biomass management (prescribed fire and timber harvest)	802	CTC	Improve effectiveness of prescribed fire and timber harvest on vegetation structure and composition. Enhance fuel reduction (2.1.4, 5, 7, 8, 11, 12)	Assess potentail costs and benefits or prescribed fire and timber harvest	plots established, monitoring through 2005	$2,100 to date	Nearly 200 acres of CTC property; minimum 10 plots per site
Sugar Pine Seedling Survival	932	NV State lands	Identify canopy closure range and slope aspect that allows optimal survival. Provide reference info regarding container stock (2.1.7, 8, 10)	Future sugar pine plantings will benefit from reference information gathered as part of this study.	Plots established, monitoring through 2003	Estimated $15,000 total cost	Study is part of larger sugar pine restoration project.
Aspen Response to Conifer Thinning	1004	NV State lands	Determine level of aspen and understory species regeneration in response to conifer thinning within conifer stands. (2.1.7, 8, 10, 11)	Provide justification for this vegetative management technique and a level of expected results. Estimate cost per acre	Initial inventory underway	Estimated $20,000 total cost	

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Ecosystem and Socio-Economic Impact of Biomass Management (Prescribed Fire and Understory Thinning)		USFS, UNR, DRI,	Investigate impacts of prescribed fire and understory thinning on forest health and productivity, nutrient cycling and soil fertility, water quality, monetary cost/benefits, and public perception (2.1.4, 5, 8, 11)	Help managers understand ecological, social and economic tradeoffs as it relates to forest health management practices.	2002 through 2004	$300,000 USFS, $300, 000 UNR, $160,000 McIntrye-Stenis	2003 Federal contribution($100,000)conting ent on availabe funding
LTBMU Forest Health Project Monitoring		USFS	Evaluate effectiveness of forest health projects (burning, vegetation management, road and trail maintenance) to promote WQ improvements and soil conservation (2.1.4, 5, 8, 11)	Adaptive Management - correlation of management activities to degree of successful achievement of short-term and long-term forest health goals	Never		Monitoring consists of obervations and measurements, and does not provide hard data other than WQ analyses
East Shore Furbearer Survey	933	Nv State lands, USFS	Locate animals, mark and identify denning sites, and potentially monitor reproduction (2.1.7, 8, 10, 11)	Identify and protect critical habitat for avoidance during vegetative management and recreation projects	Planning and design in progress	$40,000	Coordinated effort.

2.2 What constitutes "healthy" and ecologically sustainable aquatic, riparian, and meadow ecosystems in the basin, and how do we achieve them?

Upper Truckee Marsh - Wetland restoration monitoring	1006	CTC	Restore and protect 311 acres of SEZ and monitor human use, wildlife, waterfowl, and birds. Expand opportunties to restore additional wetlands and rivers nearby. (2.2.2, 4, 5, 7, and 4.3.3)	Identify sensitive habitat locations and disturbed areas for input in the restoration design process	Started May 2001, ongoing	$21,000 to date	Currently monitoring human use and wildlife and waterfoul sitings; groundwater elevations
Tahoe Yellow Cress (*Rorippa subumbellata*) Inventory	519	CTC, USFS	Determine distribution of Tahoe Yellow Cress and its associated species, monitor flucuating populations over time. (2.2.1, 2, 3, 4, 6, 7)	Determine distribution of this unique and endangered plant and help guide protection efforts.	Specific site monitoring started 1985, will continue through ??	$20,000 to date	CTC monitors Upper Truckee and begin Reagan Beach 2002, USFS monitors Baldwin beach

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Tahoe Yellow Cress reintroduction and Key Mmgt. Research	10134	TYC TAG, TRPA	Develop an increase knowledge of TYC for Adaptive Management, and evaluation of effective reintroduction techniques.	Provide information for better management within an adaptive management system.	2004	Est. $200,000	
Trout Creek - Restoration Monitoring - channel restoration	1006	CTC, CSLT, DRI	Monitor effectivness of restoration project for improving water quality and restoring habitat. (1.2.4, 2.2.4, 5, 6, 7 and 4.3.3)	Determine impact of restoration activities on wildlife habitat and water quality to guide future projects	Monitoring to continue through 2004	$220,000 to date	3 stations with data loggers, transducers, peizometers, etc. Water temp, pH, DO, veg, inverts, wildlife and fish survey, soils and 17 GW wells.
SEZ/Groundwater Indicator Network	640	TRPA	Measure ground water levels to determine SEZ relationships to plant communities and evaluate restoration potential. (2.1.2, 8 and 1.2.4)	Guide future restoration efforts and imrove groundwater database	Ongoing	$4000 per year (TRPA staff time)	Began March, 199. Project needs purpose and scope
Snow Creek - Restoration monitoring - channel restoration	1006, 20	CTC, PlacerCo, WestBot, USFS	Conduct vegetation transects, plant and macroinvert identification and water quality sampling pre and post project. (1.2.4, 2.2.4, 5, 6, 7, and 4.3.3)	Evaluate restoration impacts on vegetation and water quality to guide future projects. USFS WQ monitoring 1986 - 2005 to compare pre and post project conditions.	Started spring 1986, will continue through 2004	Total cost $60,000 - need $33K for post project and final report	Restoration completed 2000. N, P, oil and grease, SS, Turbidity, temp, pH, DO, inverts, veg, wildlife, birds, and soil. No flow, no particle size
Angora Creek - Restoration monitoring	1006	CTC, USFS, CAParks	Determine ground water table elevation at 18 locations (2.2.7, 4.3.3)	Evaluate restoration impacts on ground water table elevation	Started 1993, will continue through 2004	$12,000	18 GW wells, also invert, wildlife, and observational bird surveys

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Evaluating the Potential for Establishing a Sustainable Population of Lahontan Cutthroat Trout in Fallen Leaf Lake		TRG, U.S. Fish & Wildlife Service	To evaluate the reintroduction of Lahontan Cutthroat Trout into Fallen Leaf Lake while designing specific management strategies that could result in successful establishment of self-sustaining populations (2.2.1, 2.2.5, 2.2.6)	Will provide information on the feasibility and desirability of re-introdcing LCT to the Tahoe Basin	01-Jul-02 to 30-Jun-05	$79,999	
Lower West Side - Restoration monitoring - wetland	1006	CTC, EDAW, ENTRIX	Monitor project impact on groundwater elevation at 6 locations; monitor plant growth and species diversity, water quality, and wildlife	Improve groundwater database, evaluate potential habitat improvements	Started 1995, will continue through 2006	$10,000 to date; estimated total cost = $120,000	Project completed 2001. N, P, SS, turbidity, SC, veg, wildlife, birds, and soil
Control and Eradication of Eurasian water milfoil in Lake Tahoe		Lars W.J. Anderson USDA-ARS Exotic and Invasive Weed Research; Tahoe Keys Property Owners' Association	Develop scientifically sound, enviornmentally sustainable methods for management of Myriophylllum spicatum (Eurasian water milfoil) and other nuisance aquatic plants in Lake Tahoe. Project will also examine non-target effects as part of second phase.	Current control practices (mechanical harvesting) and continued presence of Eurasian watermilfoil are encouraging its spread around Lake Tahoe and via the Truckee River to NV sites. This project will identify appropriate methods either for sustained managment or eradication where possible.	The first phase has been completed (off-site mesocosms used to evaluate herbicides). Second phase will be small-scale on-site (Tahoe Keys Marina) research to be completed in 2003 pending approvals by Lahontan Regional Water Quality Control Board and TRPA).	1. Inhouse USDA-ARS research funds; 2. Project-specific funds from Tahoe Keys Property Owners' Association (pending)	From 1995 to 2000, Eurasian watermilfoil has spread from original populations in the Tahoe Keys Marina to approximately 18 other sites in the lake-proper. Most are less than two acres each and are amenable to eradication with proper metods.

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
Benthic Biodiversity as Indicators		CTC, TRG	Quantify the effects of anthropogenic habitat degredation and restoration on stream insects. (2.2.2, 4, 5, 6, and 4.3.3)	Evaluate potential benefits of using invertebrates as indicators of health systsms and/or successful restoration.	Started 1999, will continue through 2003	$65,000 to date	Field data collected from 5 reference, 5 impacted, and 5 restored streams.

4.2 What role should reasearch play in adaptive management?, 4.3 What role should monitoring play in adaptive management?

Lake Tahoe Organics / Motorized water craft research	661	USGS, TRPA	Determine MTBE and BTEX concentrations in Lake Tahoe and Lower Echo Lake and the effect of 2-stroke carburated engines on their concentrations. (4.3.3 also 1.1.1, 11)	Help support current and potential ordinances for motorized water craft on Lake Tahoe	Project completion after FY 2002	$52,000 for FY 2001 and 2002	Data has been published as a fact sheet and presented to TRPA governing board
PAH Assessment in Lake Tahoe		LRWQCB, UNR, TRG, USGS	Assess levels of polycyclic aromatic hydrocarbons (PAHs), compare PAH emissions from two- and four-stroke engine technologies, and perform a phytotoxicity assessment based on ambient PAH concentrations (4.3.3 also 1.1.1, 11)	Will provide decision makers with knowledge needed to know if exhaust from motorized watercraft in Lake Tahoe are having a toxic impact on lake biota	20-Jun-01 to 31-Mar-03	$154,468	Note: this represents the TRG portion of the larger PAH study headed by Glenn Miller (UNR)
Lake Particle Study/Clarity Model Application	10108	LRWQCB, UCD	Apply clarity model to assess clarity goals, develop a submodel to expand functionality (4.2.3, 4.4.1, 2)	Assist TMDL development, help determine if current clarity goals are reasonable.	must be complete by 2005	preliminary estimate: $416,000	Part of TMDL Program
Watershed Modeling	627, 628, 10110	LRWQCB	Develop hydrology model from intervening zones to estimate total direct sediment and nutrient loading (4.3.3, 4.4.1, 2, 3, 4)	Assist TMDL development.	must be complete by 2005	preliminary estimate: $380,000	

Project	R&M EIP Project #	Participants	Goals, Objectives, Sub KMQs addressed	How project will help guide future management activities	Expected Completion Date	Funding	Comments
TIIMS Data Management System	10154	USFS, NDEP, LRWQCB, TRPA	Develop an integrated database management system for Tahoe based research and monitoring programs (4.3.1, 2, 3, 4)	Provide an easily accessible source of Tahoe-specific information to help guide management decisions	Ongoing	$168,000 TRPA, $140,000 USFS, $163,000 Lahontan - Seeking $540,000	
TRG Water Clarity Research	627	TRPA, TRG, LRWQCB	Provide long term data for Secci and PPR (4.3.1, 3, 4, and 4.2.2, 3)	Provide hard data for clarity decline, including biological and nutrient data. Data will be used to develop clarity model	Ongoing	$110,000 per year	Data is published in annual water quality report
Littoral Monitoring	429	TRPA	Monitor Lake Tahoe for turbidity to determine compliance with Water Quality Threshold. (4.3.3, 4, and 1.2.10)	Evalute nearshore activities in relation to elevated turbidity, identify prestine lake shore for protection	Ongoing	$5000 per year (TRPA staff and boat time)	Funding needed for more sensitive equipment
Near Shore Turbidity Study - Phase I	429	DRI, TRPA	Measure near shore turbidity and near shore chlorophyll concentrations. (4.3.3, 4 and 1.1.1, 2, 3, 6, 13)	Identify areas with degraded water quality to target restoration efforts. Provide basis for possible change in turbidity threshold for the regional plan update	preliminary report will be available summer 2002	Total cost $70,000 (DRI est.) TRPA reports $35,802	Initial results show near shore water quality can identify problem areas. More data needed.
Near Shore Turbidity Study - Phase II		DRI, LRWQCB	Measure influence of runoff event on near shore turbidity, chlorophyll and particle size/composition (4.3.3, 4 and 1.1.1, 2, 3, 6, 13)	Identify areas with degraded water quality to target restoration efforts. Recommend protective numeric objective nearshore turbidity	Apr-03	$125,000 (approx.)	Will be done in conjunction with the Phase I study. Part of TMDL Program.