

**SCIENCE, RESEARCH & MONITORING  
TAHOE PROJECT PROPOSAL**

<b>Project Name:</b> Air Deposition Studies in the Lake Tahoe Basin	<b>EIP #</b> 805, 10104, 10145
<b>Lead Agency:</b> U.S. EPA	<b>Contact:</b> Jane Freeman
<b>Threshold:</b> Water Quality/Air Quality	<b>Phone Number:</b> 775/588-4547 ext. 248
<b>Threshold Standard:</b> WQ-2, WQ-3, AQ-8	<b>Email Address:</b> freeman.jane@epa.gov
	<b>Total Project Cost:</b> \$363, 570
	<b>Round 6 Funding requested:</b> \$ 363,570
	<b>Is this a multi-year project?</b> No

**Project Description:**

Product shall inform and support the Pathway 2007 Environmental Threshold and Total Maximum Daily Load (TMDL) decision making process and the development and implementation of future regulations necessary to protect lake clarity. This competitive Request for Proposal (RFP) shall include:

- the identification and review of existing data regarding atmospheric deposition and impacts to Lake clarity, including the deposition of particulate matter, phosphorus and nitrogen to the Lake and their relative impacts.
- The RFP must also include an analysis of data gaps that will remain once other deposition projects are completed (such as those already approved for SNPLMA rounds 5 and 6).
- Based on a review of existing and future projects, potential research needs may include the following data to be collected and applied in the Tahoe-specific Emissions Inventory (which will be a product of other projects currently funded through SNPLMA funds and other work): total phosphorous ( $P_{tot}$ ) and phosphate ( $PO_4$ ), various species of nitrogen, and several size categories of PM with associated chemical analysis (depending on the information provided by the Lake Tahoe water clarity model).
- Project shall include estimates of deposition of lake-clarity reducing pollutants with Basin-wide application. This will require refinement of existing deposition estimates and the inclusion of additional on-lake measurements to be collected as part of this project.
- Research associated with this RFP shall capitalize on previous research, both in and outside of the basin, and will work with other project implementers and the P7 Air Quality and Water Quality Technical Working Groups to determine what additional data are necessary. Products shall have basin wide application and support environmental decision making for the Lake Tahoe Basin.
- A collaborative and complimentary research team approach is necessary.

**For Science & Research Projects briefly summarize the current state of knowledge of this subject matter:**

It is well known that the loss of Lake Tahoe's famed Clarity is primarily a result of the input of phosphorous, nitrogen, and particulates to the Lake. These pollutants enter the lake via runoff, loading from streams and rivers, on-lake pollutant sources and are deposited from the atmosphere. Recent studies have indicated that the atmosphere may be a significant contributor of these pollutants to the Lake. For this reason, it is imperative that the data necessary to reduce the deposition of these pollutants be obtained. Further, emissions inventories are one of the necessary tools in the development of management strategies to reduce the deposition of these pollutants. A complete, Tahoe Basin-specific emissions inventory is needed; existing studies will be developing this important tool, however additional information identified in this project is

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needed to complement the EI and more specifically address the sources of clarity-reducing components in the atmosphere.

**Describe the purpose and need for the project:**

Most current KMQ's include questions regarding the sources of N, P, PM and other air quality pollutants. Additionally, some question how these pollutants can be reduced. It is expected that this project will provide significant levels of information that will help answer many of the KMQs.

However, because not all of the necessary data regarding atmospheric deposition and sources of clarity-reducing pollutants are not yet available, current questions are somewhat general in nature. It is expected that as more information regarding the sources of air pollution, the movements of air pollution and finally, the deposition to the Lake becomes available, more specific KMQ's will be developed. Further, as other agencies' modeling efforts will soon provide more information regarding lake clarity, and the reductions necessary to meet assigned clarity standards, regulators will create strategies to reach the reductions needed from air pollutants.

In order to develop appropriate management strategies and controls, the Tahoe-specific emissions inventory will need to be developed and validated. To more specifically address reductions in atmospheric deposition, the additional information collected by this project will be necessary. For example, if the EI indicates that residential wood smoke is a significant source of the airborne P, N and PM, and the deposition estimates developed/refined by this project indicate that these pollutants are a significant source of the P, N and PM found in the Lake, then additional KMQs regarding the impacts of this source and associated reduction measures will be developed. In this event, managers will use their resources to create regulations that will reduce the emissions from this area-wide source. However, if the EI shows that this source does not have a large impact on clarity, then management resources will be better spent addressing other significant sources.

**Describe the goals and objective of the project (for Science & Research Projects describe Key Management Questions being addressed:**

- 1.1.1 What and where are the sources of [N, P, and sediments as fine particles], and in what quantities and relative contributions are they entering Lake Tahoe? What are the individual watershed loads and total loads? What are the specific natural and anthropogenic sources? How is this material transported in the watershed and what is its fate?**
- 1.1.2 What is the linkage of human disturbance and nutrient loading to Lake Tahoe? (What are the specific sources of nitrogen, phosphorous and fine sediment in urban runoff? Is the quality of Urban runoff changing over time? And if so, why?)**
- 1.1.8 What are the specific sources that contribute to atmospheric deposition of nutrients and sediment to the surface of Lake Tahoe?**

The data obtained from this project regarding lake clarity-reducing air pollutants will directly serve to answer the above questions. Not only will the product include ambient concentrations, but will go further to identify the sources of the atmospheric pollutants, their relative importance to both atmospheric concentrations and concentrations depositing to the Lake, and more specifically, the importance of the pollutants generated by a source to lake clarity. Further, once incorporated into the emissions inventory generated by the previously referenced project, a GIS-framework will aid managers in determining the impacts of various land-use scenarios. This will provide the information necessary for managers to implement the most productive and cost-efficient regulations

to reduce the impacts to air quality and Lake clarity.

Based on the existing KMQs and existing data available, the products from this project, in combination with the previously-referenced project, will satisfy the scientific needs identified by the Pathway 2007 Air Quality Technical Working Group (AQ TWG). In fact, the AQ TWG is currently proposing the inclusion of management standards and indicators that will require these products (i.e. the Tahoe-specific emissions inventory, deposition estimates, source allocation, etc.). Without these tools, managers will not be able to identify to what level pollutants must be reduced from sources in the Basin to protect air and water quality and which control measures are necessary to meet the reductions.

**1.1.7 What spatial and temporal factors affect the deposition of air pollutants to the lake and forest, and ultimately how do these pollutants contribute to lake clarity reduction?**

To determine the spatial and temporal factors affecting atmospheric deposition, and the behavior of pollutants (i.e. whether they will deposit to the Lake) a Tahoe Basin airshed model will be necessary. The model requires ambient air quality data, meteorological data, climate information, local land use patterns and scenarios, historical air quality and weather data, and an emissions inventory specifically based on Tahoe Basin air quality, meteorology, topography and natural and human factors. Without the emissions inventory, analyses will be limited such that resultant control measures may have a high degree of uncertainty and therefore may not produce the necessary pollutant reductions. Therefore, a Tahoe-specific emissions inventory, coupled with the GIS framework for use in evaluating land-use scenarios, will be necessary to answer this KMQ. This project will provide specific information regarding lake-clarity reducing pollutants that without the project, will be extremely limited in scope and ability.

**1.1.11 What is the relative contribution of in-Basin versus out-of-Basin pollutant sources at Lake Tahoe?**

**1.1.14 What pollution is produced by vehicle emissions and from road surfaces and how do they affect lake clarity?**

The products developed by this project will address the sources of atmospheric pollutants impacting Lake Clarity. This will include the identification of in-Basin versus out-of-Basin sources, and the relative importance of in-Basin sources such as motor vehicle impacts (i.e. emissions, re-suspended road dust, etc.). Coupled with the other tools mentioned above, the impacts of specific sources to Lake Clarity will be identified.

**1.1.15 What techniques are available to reduce in-Basin sources of atmospheric pollution (wood smoke emissions, road dust, NOx from automobile exhaust, etc.)?**

**1.1.3 By identifying the sources and their relative importance, managers will be able to identify the most appropriate techniques for reducing air pollutants. This project will more specifically identify the sources and relative importance of those pollutants which impact lake clarity. What and where are the sources of [N, P, and sediments as fine particles], and in what quantities and relative contributions are they entering Lake Tahoe? What are the individual watershed loads and total loads? What are the specific natural and anthropogenic sources? How is this material transported in the watershed and what is its fate?**

1.1.4 **What is the linkage of human disturbance and nutrient loading to Lake Tahoe? (What are the specific sources of nitrogen, phosphorous and fine sediment in urban runoff? Is the quality of Urban runoff changing over time? And if so, why?)**

1.1.8 **What are the specific sources that contribute to atmospheric deposition of nutrients and sediment to the surface of Lake Tahoe?**

The data obtained from this project regarding lake clarity-reducing air pollutants will directly serve to answer the above questions. Not only will the product include ambient concentrations, but will go further to identify the sources of the atmospheric pollutants, their relative importance to both atmospheric concentrations and concentrations depositing to the Lake, and more specifically, the importance of the pollutants generated by a source to lake clarity. Further, once incorporated into the emissions inventory generated by the previously referenced project, a GIS-framework will aid managers in determining the impacts of various land-use scenarios. This will provide the information necessary for managers to implement the most productive and cost-efficient regulations to reduce the impacts to air quality and Lake clarity.

Based on the existing KMQs and existing data available, the products from this project, in combination with the previously-referenced project, will satisfy the scientific needs identified by the Pathway 2007 Air Quality Technical Working Group (AQ TWG). In fact, the AQ TWG is currently proposing the inclusion of management standards and indicators that will require these products (i.e. the Tahoe-specific emissions inventory, deposition estimates, source allocation, etc.). Without these tools, managers will not be able to identify to what level pollutants must be reduced from sources in the Basin to protect air and water quality and which control measures are necessary to meet the reductions.

1.1.8 **What spatial and temporal factors affect the deposition of air pollutants to the lake and forest, and ultimately how do these pollutants contribute to lake clarity reduction?**

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**1.1.15 What techniques are available to reduce in-Basin sources of atmospheric pollution (wood smoke emissions, road dust, NOx from automobile exhaust, etc.)?**

By identifying the sources and their relative importance, managers will be able to identify the most appropriate techniques for reducing air pollutants. This project will more specifically identify the sources and relative importance of those pollutants which impact lake clarity.

**Describe the anticipated project accomplishments:**

Expected accomplishments include:

- Data regarding the ambient concentrations of air pollutants which impact Lake clarity (to fill in existing data ‘gaps’).
- Information regarding the relative importance of pollutant sources.
- Data that will be incorporated into the Tahoe-specific emissions inventory being developed under another project (will require coordination with the project implementers).
- Refined estimates of the deposition of pollutants to Lake Tahoe which reduce lake clarity, including additional on-lake measurements of deposition.
- Output that will be useful for the EI and a future Tahoe airshed model. Products will also comply with TIIMS formatting needs.
- Discussion and recommendations regarding source controls and ongoing monitoring needs.

**Describe the “readiness” of this project to move forward**

Key tools, such as the Tahoe Emissions Inventory, will be in-place such that the information generated from this project will be able to be directly utilized by researchers and agencies to develop management strategies for Pathway 2007.

**Describe potential partnerships for this project.**

DRI which is developing the EI, Lahontan Regional Water Quality Control Board, TRPA, USFS, CARB, Other AQ agencies (i.e. Washoe County AQMD, Placer/EI Dorado County APCD, NDEP, etc.)

**For Science & Research Projects describe how this project will guide future management activities:**

This project will contribute information specific to the deposition of pollutants to the Lake for use in the development of a baseline emissions inventory, which is a necessary tool for managers to identify where resources need to be focused to reduce impacts. As previously mentioned, the EI and associated deposition information will directly contribute to the attainment of proposed management standards for the Air Quality Threshold (P7 AQ TWG, 2005) serving as the basis for the updated Regional Plan and other Agencies’ regulatory documents in the Basin. Information is also needed by the water quality agencies to address TMDL requirements.

**Include an 8 ½ X 11 map depicting the project, or research/study area.**

NA

**APPENDIX B-7  
LAKE TAHOE RESTORATION PROJECTS  
ESTIMATED COSTS & KEY MILESTONE DATES**

Project Name: Air Deposition Studies in the Lake Tahoe Basin Agency: EPA  
 Prepared by: Jane Freeman Phone: 775/588-4547 #: 805, 10104, 10145  
 EIP

**SNPLMA Project # XX, (Priority # 6-1)**

**Identify estimated costs of eligible reimbursement expenses:**

1. **Planning, Environmental Assessment and Research Costs** (specialist surveys, reports, monitoring, data collection, analysis, NEPA, etc.)  
 \$ 0 0%
  2. **Direct Labor (Payroll) to Perform the Project**  
 \$ 0 0%
  3. **Project Equipment** (tools, software, specialized equipment, etc.) None valued at \$5,000 or greater / item  
 \$ 0 0%
  4. **Travel** (including per diem where official travel status required to carry out project, such as serve as COR, experts to review reports, etc.)  
 \$ 0 0%
  5. **Official Vehicle Use** (pro rata cost for use of Official Vehicles when required to carry out project)  
 \$ 0 0%
  6. **Cost of Cooperative Agreement(s) and/or Contract(s) to Perform the Project**  
 \$ 363,570 100%
  7. **Other Costs** (direct labor for agency personnel to do project procurements; COR; PI; personnel assigned as NEPA lead; personnel assigned to review contracted surveys, designs/drawings, reports, etc.; project manager and/or project supervisor; and contracted costs for project manager and/or project supervisor if contracted separately)  
 \$ 0 0%
- TOTAL\*:** \$ 363,570 100%

**Estimated Key Milestone Dates:**

Milestones/Deliverables:	Date:
<b>Final Completion Date:</b>	

**COMMENTS:**