

Preliminary Recommendation Package
 Lake Tahoe Restoration Projects - SNPLMA Round 8 - Science & Research Projects
 Recommended by the Lake Tahoe Federal Advisory Committee 3/29/07

All subthemes should leverage previous and existing efforts to the extent possible, including the synthesis and analysis of existing data to further understand environmental processes, conditions and trends. These analyses should aim to extract possibly unknown, yet critical information from existing data sets. Any model application should leverage previous and existing efforts to the extent possible, including the use and application of existing data and models or model elements. Stakeholders in the Lake Tahoe Basin will be engaged early and through out the project for each subtheme.

Air Quality			\$700,000
Sub-Theme	Policy Information Need/Issue	Description	
Lake Tahoe Atmospheric Modeling System	The Tahoe Basin may be re-designated as a non-attainment air basin. Managers and decision-makers need better tools to understand and predict the consequences of actions that may exacerbate (e.g., prescribed burning) or improve (e.g., transportation projects) air quality conditions.	This sub-theme is intended to develop and validate a model that can be used to evaluate strategies to improve air quality in the basin and reduce the impact of the atmospheric deposition of N, P, and sediment on Lake Tahoe's water clarity. The modeling system must incorporate modules to assess pollutant transport, transformation, and deposition, along with simulating the complex meteorology present in the basin. Further, the system must be compatible with the emissions inventory developed for the basin and be capable of evaluating and assessing the impacts of nutrient and air-borne dust reduction projects, in-basin vs. out-of-basin pollutant impacts, fires, and abatement strategies on pollutant concentrations and deposition.	
Transportation	Improved information on elasticities and sensitivities of transportation types and incentives to inform transportation-related management strategies and policy choices.	In general, feasibility studies of many different transportation and transit options (e.g. private vehicles, buses, water taxis, etc.) are needed to understand the effects of incentives or disincentives. Research needs in this area include: (a) determining how people and their travel behavior would respond to changes in prices of parking or gasoline, (b) special vehicle use fees, increased or decreased congestion, (c) mandatory public transit to certain heavily-visited destinations, or (d) incentives to ride public transit or rideshare. Research needs in this area could also include studies to better quantify the link between vehicle trips and emissions including examination of: (a) the marginal impact of a vehicle trip on re-entrained dust; (b) the relationship of trip location and atmospheric deposition to the lake (e.g., do trips made further from the lake have less impact); (c) differences in emissions in summer versus winter; or (d) differences in emissions by type of vehicle.	
Forest Management & Fuels Reduction			\$1,000,000
Sub-Theme	Policy Information Need/Issue	Description	
Impact of Fire on Air and Water Quality	There is much uncertainty associated with the air and water quality impacts of prescribed fires. Expected acceleration of forest treatments could hinder or reverse the effects of other substantial efforts to improve air and water quality in the Tahoe Basin.	This sub-theme is intended to improve our knowledge and understanding of the contribution of fire to pollutant levels in the basin. Potential studies must be related to (1) the transport and deposition of aerosols from prescribed burns, (2) the impact of residential wood combustion during winter, (3) detailed chemical and physical measurements of emissions from prescribed burns, and (4) the impact of alternatives (e.g., chipping, mastication, or biomass energy generation) to prescribed burns on emissions.	
Fires and Fuels	There is clear policy direction to address the excessive fuel loads in Lake Tahoe Basin forests. Although major efforts have begun, there is much uncertainty about the effects and effectiveness of forest fuel treatment options.	Research is needed to increase our understanding in the following areas: (a) effectiveness of fuels treatment in reducing fuels and changing fire behavior; (b) effects of fuels treatment on forest associated species; (c) effects of fuels treatment on forest restoration objectives (e.g., forest succession or old forest characteristics); (d) historical conditions (disturbance regime, vegetation, and plant and animal populations) and their role in defining desired conditions for forest restoration (e.g., large trees and snags, vertical structure, plant and animal populations, or processes and functions); (e) effectiveness of fuels treatment on riparian ecosystem restoration and effects on water quality; and (f) development and testing of effective and efficient monitoring and associated indicators to provide timely feedback on project and cumulative effects of fuels treatment.	
Recreation	Tahoe Basin recreation capacity standards are outdated and are not applicable to both developed and dispersed recreation. Policy makers need new and specific information as a basis for new standards.	Recreation capacity is a multifaceted topic. Capacity standards must reflect social values related to environmental quality and recreational experience, and are further informed by institutional and infrastructural capacity. Research in this area should support the development of capacity guidelines for developed and dispersed recreation sites. Research should address one or more aspects of capacity: (a) developing environmental carrying capacity guidelines (e.g., environmental limits of acceptable change) for specific geographic settings based on recreation activities currently allowed or proposed; (b) social preferences related to crowding in different recreational settings in order to manage for a high quality recreation experience; (c) identify and assess systems for capacity planning that could augment or replace the PAOT system; or (d) research into optimizing the design and infrastructure (e.g., parking, access, or transit options) of recreation facilities found in mountain communities. Research will be used to inform the development of a recreation capacity model.	

Water Quality			\$1,100,000
Sub-Theme	Policy Information Need/Issue	Description	
Water Quality Modeling	Environmental water quality will soon be managed and regulated using a total maximum daily load (TMDL) approach. Managers and decision-makers will need tools to understand and predict the consequences of actions that may exacerbate (e.g., urban development) or improve (e.g., erosion control programs) Lake Tahoe water quality conditions.	This sub-theme is intended to develop a centralized effort to fill key knowledge gaps, develop new modeling products, evaluate/validate/update existing modeling tools, and apply these models to help agencies make key water quality management decisions. Key areas that require scientific support include, but are not limited to: (a) develop a full conceptual understanding of the important environmental processes with their subsequent incorporation into models; (b) development of new models; (c) revision and updating of existing models based on new information; (d) continued evaluation of existing models to insure that process algorithms, input data and numeric coefficients are justified; (e) continued model validation using Tahoe-specific monitoring data; (f) developing linkages between models where appropriate; (g) evaluate and update model input data; (h) application of models to assist in the formulation of management strategies and inform policy choices; and (i) development of approach for using monitoring and modeling to evaluate progress towards meeting TMDL pollutant reduction goals.	
Best Management Practices	Established programs are making substantial investments in best management practices (BMP) infrastructure. However the unique environment and sever land use constraints may reduce cost effectiveness and results in uncertainties regarding the selection of project alternatives .	Capital investments to install and retrofit BMP is the primary strategy for reducing pollutant loads reaching Lake Tahoe from storm water runoff and soil erosion. This sub-theme is intended to help address the knowledge gaps related to BMP design and implementation, and develop a regional monitoring program to evaluate effectiveness at the watershed to basin scales. Key areas that require scientific support include, but are not limited to: (a) BMP implementation, operations and maintenance for water quality treatment; (b) simulation of long-term management strategies; (c) development and application of new technologies; (d) source control and soil restoration; (e) enhancement of BMP design to target pollutants of concern; and (f) design of an integrated, cost effective regional monitoring program that is on based regulatory information needs and answers key questions related to pollutant reduction.	
Roadway Pollutants	Substantial investments in roadway pollution control projects will be made over the next decade. New information is needed in the short-term to maximize the success of future actions.	Roads and highways are a vital component of the Tahoe Basin infrastructure; however, there is some evidence to suggest they can also be a substantial source or conveyance of polluted runoff. Key areas that require scientific support include, but are not limited to: (a) understanding the specific sources of fine sediment, nitrogen and phosphorus associated with the roads; (b) determining the contribution of secondary roads to the loads found to come from regional highways; (c) tracking the transport of pollutants from the roads to the receiving water bodies; (d) understanding the importance of roadside features such as soft-shoulders, unpaved parking areas, curbs and drop-inlets, etc. on pollutant generation; (e) evaluating the impact of traffic volume and patterns on pollutant generation; (f) evaluation of BMP options; (g) understanding the role of road dust generation and the extent of its deposition onto the surface of Lake Tahoe; (h) development of a regional monitoring system to understand the local to basin-wide effects of actions taken; and (i) development of a comprehensive water quality management system for roads.	
Nearshore-Shoreline Ecology, Processes, and Stressors	Increased understanding of nearshore processes and quantification of the stressors affecting nearshore habitats	Research under this sub-theme would aim to address uncertainties and gaps in knowledge regarding Oxide of Nitrogen(NOx) from boat emissions and their direct depositions into Lake Tahoe as available nitrogen for algal production. It may also include research to enhance our understanding of littoral processes and support the development of the nearshore clarity and aesthetic indicators and standards. Additional research needs in the nearshore may include understanding the ecology, nutrient requirements and sources for increase attached algae growth.	
Climate Change			\$400,000
Sub-Theme	Policy Information Need/Issue	Description	
Climate Change and Application of Predictive Models	Future climate changes are predicted to have substantial environmental and economic consequences. New and expanding tools are needed to inform policy makers about how future climate change will specifically affect the Lake Tahoe Basin and provide information that can lead to proactive policy alternatives.	Research under this sub-theme should aim to analyze new and existing data that will lead to information that can be used to improve the ability of existing models to account for and estimate the effects of climate change. The research should aim to help prioritize of which model parameters are important, what should be measured, and what information is needed to parameterize and calibrate existing models. Factors that could be considered relate to meteorology, air quality, water quality, terrestrial vegetation and habitat composition. Once calibrated and verified, model use and application should become consistent among agencies basin wide.	
Watershed Restoration			\$200,000
Sub-Theme	Policy Information Need/Issue	Description	
Evaluation of Stream & Meadow Restoration Effectiveness	Evaluation of the effectiveness of stream and meadow restoration activities in the Lake Tahoe Basin to possible reduce sediment contributions (both actual & potential) to Lake Tahoe. Focus will be on a watershed scale and initially the Upper Truckee River watershed.	This description is currently being developed and will be available at the 4/12/07 Lake Tahoe Federal Advisory Committee meeting.	

Support for Established Science Programs			\$350,000
Sub-Theme	Policy Issue	Description	
Tahoe Science Consortium	Continued support is needed to allow the Consortium to continue to provide environmental managers and decision makers with comprehensive and well-synthesized scientific findings drawn from research, monitoring, and modeling.	Funding will cover staffing and scientist support for the continuing activities of the Tahoe Science Consortium, including: science planning, peer review, technical consultation, and science information communication to ensure quality science and scientific information support decision-making in the Lake Tahoe Basin.	
Total Science Funding			\$3,750,000

*The full \$3.75M available for SNPLMA Round 8 Science funding is allocated. A target level of funding has been identified for each of the seven theme areas (including the Tahoe Science Consortium) commensurate with their relative priority in Round 8. Actual funding levels may vary to some degree from targeted levels based on costs and merit of the proposals received through the ensuing request for proposals (RFP) prepared and administered by the USFS Pacific Southwest Research Station (PSW). It is intended that all theme areas receive funding close to their targeted funding levels in order to accomplish the objectives identified as priorities in this round of funding. Regardless of the allocation among theme areas, the total funding will not exceed \$3.75M. The cost of PSW program administration is estimated to be ~7% (\$263,000). Funds for PSW program administration will be reserved proportionately from each project awarded funding under the RFP.