

Appendix B-8

LAKE TAHOE RESTORATION PROJECTS ESTIMATED NECESSARY EXPENSES & KEY MILESTONE DATES

Project Name: Lake Forest Area B Erosion Control Agency: Placer County
 Prepared by: Amy Green Phone: 530-581-6234 EIP #: 10061, 649, 941, 943, 944, 1004, 10142, 10143, 10144
 SNPLMA Project #: _____

Identify estimated costs of eligible reimbursement expenses:

1. Planning, Environmental Assessment and

Research Costs (specialist surveys, reports, monitoring, data collection, analysis, NEPA, etc.) \$ _____ %

2. FWS Consultation—Endangered Species Act \$ _____ %

3. Direct Labor (Payroll) to Perform the Project \$ _____ %

4. Project Equipment (tools, software, specialized equipment, etc.) \$ _____ %

5. Travel (including per diem where official travel status required to carry out project, such as serve as COR, experts to review reports, etc.) \$ _____ %

6. Official Vehicle Use (pro rata cost for use of Official Vehicles when required to carry out project) \$ _____ %

7. Cost of Contracts, Grants and/or Agreements to Perform the Project \$ 2,500,000 100 %

8. Other Direct and Contracted Labor: Agency payroll for the Contracting Officer to do project procurement, COR, Project Inspector, Sec. 106 Consultation if required, NEPA Lead, Project Manager, Project Supervisor, and subject experts to review contracted surveys, designs/drawings, plans, reports, etc.; Also covered is the cost to contract for a Project Manager and/or Project Supervisor if contracted separately from other project contracts) \$ _____ %

9. Other Necessary Expenses (See Appendix B-11) \$ _____ %

TOTAL: \$ 2,500,000 100 %

Estimated Key Milestone Dates:

Milestones/Deliverables:	Date:
Complete Environmental Documents (CEQA / NEPA / TRPA)	Summer 2008
Final Plans	Winter 2008
Start Construction	July 2009
Final Completion Date:	October 2011

COMMENTS:

Funding request for water quality improvements to be constructed by qualified contractor. See Exhibit C

**APPENDIX K
LAKE TAHOE CAPITAL PROJECT PROPOSAL
ROUND 9**

Consistency with Lake Tahoe nomination criteria:

Project nominations must qualify as an Environmental Improvement Program (EIP) project and be the responsibility of the federal government (federal share responsibility); and have a willing and ready federal sponsor.

Project nominations must be consistent with one of the focus areas in the June 2006 Federal Vision (pp. 8-9) (<http://www.fs.fed.us/r5/lbmu/documents/lbmc/revised-FV-Final.pdf>) and fit into at least one category.

Capital Focus Area (as described in the 2006 Federal Vision): Watershed and Habitat Improvement

Circle a minimum of one category:

1. Continued emphasis on fuels reduction in coordination with projects funded under the 2006 SNPLMA amendment (the “White Pine” amendment).
2. Continued implementation of projects approved in Rounds 5 through 8 which implement the EIP. Project proposal should clearly describe the phase/product being produced along with the consequence of not completing the project phase proposed for Round 9.

List project(s): _____

3. Project is consistent with and contributes toward TMDL pollutant reductions within the four source categories (atmospheric, urban & groundwater, forested uplands, and stream channel).

List category (ies):_urban, forested uplands, stream channel **Urban & Groundwater, Stream Channel**

4. Control of aquatic invasive species and prevention of new aquatic invasive species.

**Project Name: Lake Forest Erosion Control Project EIP #: 10061, 649, 941, 943, 944,
1004, 10142, 10143, 10144**

Lead Agency: United State Bureau of Reclamation Contact: Myrnie Mayville

Email Address: mmayville@mp.usbr.gov Phone Number: (775) 589-5240

Threshold: WQ, SC, V, W, SR, R

**Threshold Standard: WQ – 1,2,4,5,6;
SC – 1,2; V – 1,3; W – 1,2 ; SR – 3; R – 1,2**

Funding Requested in this Round: \$2,500,000 Total Project Cost: \$6,467,588

Is this a multi-year Project? Yes (If “Yes”, describe in the Detailed Project Description below number of years or phases and which year the requested funding will cover)

Project Summary (maximum 200 words): (applicable ONLY to this Round 9 project):

The project area encompasses approximately 625 acres and is a part of the Lake Forest and Polaris Creek Watersheds. The project will construct/restore Lake Forest and Polaris Creek, restore the Lake Forest Meadow, enhance the Aspen drainage (which connects to the existing outlet of Lake Forest Creek), restore the East Springs and enhance the efforts of an ongoing urban area erosion control project.

Funding for this request will be used for construction of the SEZ/wildlife enhancement components including stream channel construction, meadow restoration, and integrate with the proposed water quality improvements of Placer County’s urban area Lake Forest Erosion Control Project (Area B - EIP Project No. 10061). All improvements are considered to benefit the control, conveyance and treatment of storm water runoff in the project area. Benefits include restoration of historic hydrology, improved water quality by treating stormwater naturally, enhancement of degraded SEZ’s, and improved wildlife habitat. Construction is anticipated to begin in 2009.

Detailed Project Description (focuses on what Round 9 is funding; list the number of years or phases the Round 9 requested funding will cover; if phased, briefly describe how this project links into previously phased projects including what remains for Rounds 10 and beyond).

The project area is located along State Route 28 (SR28) approximately 2 miles east of Tahoe City. Please refer to Exhibit A for project vicinity and location map. The project is situated in the Polaris and Lake Forest Creek Watersheds, and is irregularly-shaped. The project area is generally bounded by Lake Forest Road on the west. The northern segment of the Project Area is north of SR28, and incorporates the Highlands Subdivision including Cedarwood Drive and a section of Country Club Drive (**Highlands**). The eastern segment of the project area incorporates Panorama Estates, Lake Forest Village and Skylandia Park (part of Tahoe Island Park) south of SR28 west to Lakewood Lane (**Panorama**). The central portion of the project is dominated by the geography of a wet meadow at the convergence of Polaris Creek and Lake Forest Creek and incorporates the Lake Forest Subdivision, Lake Forest Glen and St. Francis Condominiums, and the light industrial and commercial district along Lake Forest Road (**Lake Forest**). The hydrologic boundary of the project covers 1,295 acres while the defined project area encompasses 625 acres of residential, commercial and publicly-owned properties.

The project area encompasses land or right-of-way (ROW) controlled by Placer County, California Tahoe Conservancy (CTC), California State Parks Department of Recreation (DPR), United States Forest Service (USFS), United States Coast Guard (USCG), Regents of University of California, Tahoe City Public Utility District (TCPUD), and private property owners.

SNPLMA Round 9 funding will be focused toward project construction to include restoration of two creeks, Lake Forest and Polaris, Round 10 funding will also be sought for project construction to include restoration of the Aspen Drainage, and the Springs, all of which traverse portions of the project area and will be complemented by the erosion control project (Exhibit B). Upstream of State Route (SR) 28, Lake Forest Creek is incised with manmade structures and placed fill that encroach on the channel and stream environment zone (SEZ). The reach just upstream of the SR 28 crossing has been relocated and channelized. Just downstream of the highway crossing, Lake Forest Creek is completely buried in a storm drain until approximately 1,000 feet upstream of

Lake Forest's outlet to Lake Tahoe, where the creek joins the Aspen Drainage. The piped stream flow has eliminated floodplain function and wet meadow hydrology, resulting in a desiccated meadow and lack of proper ecological function. This has also created a history of flooding within the project area during heavy storm events, downstream of the Lake Forest Glen Condominiums at the storm drain outlet. Downstream of the storm drain outlet, the riparian area of Lake Forest Creek has been degraded through channelization and urbanization. Most of the channel has been straightened or otherwise altered. The wetlands at the mouth of the creek at Lake Tahoe are also degraded and mostly non-functional.

The Polaris Creek watershed is relatively undeveloped. The section of Polaris Creek upstream of SR 28 has been channelized and disconnected from its surrounding meadow. In addition, fill has been placed within the meadows, destroying critical habitat. Downstream of SR 28, construction of Pomin Park disrupted the natural flow of water and environment at the mouth of Polaris Creek and the wetland complex just upstream of the mouth within and adjacent to Pomin Park. Existing wetlands have been degraded by placement of fill. The creek reaches that drain the wetland have been channelized and disconnected from their floodplain meadows.

The Aspen Drainage collects storm water from Lake Forest Road and is constantly affected by the deposition of sand from snow removal practices. As a consequence a drainage channel has been created, which does not take advantage of the potential for wet meadow infiltration and filtering of sediments. The drainage continues to the outlet of the Lake Forest Creek stormdrain and ultimately outlets to Lake Tahoe.

The SEZ / Wildlife Enhancement component (Phase 1 – Round 9 funding) of the project involves daylighting Lake Forest Creek from a 1000 foot culvert and reconstructing altered segments of Polaris Creek. Lake Forest Creek was placed in a culvert at Highway 28 for the development of the Lake Forest Glen Condominiums and directed to the Aspen drainage (flows through Skylandia Park) that eventually outlets to Lake Tahoe at the end of Bristlecone Avenue. The historic drainage patterns of Polaris Creek have been relocated for various development and significantly altered ground and surface water hydrology. The project proposes to reconstruct the Lake Forest channel in the meadow and change the outlet to Pomin Park and Star Harbor. There will also be significant restoration of the Lake Forest Creek above Highway 28, including removal of a concrete channel, bank stabilizations, and floodplain restoration. Additionally, fill will be removed from the Aspen drainage and the meadow will be restored along with the existing outlet of Lake Forest. Segments of Polaris Creek will be reconstructed that will restore historic drainage patterns and deliver more water to the Lake Forest meadow. The project will greatly enhance degraded SEZ's, restore the stream / floodplain relationship, improve water quality through natural processes, and enhance terrestrial and aquatic wildlife habitat. It is anticipated the project will take three years to construct. Year 1 will involve construction of all new channels and revegetation. Phase 2 (Second year – Round 9 funding) will be a year of irrigation and seasoning of all new revegetated areas. Phase 3 (Third year – Round 9 and 10 funding) will involve creating connections to the new channels, irrigation, flushing the new channels, blocking the existing culvert, and restoration of the Aspen Drainage and Springs. This project has received SNPLMA erosion control funding through USFS sponsorship for planning and anticipates seeking additional funding for construction of erosion control portions of Area B (urbanized zones of project area). It is necessary for the SEZ / Wildlife restoration to occur first due to the fact that significant stormwater water will be directed through the SEZ from the erosion control components.

The anticipated project improvements resulting from the SNPLMA USBR-sponsored funding should vastly improve the water quality of storm water runoff of the project area and have a positive future effect on the quality and clarity of Lake Tahoe.

Describe the goals and objectives of the project (those applicable ONLY to this Round 9 project):

In general, the goals of the SEZ improvement component of the project include water quality, soil erosion control, enhancement of terrestrial and aquatic wildlife habitat, and enhancement of vegetation and scenic resources through restoration of natural functions processes. The preservation and restoration of SEZs is an important component of the EIP. Functional SEZs protect the clarity of the lake, by providing natural storm water treatment and stable conveyance of runoff. They often include diverse plant communities and are a key habitat for wildlife.

Multiple natural stream channels within the project areas have been destroyed, with the streams rechanneled into man-made conduits or other existing stream channels. Reconstruction of historic stream channels and rechannelization of flows back into them, taking into account existing developed conditions, is a primary project objective. Restoring a more natural, or wetter, moisture regime to existing meadows leading to greater vitality of the plant community is an additional objective.

This project also includes goals for habitat restoration that will accompany the enhanced SEZ. Habitat and animal travel routes have been reduced, fragmented, and degraded by urbanization. Even in areas of less intensive development, the natural landscape has been significantly modified by residential subdivisions and the construction of roads and houses. There are three major objectives for wildlife/fisheries and habitat restoration. They are as follows:

- Preserve, through fencing or other means, a wide variety of habitat types, as well as the corridors, so animals can move from one area to another.
- Upgrade existing habitat to restore diversity by creating a mosaic of vegetation types and ages, and by enhancing meadow habitat for deer and other animals and birds by restoring diverted natural water sources and removing invading lodgepole pine.
- Maintain habitat quality by managing public access and recreation.

The primary approach to wildlife enhancement is the restoration of Lake Forest Creek into a new channel in the meadow area that is owned by the CTC. An additional approach is to create habitat "edges" and revegetate eroded areas, even to purposely leave snags and downed logs for creatures that depend on them for perches, nesting or cover.

Describe the anticipated project accomplishments (i.e. products or identifiable environmental benefits being produced or implemented under this project):

Upon completion of the project it is expected 44 acres of SEZ's will be restored as well 7,970 feet of stream channels. Although the majority of the streams in the project are not fish bearing there will be great benefits to other aquatic species such as macroinvertebrates and amphibians. The restoration of historic surface / groundwater hydrology will greatly enhance vegetation with the eventual expectation that a complex mosaic of species and ages will result in high quality terrestrial habitat. It is anticipated that the introduction of willows into the meadow could create desirable bird habitat (especially willow fly catcher).

The proposed improvements of this project are also essential to achieving substantial sediment reduction, by directing pretreated stormwater from the projects erosion control components through the restored SEZ. Recent research, conducted as part of developing Total Maximum Daily Load (TMDL) water quality standards for Lake Tahoe, has shown that on the order of a 50 percent reduction of the pollutants reaching Lake Tahoe, including fine sediment, will ultimately reverse the downward trend of Tahoe's water clarity.

Describe the "readiness" of this project to move forward (urgency, capacity, capability, environmental documentation etc.):

All planning of the project has been fully funded and a number of products have been completed. To date, the planning process has completed an Existing Conditions Analysis Memorandum (including a Wildlife and Recreation supplement), Formulation of Alternatives Memorandum, Evaluation of Alternatives Memorandum, Preferred Alternative Report, and 25% Design Plans. It is anticipated that environmental documentation (CEQA and NEPA) and final design plans will be completed by the summer of 2008. This project will be ready to construct in 2009.

Even though funding commitments for final design are in place, future SNPLMA funding for construction is critical to maintain the momentum and readiness of this project.

Describe partnerships for this project. (if applicable, project should identify partner funding [committed/secured] and how it is integrated into the project)

This project has had close collaboration with many area agencies, both funding and regulatory. The project has received funding from three programs at the California Tahoe Conservancy (Erosion Control, Wildlife, and SEZ), the United States Forest Service, the Tahoe Regional Planning Agency, and the U.S. Bureau of Reclamation. Through a Technical Advisory Committee process, the project has been jointly developed with the above listed agencies, as well as the California Department of Transportation (they presently are planning a project through the area and are collaborating), Lahontan Regional Water Quality Control Board, the Tahoe City Public Utility District, the California Department of Parks and Recreation, the University of California Davis, and community members.

The erosion control project being conducted concurrently with the SEZ/Wildlife enhancement project identifies water quality alternatives that are consistent with the SEZ/Wildlife improvements. The County is working with the Tahoe Resource Conservation District (TRCD) Backyard Conservation Program/BMP Retrofit Program to provide technical assistance to property owners to implement BMPs on their properties throughout the entire Lake Forest Subdivision.

Describe the project monitoring that will be implemented as part of this project including:

1) The questions the monitoring program is designed to answer

The project is developing a comprehensive monitoring plan that will focus on five monitoring groups: Photographs, Hydrology and Geomorphology, Water Quality, Vegetation, and Terrestrial and Aquatic Wildlife. Presently all baseline monitoring is completely funded including a comprehensive water quality monitoring program, extensive wildlife surveys, groundwater well installation and monitoring (presently additional groundwater monitoring is

being sought by TRCD with a grant proposal to the CA Department of Water Resources). The primary questions the monitoring will answer are as follows:

- What is the effect of the entire project on water quality (nutrients and sediment);
- what is the effect of the SEZ/ Wildlife phase on surface and groundwater hydrology, aquatic and terrestrial wildlife habitat and populations, and vegetation communities and vigor; and
- Additional geomorphic and photographic monitoring will answers questions relating to success of design at creating natural watercourses.

2) **The monitoring approach** (describe the methods and strategies [i.e. monitoring, research, or both] that will be used to verify whether the project goals and objectives have been met. A detailed monitoring/research plan is not required, but enough detail must be provided to allow someone that is unfamiliar with the project to understand and evaluate the proposed methods and strategies.)

The following approaches will be taken for each of the monitoring groups:

- **Photographs:**

Groundbased photopoints will be established throughout the project area and in conjunction with other surveys (groundwater, geomorphology). Additionally, aerial photos will be obtained for monitoring changes in channel planforms, plant communities, and meadow vegetation structure.

- **Hydrology and Geomorphology:**

Discharge at the end of the project area will be measures to determine the effect of the project on reducing the peak and timing of the hydrograph. Groundwater will be monitored with wells to determine if the project raises seasonal groundwater elevations. The new channels will have extensive geomorphic monitoring using standard protocols, including: longitudinal profiles, cross sections, and sediment surveys. These surveys will also utilize photos to document changes. This monitoring will evaluate the effectiveness of the project at creating geomorphically stable channels and potentially lead to adaptive management.

- **Water Quality:**

Due to the complex network of drainages in the project area to determine the water quality monitoring strategy involves measuring water quality entering Lake Tahoe pre and post project. The two outlets of the project area will be comprehensively monitored for nutrients and sediment. Gauging stations have been established to measure discharge. These stations are equipped with automated samplers that will sample all parts of storm hydrographs for both nutrients and sediment (including particle size distribution to determine the fine fraction). This monitoring will determine the annual and storm sediment and nutrient loads entering the lake before and after the project.

- **Vegetation:**

Vegetation will be monitored with both ground and aerial photos. Ground photos will be used to measure the vigor of vegetation in the restored meadow. These photos will be linked to local groundwater elevations to determine the seasonal effects of the project. Aerial photos will be analyzed to determine if plant communities have changed and to determine the effect of the project on meadow structure (development willow).

- **Aquatic and Terrestrial Wildlife:**

Extensive wildlife surveys have been conducted using standard protocols for small mammals, bats, butterflies, birds, and reptiles/amphibians. Due to the fact the project predicts to have significant benefit to birds additional surveys are planned before construction. The surveys will be repeated after the project to evaluate the effect of the project on these species. Components of other monitoring groups such as vegetation, photos, geomorphology, and

hydrology will be utilized to help assess habitat quality in order to determine a comprehensive assessment of the project's effect on wildlife.

3) Whether this project monitoring fits into a larger monitoring or research program (including how information from the monitoring and research will be used to improve the continued performance of the proposed project or improve future similar projects)

Numerous other stream and habitat restoration projects are planned throughout the Lake Tahoe basin over the next few years and it is anticipated this monitoring will be used to evaluate overall effectiveness of projects in the basin. There has been a concerted effort by agencies in the basin to develop consistent protocols for monitoring and this plan has those into effect. Restoration of the Upper Truckee River in South Lake Tahoe has led the effort to develop consistent monitoring methods of these types of projects and that has been a guide for development of this plan. The water quality monitoring plan has also specifically tried to answer key questions needed in the development of the Tahoe TMDL. Additionally, if a groundwater monitoring grant proposal is funded a key question of what the impact of directing stormwater to SEZ's has groundwater quality will be answered. It is anticipated that this monitoring can be a key component to the larger regional research efforts on evaluating restoration effectiveness on water quality, hydrology, wildlife, and vegetation.

Describe these two items which will be considered along with the above project monitoring information by the Tahoe Science Consortium related to research and monitoring resource areas and the effectiveness of environmental restoration activities:

1) Describe the specific goals and objectives of the project and describe how fulfilling those objectives will contribute to the achievement of one or more environmental thresholds.

The overall project has developed a comprehensive list of goals and objectives but for the purpose of developing an effective monitoring plan this phase of the project has developed these very specific goals and objectives. The plan clearly links the anticipated monitoring and methods to these goals and objectives:

Goal #1: Restore properly functioning geomorphic channel configuration

- Objective 1a: Build and restore channels to a size and shape that replicate historic geomorphology and flood frequencies within constraints.
- Objective 1b: Eliminate or reduce the need for maintenance by designing a geomorphically stable channel. Note that stability in this sense is a dynamic equilibrium; the channel is not intended to be perfectly stable in one location over time. However, change should not be catastrophic, but rather characterized by natural channel movement over time, with erosion and depositional processes in balance.

Goal #2: Improve aquatic and wildlife habitat.

- Objective 2a: Create or enhance aquatic habitat (amphibians and macro-invertebrates) by constructing new channels, placing desirable bed substrate, and enhancing wet meadow habitat.
- Objective 2b: Create or enhance terrestrial wildlife habitat (birds and small mammals) by enhancing wet meadow habitat and creating complex meadow structure.
- Objective 2c: Protect sensitive wildlife habitat areas from excessive public use by managing public access.

Goal #3: Improve water quality through naturally functioning floodplains and standard erosion control techniques.

- Objective 3a: Increase storage of flood flows on and in floodplain (increase contact time with wetland plants).
- Objective 3b: Raise the level of groundwater and the potential for water quality treatment by wetland plants.
- Objective 3c: Improve water quality entering the lake through various erosion control methods and by directing pretreated stormwater into the restored meadow.

Goal #4: Improve riparian, meadow, and upland vegetation.

- Objective 4a: Increase spatial extent and vigor of native obligate wetland species and wet meadow plant communities.
- Objective 4b: Increase spatial extent, canopy cover, and recruitment of montane riparian scrub vegetation.
- Objective 4c: Increase groundwater elevations and flooding (water availability) throughout the growing season in the floodplain to support wet meadow plant communities.
- Objective 4d: Remove conifer encroachment in meadows and aspen stands.
- Objective 4e: Improve upland forest habitat structure.
- Objective 4f: Eliminate invasive species.

Goal #5: Construct projects effectively and efficiently.

- Objective 5a: High success in project re-vegetation.
- Objective 5b: Protect existing resources during construction.
- Objective 5c: High construction efficiency given project constraints.

2) Describe the risk to the environment from failure of the proposed project (i.e. if the project fails what is the environmental consequence).

If the project fails to move forward, the most significant environmental consequence is delaying progress on decreasing pollutant loading to Lake Tahoe. Secondly, the opportunity to enhance 44 acres of SEZ is missed and there will be continued adverse impacts on the existing streams and wildlife.

Failure to move forward on the Lake Forest Erosion Control Project will result in current storm water discharges to continue at levels considered detrimental to the quality and clarity of Lake Tahoe. Specific recent studies of urban storm water runoff indicate this lake input has one of the most significant factors in the continued decrease in water clarity. Because this project proposes to restore approximately 44 acres of SEZ at such close proximity to the lakeshore, implementation of this project in a timely manner is critical to help reducing pollutant loads and meeting key environmental thresholds and future TMDL allocation goals.

The proposed project intends to improve existing conditions without negatively impacting the downstream properties. As part of the reconstruction of Lake Forest Creek, a small berm will be constructed to prevent potential flooding during a normal storm event. If the project should fail structurally during a normal storm event, (i.e. a berm breach) it could impact downstream properties with short term flooding. The project will not cause a negative environmental impact during other storm events, such as a 50-yr or 100-yr event. It should also be noted that a failure of any proposed project improvements such as a berm breach occurring as a result of a storm event

that exceeds design parameters is projected to have less of an impact (i.e., zone of flooding would be smaller) on downstream properties than from flooding caused by the same storm event under existing conditions.

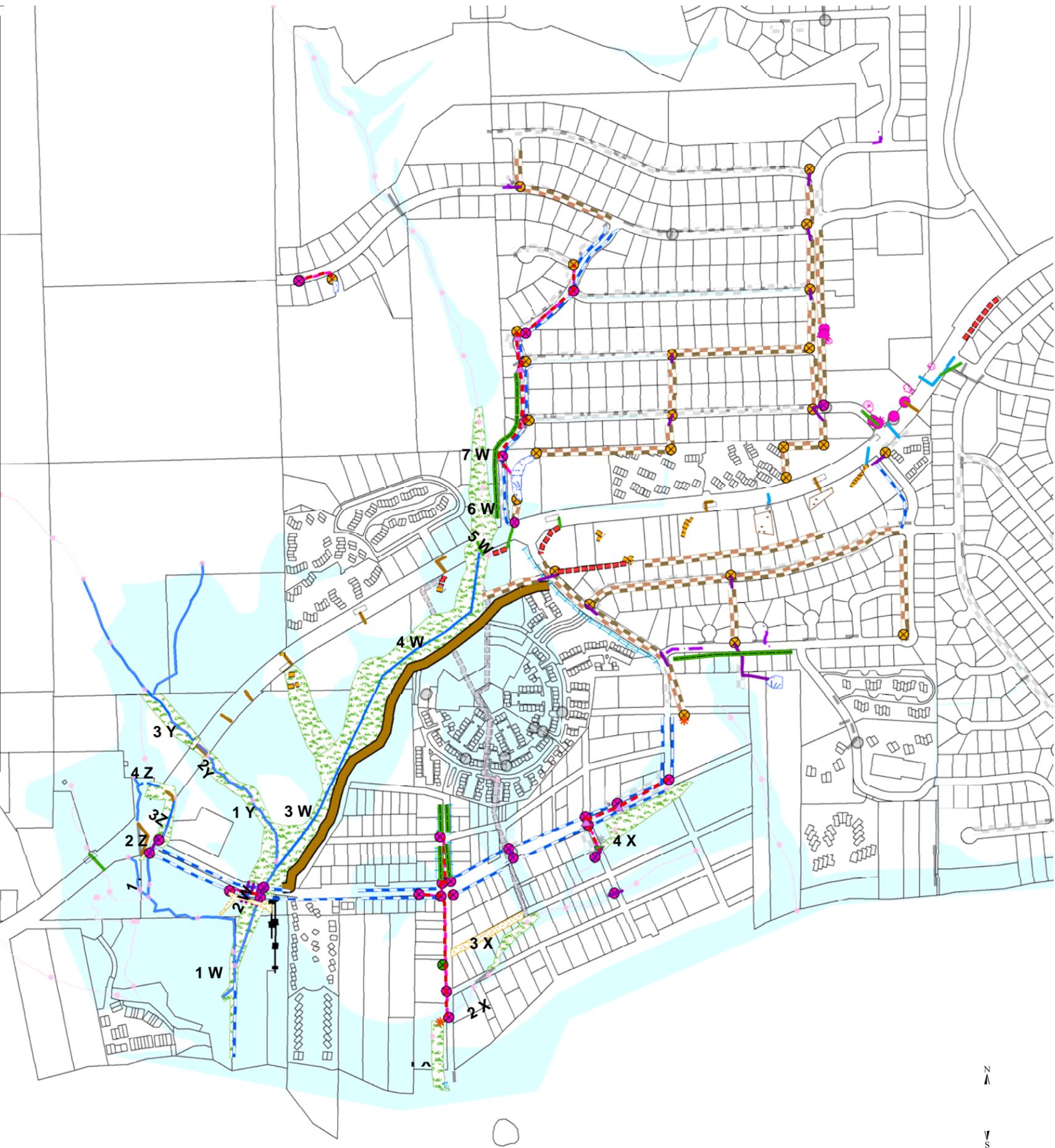
Describe how the project results will be communicated and made available to the public.

Through the overall environmental review process a series of public meetings have been held and are planned for the future. It is also anticipated results of the monitored will be presented at various regional venues such as LTIMP and local science conferences. Additionally, due to the fact UC Davis is involved with the water quality monitoring it is expected publishable research will be generated and presented. Additionally all documents produced from this project are available at County offices and the Tahoe City Public Library for review by any interested person.

Include an 8 ½ X 11 map depicting the project.

Legend

- | | | | |
|--|---|--------------------------|---|
| | Proposed Shoulder Treatment | Caltrans Culverts | |
| | Proposed Storm Drain | Replace | |
| | Proposed Infiltration Basin | | Caltrans Culvert to be Construct |
| | Proposed Pervious Pavement | | Existing Caltrans Culvert |
| | Proposed Caltrans Dissipation Structure | | Caltrans Culvert to be Lined |
| | Proposed Caltrans Sand Collection Vault | | Caltrans Culvert to be Replaced |
| | Proposed Caltrans Swale | | Proposed Coast Guard Parking Barrier |
| | Proposed Culvert | | Existing Streams |
| | Proposed Pre-Treatment Vault | | Proposed Stream Courses |
| | Proposed Manhole | | Proposed Restoration Reaches |
| | Proposed Drop Inlet | | Proposed Nahas Development Detention Basin |
| | Proposed Sediment Trap | | Proposed Nahas Development Drop Inlet |
| | Proposed Treatment Vault | | Proposed Nahas Development Energy Dissipation |
| | Proposed Energy Dissipation | | Proposed Nahas Development Lined Channel |
| | Proposed Lined Channel | | Proposed Nahas Development Culvert |
| | Proposed Slope Treatment | | Proposed Nahas Development Storm Drain |
| | Proposed Curb and Gutter | | Existing Stormdrain |
| | Proposed Parking Barrier | | Existing Culvert |
| | Proposed Berm (Where Needed) | | Existing Catch Basin |
| | Proposed Caltrans Rock Check Dam | | Existing Sediment Trap |
| | | | Existing Drainage Ditch |
| | | | AreaB_Parcels |
| | | | Verified_SEZ |



LAKE FOREST CREEK (REACHES 1w-7w)
 POLARIS CREEK (REACHES 1Y-3Y)
 ASPEN DRAINAGE (REACHES 1X-4X)
 SPRINGS (REACHES 1Z-4Z)



**SEZ/Wildlife Resoration Cost Estimate
Lake Forest Erosion Control Project Area B Preferred Alternative**

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
1	1W	Excavation	655	LF	\$70	45,850.00
2	1W	Construct Floodplain / Wet Meadow / Wetland	655	LF	\$50	32,750.00
3	1W	Revegetation	655	LF	\$20	13,100.00
4	1W	Temporary Irrigation	655	LF	\$20	13,100.00
5	1W	Remove/Construct Restroom	1	EA	\$55,000	55,000.00
6	1W	Create Stream Channel	655	LF	\$100	65,500.00

Subtotal 225,300.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
7	2W	Culvert Remove and Replace	520	LF	\$100	52,000.00

Subtotal 52,000.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
8	3W	Construct Floodplain / Wet Meadow / Wetland	1,610	LF	\$30	48,300.00
9	3W	Revegetation	1,610	LF	\$20	32,200.00
10	3W	Temporary Irrigation	1,610	LF	\$20	32,200.00
11	3W	Create Stream Channel	1,610	LF	\$100	161,000.00

Subtotal 273,700.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
12	4W	Excavation	880	LF	\$500	440,000.00
13	4W	Construct Floodplain / Wet Meadow / Wetland	880	LF	\$100	88,000.00
14	4W	Revegetation	880	LF	\$20	17,600.00
15	4W	Temporary Irrigation	880	LF	\$40	35,200.00
16	4W	Remove Storm Drain/Water Line	1	EA	\$10,000	10,000.00
17	4W	Create Stream Channel	880	LF	\$200	176,000.00

Subtotal 766,800.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
18	5W	Culvert Remove and Replace	0	LF	\$55	0.00

Subtotal 0.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
19	6W	Bank Stabilization	440	LF	\$200	88,000.00

**SEZ/Wildlife Resoration Cost Estimate
Lake Forest Erosion Control Project Area B Preferred Alternative**

20	6W	Temporary Irrigation	440	LF	\$20	8,800.00
21	6W	Berm Construction	440	LF	\$100	44,000.00
22	6W	Create Stream Channel	440	LF	\$100	44,000.00

Subtotal 184,800.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
23	7W	Excavation	500	LF	\$100	50,000.00
24	7W	Construct Floodplain / Wet Meadow / Wetland	500	LF	\$50	25,000.00
25	7W	Bank Stabilization	500	LF	\$300	150,000.00
26	7W	Revegetation	500	LF	\$20	10,000.00
27	7W	Temporary Irrigation	500	LF	\$20	10,000.00
28	7W	Install Vertical Grade Control	500	LF	\$100	50,000.00

Subtotal 295,000.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
29	1X	Excavation	700	LF	\$300	210,000.00
30	1X	Construct Floodplain / Wet Meadow / Wetland	700	LF	\$250	175,000.00
31	1X	Revegetation	700	LF	\$20	14,000.00
32	1X	Temporary Irrigation	700	LF	\$30	21,000.00
33	1X	Create Stream Channel	700	LF	\$100	70,000.00

Subtotal 490,000.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
34	2X	Bank Stabilization	165	LF	\$500	82,500.00
35	2X	Revegetation	165	LF	\$20	3,300.00
36	2X	Temporary Irrigation	165	LF	\$20	3,300.00

Subtotal 89,100.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
37	3X	Revegetation	335	LF	\$20	6,700.00
38	3X	Temporary Irrigation	335	LF	\$20	6,700.00
39	3X	Berm Construction	335	LF	\$40	13,400.00
40	3X	Restore Channel	335	LF	\$100	33,500.00

Subtotal 60,300.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
41	4X	Excavation	550	LF	\$300	165,000.00
42	4X	Construct Floodplain / Wet Meadow / Wetland	550	EA	\$50	27,500.00
43	4X	Revegetation	550	LF	\$20	11,000.00
44	4X	Temporary Irrigation	550	LF	\$30	16,500.00
45	4X	Create Stream Channel	550	LF	\$50	27,500.00

Subtotal 247,500.00

**SEZ/Wildlife Resoration Cost Estimate
Lake Forest Erosion Control Project Area B Preferred Alternative**

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
46	1Y	Construct Floodplain / Wet Meadow / Wetland	850	LF	\$30	25,500.00
47	1Y	Revegetation	850	LF	\$20	17,000.00
48	1Y	Temporary Irrigation	850	LF	\$20	17,000.00
49	1Y	Create Stream Channel	850	LF	\$100	85,000.00
Subtotal						144,500.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
50	2Y	Culvert Remove and Replace	0	LF	\$0	0.00
Subtotal						0.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
51	3Y	Construct Floodplain / Wet Meadow / Wetland	450	LF	\$30	13,500.00
52	3Y	Revegetation	450	LF	\$20	9,000.00
53	3Y	Temporary Irrigation	450	LF	\$20	9,000.00
54	3Y	Create Stream Channel	450	LF	\$100	45,000.00
Subtotal						76,500.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
55	1Z	Culvert Remove and Replace	70	LF	\$55	3,850.00
Subtotal						3,850.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
56	2Z	Revegetation	300	LF	\$20	6,000.00
57	2Z	Restore Channel	300	LF	\$100	30,000.00
Subtotal						36,000.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
58	3Z	Culvert Remove and Replace	0	LF	\$55	0.00
Subtotal						0.00

NO.	Reach	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
59	4Z	Excavation	100	LF	\$100	10,000.00
60	4Z	Construct Floodplain / Wet Meadow / Wetland	100	LF	\$30	3,000.00
61	4Z	Revegetation	100	LF	\$20	2,000.00
62	4Z	Temporary Irrigation	100	LF	\$30	3,000.00
63	4Z	Create Stream Channel	100	LF	\$100	10,000.00
Subtotal						28,000.00

NO.	DESCRIPTION	QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
64	Mobilization/Demobilization (2%) Shared	1	LS	\$59,467.00	59,467.00
65	Pollution Control Shared	1	LS	\$45,000.00	45,000.00
66	Project Sign, Snowpoles, Cleanup Shared	1	EA	\$40,000.00	40,000.00

**SEZ/Wildlife Resoration Cost Estimate
Lake Forest Erosion Control Project Area B Preferred Alternative**

67	Prepare SWPPP	Shared	1	EA	\$5,000.00	5,000.00
68	Traffic Control (1%)	Shared	1	LS	\$29,734.00	29,734.00
Subtotal						3,152,551.00

NO.	DESCRIPTION		QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
64	Contingency (20%)	Shared	1	LS	\$630,510.00	630,510.00
Subtotal						630,510.00

NO.	DESCRIPTION		QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
65	Inspection (15%)	Shared	1	LS	\$94,577.00	94,577.00
Subtotal						94,577.00

Total Estimated Construction Cost 3,877,638.00

NO.	DESCRIPTION		QUANTITY	UNIT (SI)	UNIT PRICE	TOTAL
64	Acquisition (based on 9 private DEs only)		97,972	SF	\$20	1,959,440.00
65	Utility Relocation		-	EA	-	-
66	Final Design (20%)		1	LS	\$630,510	630,510.00
Subtotal						2,589,950.00

Total Estimated Design & Acquisition Cost 2,589,950.00

Total Estimated Restoration Cost 6,467,588.00