

Appendix B-8

**LAKE TAHOE RESTORATION PROJECTS
ESTIMATED DIRECT COSTS & KEY MILESTONE DATES**

**Assess Potential for the
Reintroduction of Sensitive**

Project Name: Amphibians Agency: USFS - LTBMU
 Prepared by: Mike Morrison, PhD Phone: (775) EIP #: 593
 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. Direct Labor (Payroll) to Perform the Project	\$ <u>10,000</u>	_____ %
3. Project Equipment (tools, software, specialized equipment, etc.)	\$ <u>5,000</u>	_____ %
4. Travel (including per diem where official travel status required to carry out project, such as serve as COR, experts to review reports, etc.)	\$ <u>15,000</u>	_____ %
5. Official Vehicle Use (pro rata cost for use of Official Vehicles when required to carry out project)	\$ <u>15,000</u>	_____ %
6. Cost of Contracts, Grants and/or Agreements to Perform the Project	\$ <u>70,000</u>	_____ %
7. Other Direct 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)	\$ <u>10,000</u>	_____ %
TOTAL*:	\$ <u>125,000</u>	<u>100</u> %

Estimated Key Milestone Dates:

Milestones/Deliverables:	Date:
Final study plan and procedures/report	1/2006
Field sampling/data summary and report	10/2006
Bullfrog field trials/data summary and report	10/2007
Management plan/report	5/2008
Final Completion Date:	7/2008

COMMENTS:

SCIENCE, RESEARCH & MONITORING TAHOE PROJECT PROPOSAL

Project Name: Assess Potential for the Reintroduction of Sensitive Amphibians

EIP # 593

Lead Agency: USFS

Contact: J. Shane Romsos

Phone Number: (530) 543-2745

Email Address: sromsos@fs.fed.us

Threshold: Wildlife

Total Project Cost: \$125,000

Threshold Standard: W-2 Riparian Habitat

Round 6 Funding requested: \$125,000

Is this a multi-year project? Yes/No: Yes

Project Description (Include a specific list of tasks and subtasks to be accomplished that will facilitate Basin agencies in writing a detailed scope of work):

1. Objectives: List the objectives of the proposed research being tested during the project, and briefly state why the intended research is important.

The overall goal of this project is to enhance the distribution and abundance of amphibian populations. Specific objectives include:

- a. Summarize existing data and other information on the status (distribution and abundance) of amphibians.
- b. Locate through field surveys sites that (1) have and (2) do not have the potential for reintroduction.
- c. Initiate field trials to determine the possibility of extirpating bullfrogs from selected waterbodies.
- d. Develop specific management recommendations for implementing amphibian enhancement and reintroductions.

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

A substantial body of literature has been developed in the past 10-15 years documenting a widespread decline of amphibians throughout the world. These declines have been attributed to a number of factors, including habitat loss and degradation, accumulation of biocides, fallout from air pollution, disease and parasites (usually promoted by poor habitat conditions and pollution), and the introduction of non-native predators. In the western United States, attention has focused on several factors, including habitat loss and degradation and non-native predators. More specifically, in the Sierra Nevada habitat degradation has impacted amphibians at lower to middle elevations. Impacts include changes in hydrology caused by road building, housing, and various land management practices. The result includes both outright loss of habitat area and a general drying of breeding and homerange areas. Additionally, non-native bullfrogs, which were introduced both accidentally and intentionally (for food), is a significant predator of eggs and larvae of native species including the mountain yellow-legged frog, western toad, and various salamanders. At higher elevations, where relatively few gross habitat changes have occurred, the major impact appears to be the introduction of non-native fish (primarily trout planted for recreational purposes). The presence of fish in water bodies used by breeding amphibians often results in native amphibian extirpations.

Various methods have been implemented to stabilize and reverse the decline in abundance and distribution of amphibians. In the Sierra Nevada, methods include reintroduction of amphibians to water bodies devoid of fish and other predators, removal of predators prior to introduction, and restoration of habitat in currently occupied water bodies to enhance existing populations (e.g., enhancing habitat conditions, improving water supply). All of these methods have been successful when carefully applied based on site-specific conditions. That is, no single method of reintroduction and habitat restoration is superior per se. As such, any attempt to enhance amphibian populations must be preceded by a thorough evaluation of existing site conditions, including an assessment of habitat conditions, the presence of non-native predators, and the status of the target population (i.e., does the desired species still exist). Following such reconnaissance-level monitoring, a sub-set of sites can be selected that have the highest potential for successful reintroduction. Some of the primary factors that lead to a successful project include the absence of predators (native and non-native), habitat conditions, and the proximity of source populations. Failure to assess the location of other populations can doom a reintroduction to failure in the long-term because isolated populations are much more likely to go extinct.

Describe the purpose and need for the project: (For Science & Research Projects describe how this project will guide future management activities. This description should include a quantitative estimate of the anticipated gain in management information and describe how the research and/or monitoring project may inform the development and understanding of additional Key Management Questions (one page recommended):

This project will guide future management activities in both direct and indirect ways. In the most direct sense this project will identify locations where amphibians can be reintroduced. These sites will thus be the focus of future activities designed to enhance amphibian populations (as a priority activity). Indirectly, this project will impact virtually all management activities (e.g., recreation, roads, harvesting, grazing) by identifying locations where amphibians cannot successfully be reintroduced, thus lessening or eliminating the attention that will have to be given amphibian populations in project planning.

This project will impact most of the planning area by identifying and prioritizing sites for amphibian reintroduction and restoration. All wet areas (springs, meadows), water bodies (ponds, lakes), and waterways (creeks, streams) will be assessed through existing data and additional field surveys. This project will thus result in a comprehensive understanding of locations that (1) currently support amphibians and the site conditions present, (2) could potentially support amphibians and the type and intensity of restoration needed to allow successful reintroduction, and (3) are unlikely to support amphibian populations because of site conditions. By developing such a comprehensive list of sites most future management activities in the planning area will be able to be evaluated with regard to the potential impact on amphibian populations with little or no additional field surveys for amphibians.

Amphibians are sensitive to water conditions, making them ideal species for assessing biological integrity. The results of the project will result in recommendations for the overall improvement of water bodies, streams, and wetlands found to be viable for amphibian reintroduction. Numerous sensitive bird species, including willow flycatcher, marshbirds, waterfowl, and related species inhabit areas used by amphibians and will thus benefit from enhancement for amphibians.

Describe the goals and objective of the project (for Science & Research Projects describe Key Management Questions being addressed (Recommended 2-3 pages):

1. Objectives: List the objectives of the proposed research being tested during the project, and briefly state why the intended research is important.

The overall goal of this project is to enhance the distribution and abundance of amphibian populations. Specific objectives include:

- e. Summarize existing data and other information on the status (distribution and abundance) of amphibians.
- f. Locate through field surveys sites that (1) have and (2) do not have the potential for reintroduction.
- g. Initiate field trials to determine the possibility of extirpating bullfrogs from selected water bodies.
- h. Develop specific management recommendations for implementing amphibian enhancement and reintroductions.

2. Approach: Outline the research design, methods, and techniques that you intend to use in meeting the objectives stated above.

- a. Research design: The overall design of this project is a stepwise study of the potential for reintroduction of amphibians in the Basin. First, we will summarize the existing data on the distribution and abundance of amphibians in the Basin. This will ensure that a thorough knowledge of amphibians is gained and no duplication of efforts occurs. Second, based on existing data we will conduct field surveys to identify sites that have the potential for successful amphibian reintroduction. Lastly, we will conduct field trials to determine if it is feasible to remove bullfrogs—a prerequisite to amphibian reintroduction in areas harboring bullfrogs—from sites within the Basin.
- b. Methods and techniques:
 - (1) Existing data: Most of the existing data on amphibians in the Basin has been previously summarized in two primary sources: the Lake Tahoe Watershed Assessment and in the Multi-species Inventory and Monitoring (MSIM) program. Additionally, the MSIM has conducted intensive amphibian (and other vertebrate) surveys throughout much of the Basin. We will summarize the following data from each source:
 - (a) Species of amphibian, numbers (if provided), and specific location (UTM coordinates).
 - (b) Presence of potential predators (fish, bullfrogs)
 - (c) Habitat condition
 - (d) Other recorded site characteristics (e.g., slope, aspect, surrounding conditions)
 - (2) Field surveys: Based on the results of (1), above, we will identify on a GIS layer all sites that are known to harbor amphibians and those known to be devoid of amphibians. We will then visit a selected set of the sites that are stratified by both north-south extent in the Basin and elevation to verify the occurrence or lack of occurrence of amphibians. Data recorded at each site will include:
 - (a) Site conditions (habitat, water parameters)
 - (b) Amphibians presence
 - (c) Potential predators present (fish, bullfrogs)

Existing data indicates that bullfrogs have a distribution limited by elevation in the Basin, occurring from lake level and up adjacent watershed for about 1000 feet in elevation (this information will be expanded and made more specific by this project). We will thus divide the project area into two basic strata based on elevation and the presence or absence of bullfrogs.

- (3) High elevation sites: We will identify specific sites above the distribution of bullfrogs for potential amphibian reintroduction (primarily mountain yellow-legged frog). Sites will be located that have either very poor fish habitat (i.e., not a large or healthy population) or lack fish. We will locate networks of sites (ponds, creeks, lakes) that are located in close proximity that could serve as population centers for reintroduced amphibians.
- (4) Low elevation sites: As noted above, amphibians cannot be successfully reintroduced into sites harboring bullfrogs. Current information indicates that bullfrogs wither inhabit, or are in close proximity, to most low-elevation water bodies in the Basin. As such, we will conduct a trial study to determine if bullfrogs can be extirpated from a water body. We will locate a suitable study location: based on preliminary fieldwork by USFS personnel a series of ponds in the Spring Creek drainage appear suitable. A number of techniques have been used to control bullfrogs, including hand removal of egg masses, chemicals, netting of larvae, shooting and gigging of adults, and other methods. Techniques potentially suitable for the Basin include hand removal of egg masses, netting of larvae, and gigging of adults. We will determine the effort necessary to remove frogs from the selected area. These results will be incorporated in the final report and management recommendations.
- (5) Management Recommendations and Implementation: We will develop a final report that incorporates all literature, unpublished data, and results of field surveys. Recommendations will be developed that provide specific locations for implementation of a reintroduction program; elements include:
 - (a) The location of each network of water bodies recommended for reintroduction.
 - (b) The species recommended for reintroduction.
 - (c) Development of specific recommendations on how a reintroduction program should proceed.
 - (d) Results of bullfrog field trials and recommendations for amphibian reintroductions at low elevations.
 - (e) Cost analysis of varying levels of reintroduction programs.

3. Identify the Key Management Questions being addressed and/or how the project may inform the development and understanding of additional Key Management Questions.

Numerous Key Management Questions (KMQs) are directly and indirectly addressed by this project. Under Forest Health and Biodiversity (2.1), this project most directly addresses issues of indicator species (2.1.8), diversity and biological integrity (2.1.9), and biodiversity (2.1.11). Amphibians are known to be extremely sensitive to water conditions; even small changes in temperature, turbidity, flow rate, depth, and other factors will cause breeding failure and eventual extirpation from a site. In addition to water condition, the presence of non-native predators will often render a site uninhabitable for amphibians. Thus, amphibians can serve as useful indicators of changes in water quality. Further, amphibians are good indicators of overall ecosystem health and integrity.

KMQs related to what constitutes healthy and ecologically sustainable aquatic, riparian, and meadow ecosystems and how do we achieve them (2.2) are also directly assessed by this project. A thorough knowledge of the distribution, abundance, and health of amphibians provides insight on the risks to ecosystem health (2.2.2), the location of significant ecological areas (2.2.3), and changes in site conditions (2.2.6). Additionally, a product of this project will be the development of specific management actions and conservation strategies for enhancement of aquatic and associated terrestrial systems (2.2.4, 2.2.7).

Describe the anticipated project accomplishments (for Science & Research Projects provide a qualitative description of how the results of each task will reduce the uncertainty of predicting the behavior of the environmental processes being studied and may lead to solutions to environmental problems (one page recommended) to improve the agencies' abilities to protect the environment and achieve the management objectives.):

As detailed above, this project will substantially expand knowledge of our ability to enhance and expand amphibian populations. The major accomplishment will be development of specific recommendations and procedures for reintroducing amphibian to the Basin, including the possibility of reducing bullfrog populations to a level that would allow reintroductions at low elevations. Thus, this project will solve the question regarding the efficacy of proposals to enhance amphibian populations through the technique of reintroductions. Management agencies cannot currently determine if amphibians can be reintroduced, especially in areas inhabited by fish and bullfrogs.

Accomplishments by objective/task include:

- a. Summarize existing data and other information on the status (distribution and abundance) of amphibians. Accomplishment: Substantially improve an agency's ability to management lands based on knowledge of amphibian occurrence.
- b. Locate through field surveys sites that (1) have and (2) do not have the potential for reintroduction. Accomplishment: Remove uncertainty regarding the ability of the technique of reintroductions to enhance amphibian populations.
- c. Initiate field trials to determine the possibility of extirpating bullfrogs from selected waterbodies. Accomplishment: Remove uncertainly regarding the ability to control bullfrogs and successfully reintroduce amphibians at low elevations.
- d. Develop specific management recommendations for implementing amphibian enhancement and reintroductions. Accomplishment: Remove uncertainty about the timeframe, methods, and costs associated with reintroduction programs.

In summary, this project will allow decisions to be made regarding the usefulness of reintroductions as a technique for enhancing amphibian populations.

Describe the "readiness" of this project to move forward (environmental documentation, etc.; for Science and Research Projects that are a continuation of previous projects, provide a quantitative measure of the actual gain in management information (one to two paragraphs recommended):

As developed above, much data already exists on the distribution and abundance of amphibians in the Basin. These data will allow immediate initiation of the study of reintroductions as a management technique. Additionally, the USFS has been examining bullfrog distribution in selected watersheds in the Basin and has gained familiarity with bullfrog sampling and behaviors. Field teams are also in

place each summer that are gathering data on wildlife populations in all watersheds scheduled for restoration by the USFS and CTC.

Describe potential partnerships for this project.

The USFS is already working with TRPA and CTC on multiple restoration projects throughout the Basin. This existing partnership will form the basis for the project proposed herein. Additionally, CDFG and NDOW have interest in sensitive species such as amphibians, and also those factors inhibiting population expansion (fish, bullfrogs). Thus, CDFG and NDOW are potential partners for this project. CDPR and Nevada Parks have interest in amphibian enhancement on properties they manage in the Basin and will be included in the project.

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

Overall declines in amphibian populations (within and outside the Basin) instigate the need to assess the potential for native amphibian reintroduction. This project will provide a framework for native amphibian reintroduction and management throughout the Basin and across agencies. The identification of management actions and techniques develop through this work would benefit both land managers within the basin and through the Sierra Nevada.

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

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