Arizona Water Protection Fund
FY 2011 Grant Application Review

Application # WPF0401 **Applicant:** Grand Canyon Wildlands Council

Title of Project: Hidden Slough and Leopard Frog Marsh Restoration in Glen Canyon Natural Recreation Area, AZ

Additional materials were submitted with this application that could not be reproduced and distributed for review. These materials may be reviewed in person at the Arizona Water Protection Fund offices at (3550 N. Central Avenue, 2nd Floor, Phoenix). The additional materials available are the following:

_____**Maps**
_____**Photographs**
_____**Disk**
_____**Other**

WPF0401

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Arizona Water Protection Fund
Application Cover Page
FY 2011

Title of Project: Hidden Slough and Leopard Frog Marsh Restoration in Glen Canyon Nat. Rec. Area, AZ

Type of Project:
- ☒ Capital or Other
- ☐ Water Conservation
- ☐ Research

Stream Type:
- ☒ Perennial
- ☐ Intermittent
- ☐ Ephemeral

Your level of commitment to maintenance of project benefits and capital improvements:
☐ < 5 years ☐ 5-10 years ☐ 11-15 years ☒ 16-20 years

Applicant Information:

Name/Organization:	Grand Canyon Wildlands Council
Address 1:	P.O. Box 1594
Address 2:	
City:	Flagstaff
State:	AZ
ZIP Code:	86002
Phone:	928-556-9306
Fax:	928-779-3567
Tax ID No.:	EIN No.: [redacted]

Inside an AMA: Yes ☐ No ☒

If yes, which AMA:
- ☐ Phoenix
- ☐ Tucson
- ☐ Prescott
- ☐ Pinal
- ☐ Santa Cruz

Type of Application:
- ☐ New
- ☒ Continuation

Contact Person:

Name:	Kelly Burke
Title:	Executive Director
Phone:	928-556-9306
Fax:	928-779-3567
e-mail:	kelly@grandcanyonwildlands.org

Any Previous AWPF Grants:
☒ Yes ☐ No

If yes, please provide Grant #(s):
99-074WPF; 99-075WPF

Arizona Water Protection Fund Grant Amount Requested:

$348,899

If the application is funded, will the Grantee intend to request an advance:
☒ Yes ☐ No

Matching Funds Obtained and Secured:

Applicant/Agency/Organization:	Amount ($):
1. Applicant	97,425.00
2. Glen Canyon NRA	7,675.00
3. Grand Canyon Youth	6,815
4. Colorado River Discovery	1,740
5. AGFD	3,375
Total:	117,030

Has your legal counsel or contracting authority reviewed and accepted the Grant Award Contract General Provisions?
☒ Yes ☐ No ☐ N/A

Signature of the undersigned certifies understanding and compliance with all terms, conditions and specifications in the attached application. Additionally, signature certifies that all information provided by the applicant is true and accurate. The undersigned acknowledges that intentional presentation of any false or fraudulent information, or knowingly concealing a material fact regarding this application is subject to criminal penalties as provided in A.R.S. Title 13. The Arizona Water Protection Fund Commission may approve Grant Awards with modifications to scope items, methodology, schedule, final products and/or budget.

Kelly Burke	Executive Director, 928-556-9306
Typed Name of Applicant or Applicant's Authorized Representative	**Title and Telephone Number**
Kelly Burke	8/31/2010
Signature	**Date Signed**

GRAND CANYON
WILDLANDS
COUNCIL

August 24, 2010

Arizona Water Protection Fund
Arizona Department of Water Resources

Dear Commissioners,

The Board of Directors of Grand Canyon Wildlands Council authorizes Kelly Burke, Director, to submit the application ***"Hidden Slough And Leopard Frog Marsh Restoration Planning, Implementation, Maintenance, And Monitoring In Glen Canyon National Recreation Area, Arizona"*** to the Arizona Water Protection Fund. We are unanimously supportive of and dedicated to implementing this restoration in Glen Canyon.

We thank you for all you do to benefit Arizona's water resources and for this critical grant opportunity.

Sincerely,

Kurt Menke
Board Chair

P.O. Box 1594 Flagstaff AZ 86002 web grandcanyonwildlands.org ph 928.556.9306 fax 928.779.3567

2) Executive Summary

We propose to assist the National Park Service (NPS) achieve its conservation mission along the Colorado River in Glen Canyon National Recreation Area (GLCA) by undertaking riparian restoration and monitoring downstream from Glen Canyon Dam: at Hidden Slough (Colorado River Mile -6.5R) and Leopard Frog Marsh (Colorado River Mile -9L). The Colorado River riparian zone in lowermost Glen Canyon has been severely modified by the construction and operations of Glen Canyon Dam since 1963, which has reduced flood frequency and sediment transport. Ecological stabilization of the riparian zone of this previously flood-scoured reach permitted extensive colonization of lower riparian zone by non-native phreatophytes, particularly tamarisk (*Tamarix* spp.). Reduced flow fluctuations since 1991 have allowed increased establishment and growth of tamarisk in this reach, and cover exceeds 30 percent in many areas. While the recent arrival of the tamarisk leaf beetle (Chrysomelidae: *Diorhabda elongata*) is likely to reduce tamarisk foliage, restoration of native *Salix gooddingii* and other native phreatophytes is needed to provide habitat for fish and wildlife in the recreation area.

The NPS, with Grand Canyon Wildlands Council (GCWC) as principal cooperator and Fred Phillips Consulting, undertook similar tamarisk control and native revegetation of 10 acres at Lees Ferry, Arizona from 2002-2005. That site is now the only stretch of the Colorado River in GLCA that is strongly dominated by native vegetation. The two restoration sites selected for this next project are the highest priority restoration sites evaluated by GLCA in its 2008 Colorado River Riparian Revegetation Plan for the reach. GCWC conducted tamarisk control and revegetation of 6 acres at Hidden Slough from 2008-2010, including the construction of a nursery at Lees Ferry. While very successful thus far, we request support from AWPF to quantitatively and qualitatively evaluate the tamarisk removal and revegetation at Hidden Slough, complete tamarisk control, complete the revegetation process, phase out the irrigation infrastructure at the site, and develop and test a monitoring program for the NPS with results of these activities to guide restoration at Leopard Frog Marsh.

Leopard Frog Marsh has not previously received restoration attention; we will be using applicable Hidden Slough evaluation results at this site. The site supported Northern Leopard Frogs (Ranidae: *Rana pipiens*) until about 1995, as well as one of only three naturally occurring Arizona populations of Niobrara ambersnail (Succineidae: *Oxyloma h. haydeni*). With the implementation of a moderate-low fluctuating flow regime from the dam by the Bureau of Reclamation in 1991 shoreline vegetation density increased at Leopard Frog Marsh, overgrowing frog and ambersnail habitat. Recent surveys by the NPS and L.E. Stevens (personal communication) have failed to reveal any remaining leopard frogs, and the ambersnail population also appears to be at risk of habitat loss. We request support from AWPF for habitat restoration planning; tamarisk control; reconfiguration of the site; reintroduction of leopard frogs/snails; and development, and testing and applying a monitoring and maintenance plan, to restore this site.

GCWC is requesting funding from AWPF over three years (2010-2013) to assist the NPS in implementing the Colorado River Riparian Revegetation Plan (GCNRA). This work will set the stage for restoration of additional sites within lower Glen Canyon, and the techniques used here will be evaluated for utility in further restoration activities in this reach.

3) Project Overview

Background

Wetland and riparian habitats are rare throughout the middle and lower elevations of the arid Southwest, yet provide essential habitat for a large proportion of the region's wildlife, avian and invertebrate species. Less than 0.5% of the Southwest region is occupied by riparian and wetland habitat, but that habitat supports more than one third of the region's floral and avifaunal diversity (Stevens and Ayers 2002). Little of Arizona's historic wetlands remain and a vast proportion of its native riparian habitat has been destroyed (Brinson et al. 1981, Knopf et al. 1988). Revegetation of riparian habitats has been recognized by all land managing agencies as an important effort to support and revive the region's riparian ecological integrity. To that end, several substantial riparian revegetation projects have been conducted along the Colorado River.

GLCA was established as an NPS unit on October 27, 1972 "...to provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent thereto... and to preserve scenic, scientific, and historic features contributing to public enjoyment of the area" (NPS 1979). GLCA recreational opportunities include river running, boating, sport fishing, backcountry hiking, and wildlife viewing. Its canyons provide habitat for more than 400 species of plants, birds, fish, mammals, and herptofauna including Northern Leopard frog (*Rana pipiens*), four endangered fish species, threatened bald eagle (*Haliaeetus leucocephalus*), and peregrine falcon (*Falco peregrinus*). GLCA has an annual visitation approaching one million visitors each year, and protecting natural resources there is a high priority for the NPS.

Prior to the construction of Glen Canyon Dam in 1963, high springtime flows scoured the river banks, restricting perennial native plant species to upper riparian terraces (Turner and Karpiscak 1980). The construction and operation of the dam reduced flood frequency and sediment transport, and it allowed non-native riparian tamarisk and other plant species to colonize the riparian zone of the Colorado River downstream from Glen Canyon Dam in Glen Canyon National Recreation Area. Restoration of GLCA riparian shorelines is important to the NPS mission there, and the NPS has developed an ecological assessment of restoration priorities downstream from Glen Canyon Dam, with several sites identified as high priority for restoration.

To begin restoration of the Colorado River shorelines in GLCA, GCWC and the NPS jointly undertook a 10 acre riparian restoration project at Lees Ferry, Arizona in 2002. This project was funded by the Arizona Water Protection Fund (AWPF) and was designed to determine whether tamarisk could be removed from Colorado River banks below Glen Canyon Dam and to learn about the rate and success of native riparian species plantings. The site provides a very successful example of riparian ecosystem revegetation: eight years after tamarisk removal no new tamarisk has established on the site, and four years after irrigation was halted more than 50 percent of the planted shrubs and trees survive. After only two growing seasons, avian species diversity and abundance equaled pre-treatment levels (Stevens 2005), and after four years bird diversity was twice that of the pre-treatment condition (L.E. Stevens, Grand Canyon Wildlands Council, personal communication). Not surprisingly, most upper terrace plantings of phreatophyte trees failed, demonstrating that tree plantings of cottonwood and willow should be conducted at stage elevations less than 6 feet above the approximate 20,000 cfs stage. However,

the project clearly demonstrates that native riparian vegetation can be successfully established in place of tamarisk in the Glen Canyon reach. Lees Ferry is readily accessible by road, and the sites selected for restoration here are remote, requiring different tamarisk control and revegetation strategies. Also, the arrival of non-native tamarisk leaf beetle (*Diorhabda elongata*) has begun to defoliate tamarisk, a change that may help with tamarisk control efforts.

Goals

Goal 1 – Further the mission of the GCWC through active collaboration with land management agencies (www.GrandCanyonWildlands.org).

Goal 2 – Restore natural shoreline configuration, native riparian vegetation, and natural habitats along the Colorado River downstream from Glen Canyon Dam.

Goal 3 – Conduct restoration activities in a fashion fully consistent with the NPS mission, and in accord with NPS management policies and practices.

Objectives

Objective 1 – Assist GLCA staff ensure the sufficiency of GLCA riparian restoration guidance.

Objective 2 – Assemble, compile, and assess historic information to guide planning.

Objective 3 – Develop a prioritized restoration, maintenance, and pilot monitoring plan for each site.

Objective 4 – Implement the two restoration, maintenance, and monitoring plans.

Statement of Problem/Causes

Prior to the construction of Glen Canyon Dam in 1963, large annual springtime floods scoured the channel between Glen Canyon Dam and Lees Ferry, preventing establishment of perennial lower riparian zone vegetation (Carothers et al. 1979, Topping et al. 2003). These floods scoured and deposited sediment, flushed salts from the soils, and helped disperse the seeds of native vegetation that were adapted to flooding. Pre-dam middle and upper riparian zone terraces supported native phreatophytes, including Goodding's willow (*Salix gooddingii*), coyote willow (*Salix exigua*), arrowweed (*Pluchea sericea*), seep willow (*Baccharis emoryi* and *B. salicifolia*), rare Fremont cottonwood (*Populus fremontii*), and common reed (*Phragmites australis*). Pre-dam upper riparian zone terraces supported hackberry (*Celtis laevigata*), snowberry (*Symphoricarpos* sp.), scrub oak (*Quercus turbinella*), prince's plume (*Stanleya pinnata*), Apache plume (*Fallugia paradoxa*), inkweed/seepweed (*Suaeda moquinii*), rabbitbrush (*Chrysothamnus nauseosus*), and saltbush (*Atriplex canescens* and other species), as well as non-native tamarisk (*Tamarix* spp.)(Carothers et al. 1979, Turner and Karpiscak 1980, Webb 1996). Tamarisk was first detected in GLCA at Lees Ferry in the 1920's and became widely established on upper riparian terraces from prior to 1938 through 1963 (Clover and Jotter 1944, Turner and Karpiscak 1980, Johnson 1991). Construction of Glen Canyon Dam in 1963 drastically altered the river ecosystem, and stabilized riparian conditions allowed a profuse growth of riparian vegetation, including large monotypic stands of tamarisk, to develop in the lower riparian zone along the water's edge.

Tamarisk colonized and dominated the GLCA lower riparian zone due to its prolific seed production through the growing season, rapid growth rate, and its tolerance of flooding, fire,

salinity, and drought stresses (summarized in Mortenson et al., in press). However, coarsened post-dam riparian soils now largely preclude tamarisk establishment along the river except in years with May-June floods (Stevens 1989, Stevens et al. 2002). Although tamarisk does provide habitat, shade and erosion control, it has an overly dense canopy structure and relatively low stature in contrast to native riparian trees like Goodding's willow. Also, the growth of tamarisk in dense monocultures precludes establishment of native riparian plant species. Therefore, although it provides some habitat for riparian insects and vertebrates (particularly neotropical migrant birds -- Brown and Trossett 1989), the quality of that habitat is relatively low (Engel-Wilson and Ohmart 1978, Hunter et al. 1988, Ohmart et al. 1988, Zavaleta 2000). Improved riparian management of Glen and Grand Canyons is likely to improve bird and wildlife habitat, and also visitor recreational experience.

As the Lees Ferry riparian restoration project demonstrates, riparian restoration requires control of tamarisk and requires revegetation with consideration of geomorphology and irrigation. Lees Ferry was an easily-accessed site, and the sites proposed here are remote. Therefore, site access will require boat transport, and given the Wilderness management objectives of the Park, the work will have to be conducted with a "minimum tool" approach. Successful removal of tamarisk and establishment of the irrigation network at Hidden Slough demonstrates our ability to conduct riparian restoration at remote sites. Such restoration efforts are important not only to the rehabilitation of the site, but also serve as a seed source for native phreatophytes to enhance further colonization of the shorelines.

Statement of Solutions/Hypotheses

As described in the 2008 NPS Glen Canyon Riparian Revegetation Plan, a suite of sites have been prioritized for riparian restoration including NEPA compliance, site assessment and design, tamarisk removal, nursery propagation of willows and cottonwoods, native species plantings, gravity irrigation installation as needed, weeding, watering, irrigation maintenance, and site monitoring. The hypothesis is that native riparian trees and other plant species can be established and provide seed sources and a functional corridor of riparian/wildlife habitat for the Glen Canyon Reach.

Statement of Project Years of Benefit

This restoration project is designed to be completed in three years, with benefits to wildlife beginning within 2 years of tamarisk control and initiation of revegetation. The changes undertaken at the two sites are likely to be permanent improvements, as the Hidden Slough site was entirely dominated by tamarisk, and the Leopard Frog Marsh site has substantial tamarisk interference with springs geomorphology. In addition to the benefits achieved at the individual sites, these restoration efforts should result in native phreatophyte seed production, serving as a seed source both downstream (through hydrochory) and upstream (through anemochory – wind dispersal) throughout lowermost GLCA. With minor maintenance and monitoring effort, the leopard frog habitat and population restoration, and the ambersnail habitat restoration benefits at Leopard Frog Marsh should continue indefinitely. Such actions support the NPS mission in this reach.

Project Location & Environmental Contaminant Information
FY 2011

Project Location Information

1. County: Coconino	2. Section: 24	3. Township: 35N	4. Range: 16W

5. Watershed: Upper Colorado

6. 8 or 10 Digit Hydrologic Unit Code (HUC): 1407006

7. Name of USGS Topographic Map where project area is located: Ferry Swale, AZ

8. State Legislative District: 2

(Information available at: http://159.87.126.6/mapping/default2.asp?tname=Original.2009.Legislative.Map&org2009leg=on&service=ircmaps&init=true)

9. Land ownership of project area: NPS

10. Current land use of project area: Glen Canyon National Recreation Area

11. Size of project area (in acres): 15acres

12. Stream Name: Colorado River

13. Length of stream through project area: 3 miles

14. Miles of stream benefited: 15 miles

15. Acres of riparian habitat: 15 acres will be:

- ☒ Enhanced
- ☐ Maintained
- ☒ Restored
- ☐ Created

16. Provide directions to the project site from the nearest city or town. List any special access requirements:
From Page, AZ travel southwest on highway 89 and turn right (north) on highway 89A to Marble Canyon and Lees Ferry. Turn right on road to Lees Ferry and drive to boat ramp. Travel by boat upriver from Lees Ferry to ~6.5 mile and ~8.5 mile to reach the sites. Running upriver requires skills in river navigation and an appropriate boat. Colorado River Discovery provides uphauls for kayakers and for this restoration work, in addition to their one-day trips originating in Page, AZ.

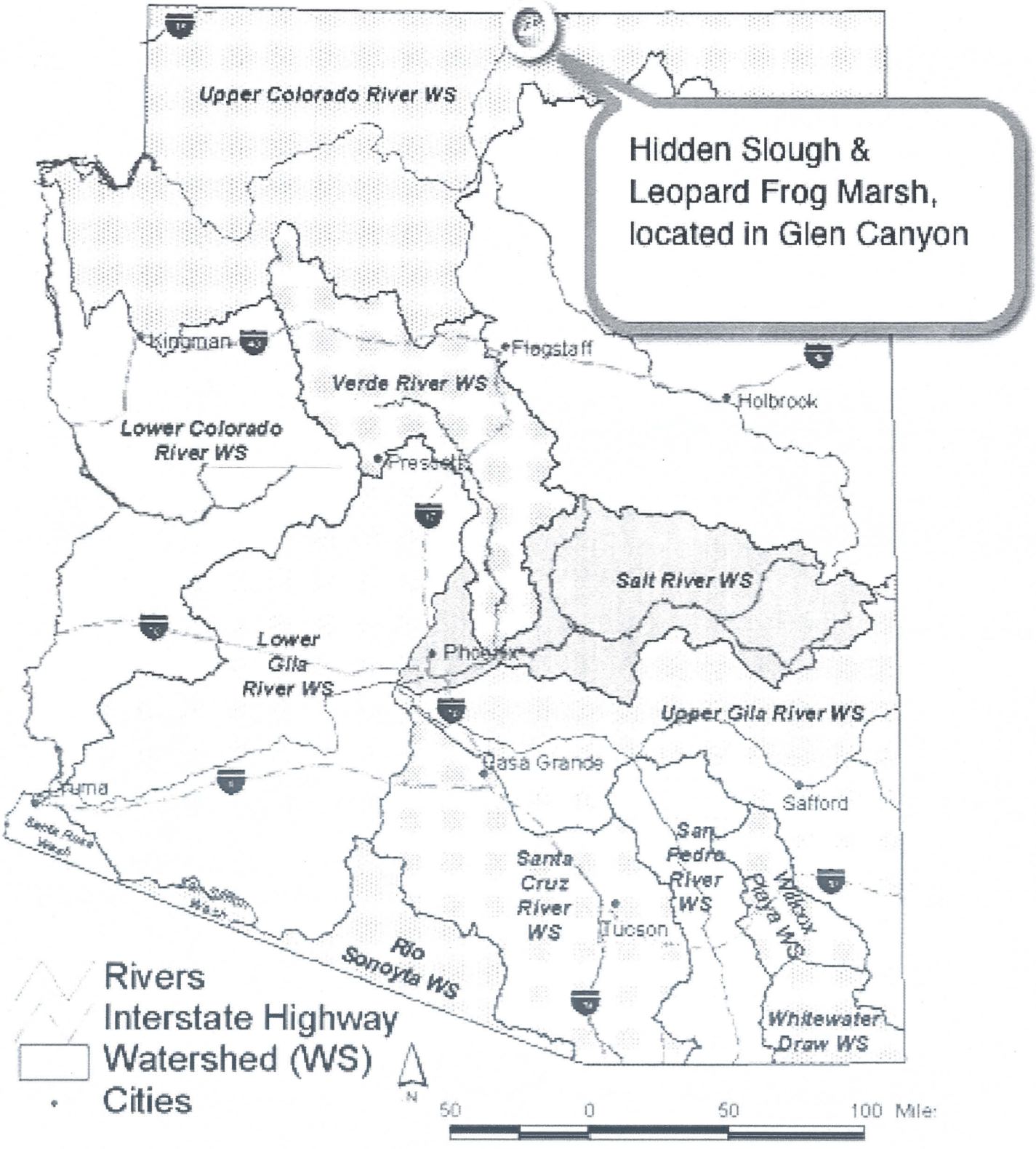
Environmental Contaminant Location Information

1. Does your project site contain known environmental contaminants? ☐ **YES** ☒ **NO** If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants:

2. Are there known environmental contaminants in the project vicinity? ☐ **YES** ☒ **NO** If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants:

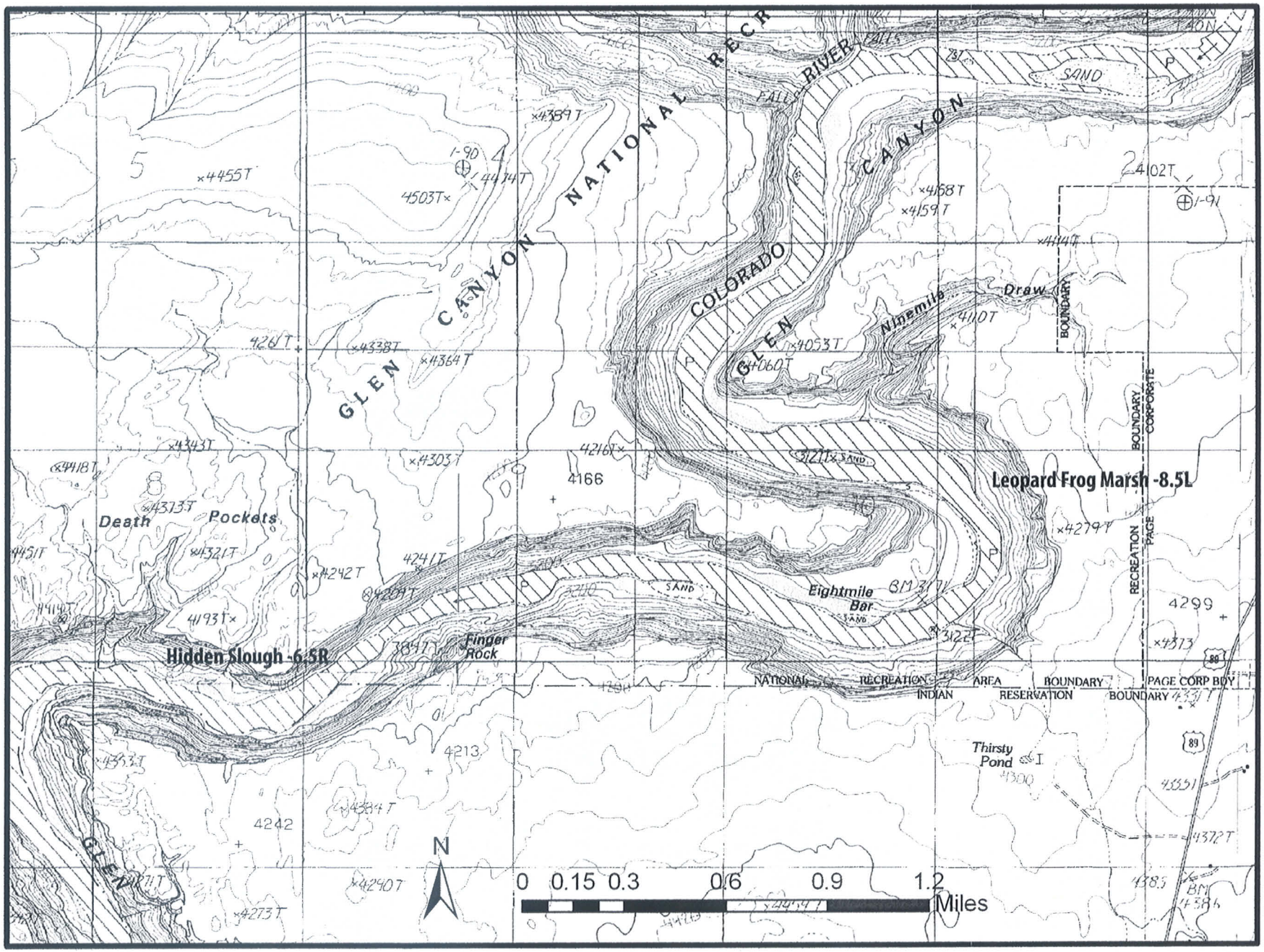
3. Are you asking for Arizona Water Protection Fund monies to identify whether or not environmental contaminants are present? ☐ **YES** ☒ **NO**

Arizona Watershed Map
FY 2011



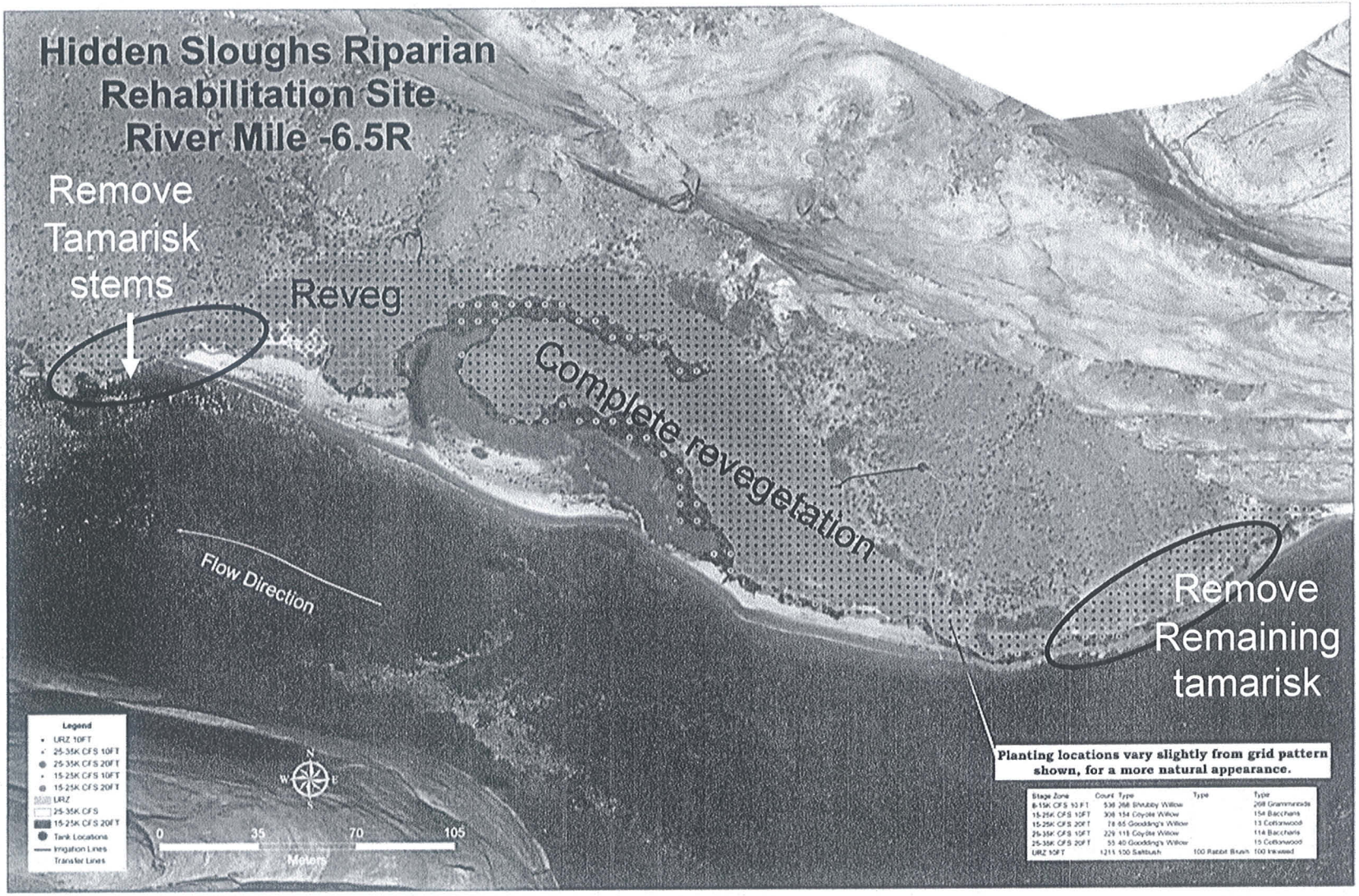
Project Title: Hidden Slogh and Leopard Frog Marsh Restoration in Glen Canyon Nat. Rec. Area, AZ

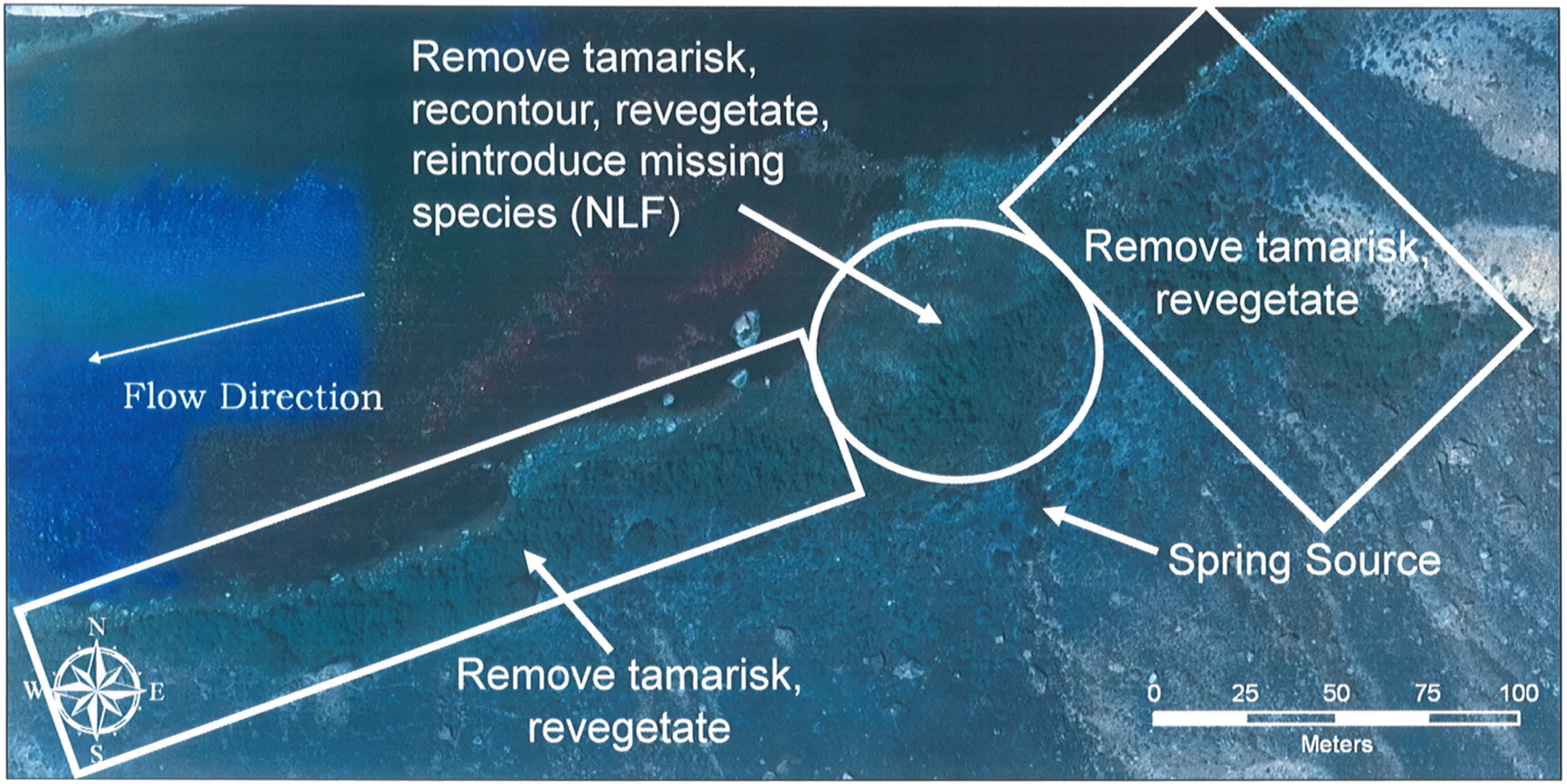
Proposed Project Area



Hidden Slough and Leopard Frog Marsh Restoration Project

Grand Canyon Wildlands Council


Hidden Sloughs Riparian
Rehabilitation Site
River Mile -6.5R
Remove
Tamarisk
stems
Reveg
Complete revegetation
Flow Direction
Remove
Remaining
tamarisk
Legend
URZ 10FT
25-35K CFS 10FT
25-35K CFS 20FT
15-25K CFS 10FT
15-25K CFS 20FT
URZ
25-35K CFS
15-25K CFS 20FT
Tank Locations
Irrigation Lines
Transfer Lines
N
W
E
S
0
35
70
105
Meters
Planting locations vary slightly from grid pattern shown, for a more natural appearance.
Stage Zone Count Type Type Type
8-15K CFS 10 FT 538 268 Shrubby Willow 268 Grammineids
15-25K CFS 10FT 308 154 Coyote Willow 154 Baccharis
15-25K CFS 20FT 78 65 Goodding's Willow 13 Cottonwood
25-35K CFS 10FT 229 115 Coyote Willow 114 Baccharis
25-35K CFS 20FT 55 40 Goodding's Willow 15 Cottonwood
URZ 10FT 1211 100 Saltbush 100 Rabbit Brush 100 Inkweed



Leopard Frog Marsh, Colorado River Mile -9L,
Glen Canyon National Recreation Area, Arizona.

6) Scope of Work

Task 1: Obtain Permits, Authorizations, Clearances and Agreements.

Task Purpose/objective: Compliance with all local, state, and federal permit requirements and laws.

Task Description: Obtain permits, clearances, authorizations and agreements. Grantee shall obtain and submit to the Project Manager all necessary permits, authorizations, clearances and agreements required to complete the tasks listed in the Scope of Work. The requirements shall be met before any ground disturbing work is performed and shall include, if necessary:

- National Environmental Policy Act (NEPA) Environmental Assessment (EA), Finding of No Significant Impact (FONSI), and Decision Record (DR).
- May include burn permit, AGFD, and USFWS permits, depending on implementation plan.
- Endangered Species Act (ESA) consultations.
- Subcontractor agreements.
- Copy of Cooperative Agreement between NPS and Grand Canyon Wildlands Council.
- Grantee shall submit to the Project Manager all documentation necessary to obtain a State Historic Preservation Office (SHPO) clearance, including an archeological survey. Upon receipt of the documentation, the Project Manager shall forward the documentation to SHPO for its review. SHPO clearance shall be obtained prior to initiation of any ground disturbing work.
- **Deliverable Description:** Progress and Final Reports on acquisition of permits and compliance, containing:
  - 1.1) Copies of all permits, clearances, authorizations and agreements necessary for project implementation and operation and maintenance activities, including NEPA and ESA documentation;
  - 1.2) Copies of sub-contractor agreements;
  - 1.3) Copy of GLCA-GCWC Cooperative Agreement;
  - 1.4) Copy of SHPO clearance, including archaeological survey;
  - 1.5) Copy of construction requirements and consultations.

Deliverable Due Date: 1.1 - 1.3 by 31 March 2011; 1.4 – 1.5 by 1 July 2011

AWPF Reimbursable Cost: $17,745

Task 2: Compilation and Assessment of Background Information.

Draw Together Results to Date on Site Mapping and Manipulation, Historic Map Photo Assessment, Review of Leopard Frog and Niobrara *Oxyloma* Ambersnail Habitat Requirements. and Review Invertebrate, Herpetofauna, Bird, and Mammal History and Distribution in the Study Reach.

Purpose/objective: To develop/provide relevant background information and high resolution maps for Hidden Slough completion and monitoring, and for restoration design, maintenance, restoration, and monitoring of Leopard Frog Marsh.

Task Description: The grantee will conduct a land survey of Hidden Slough and Leopard Frog Marsh and produce 0.5 m contour site maps for monitoring comparison and site design planning.

The Grantee will review historic photos from 1973, 1984, 1992, 2002, 2005 to assess wetland configuration and overgrowth through time at Hidden Slough and Leopard Frog Marsh to inform restoration design plans. The grantee shall compile and review relevant historical information on the two study sites, on the habitat configuration and requirements for Northern Leopard Frog and Niobrara *Oxyloma* ambersnail, and on the distribution and history of wetland and riparian invertebrates, herpetofaunae, birds, and mammals in the study reach. The information compiled on northern leopard frogs, Niobrara *Oxyloma* ambersnails, herpetofaunae bird, mammal, and invertebrate data will be used to design a wildlife monitoring plan at Hidden Slough and Leopard Frog Marsh, and at an untreated control site, and at Lees Ferry.

Deliverable Description: A report including the following:

2.1) Hidden Slough and Leopard Frog Marsh topographic and vegetation maps;

2.2) Historic aerial photo analysis report for Hidden Slough and Leopard Frog Marsh;

2.3) Review of distribution changes, habitat configuration, and habitat requirements for northern leopard frogs, *Oxyloma* ambersnails, and other invertebrates, herpetofauna, avifauna, and mammals in the study reach.

Deliverable Due Date: 30 May 2011

AWPF Reimbursable Cost: $48,773

Task 3: <u>Prepare Plans for Tamarisk Control, Site Revegetation Design, Population Restoration Design, Monitoring, Native Species Translocation, and Education/ Outreach.</u>

Purpose/objective: To develop plans for implementation tasks.

Task Description: Grantee shall develop plans for:

3.1) Hidden Slough completion and maintenance plan;

3.2) Leopard Frog Marsh restoration and maintenance plan;

3.3) Hidden Slough and Leopard Frog Marsh revegetation and photo monitoring plan;

3.4) Hidden Slough and Leopard Frog Marsh wildlife monitoring plan;

3.5) Northern leopard frog plan and *Oxyloma* ambersnail reintroduction/restoration plan;

3.6) Glen Canyon restoration outreach/education plan;

3.7) Photo monitoring plan.

Deliverable Description: Preparation of plans for tamarisk control, site restoration, population restoration,

Deliverable Due Date: 31 March 2011, 31 July 2011, 31 July 2012

AWPF Reimbursable Cost: $25,725

Task 4: <u>Monitor Hidden Slough and Leopard Frog Marsh Aquatic and Wetland Invertebrate, Herpetofaunal, Bird, and Mammal Populations.</u>

Purpose/objective: The grantee will initiate wildlife monitoring using the background information (2, above) on the aquatic and wetland/riparian invertebrates and terrestrial vertebrates at Hidden Sloughs and Leopard Frog Marsh in relation to a control site and the Lees Ferry restoration site. The data gathered will be used to ground pre-treatment conditions, evaluate project success and potential use elsewhere in GLCA by the NPS.

Task Description: Grantee shall initiate monitoring of aquatic and wetland wildlife at Hidden Slough and Leopard Frog Marsh, a similar-but-untreated control site, and the Lees Ferry Restoration site. Quarterly trips are planned during the growing season (spring, summer, and fall) for invertebrates and herpetofauna, 2 trips/yr are planned for mammals (spring and fall), and avian monitoring will take place monthly from April-June, and quarterly thereafter (6 trips.yr). This process will provide the NPS with a monitoring program to compare the wildlife at treated sites with existing conditions at a similar- but-untreated control site, and at the Lees Ferry restoration site. The control site will be selected pending discussion with the NPS.
Deliverable Description: Annual progress report on distribution and population status of riparian invertebrates and vertebrates at Hidden Slough and Leopard Frog Marsh in relation to patterns at a similar but untreated control site and at the Lees Ferry restoration site.
Deliverable Due Date: 30 September 2011, 30 September 2012, 30 September 2013
AWPF Reimbursable Cost: $66,187

Task 5: Hidden Slough Restoration Plan Implementation, Including Tamarisk Removal and Methods Refinement, Native Plant Pole Planting and Seeding (Including Rare Species Plantings), Site Maintenance, and Monitoring.
Purpose/objective: Complete tamarisk control at Hidden Slough by cutting remaining standing tamarisk; refine tamarisk control methods through consideration of defoliation by tamarisk leaf beetles to eliminate regrowth; remove slash; and complete native riparian plant revegetation at Hidden Slough. A review of the success of these methods and results will benefit restoration of Leopard Frog Marsh.
Task Description: Grantee shall complete tamarisk removal by cutting burned portion of stand, evaluating tamarisk leaf beetle defoliation and potential for burning/cutting versus cutting, followed by slash pile burning. Grantee shall pole plant additional native Goodding's willow and seed highest terrace with native perennial riparian shrubs. Grantee will evaluate potential for planting or seeding with propagules of rare native shrubs, such as scrub oak, hackberrry, box elder, snowberry, and other riparian zone shrubs and trees. Maintenance will include irrigation and weeding.
Deliverable Description: Quarterly, annual, and final progress reports.
Deliverable Due Date: 31 July 2011, 30 September 2011, 31 December 2011; 30 April 2012, 31 July 2012, 30 September 2012, 31 December 2012; 30 April 2013, 31 July 2013, 30 September 2013, 31 December 2013 (final report)
AWPF Reimbursable Cost: $78,351

Task 6: Refine the Final Leopard Frog Marsh Restoration Plan, including Non-native Plant Removal and Wetland Restoration.
Purpose/objective: Refine the final restoration implementation plan for removal of non-native plants and wetland restoration plan of Leopard Frog Marsh.
Task Description: The non-native plant removal and restoration plan developed for Leopard Frog Marsh will be revised and will be compatible with the NPS mission and policy in GLCA. The plan will be based on the site map and background data (Task 2, Task 3.6), which indicate the historic extent of tamarisk cover. Due to the sensitive geomorphology

and biology of the springs habitat that feeds the marsh, tamarisk control will be undertaken manually and without the use of pesticides. Tamarisk leaf beetle is likely to eliminate regrowth of tamarisk, and this will be confirmed through monitoring. If leaf beetles do not successful kill resprouting tamarisk, we will cut off regrowth at quarterly intervals to kill the plants. Site reconfiguration may be needed to improve habitat for leopard frog and Niobrara ambersnail reintroduction/population restoration.

Deliverable Description: A Leopard Frog Marsh final restoration plan.

Deliverable Due Date: 31 August 2011

AWPF Reimbursable Cost: $9,109

Task 7: Implement Leopard Frog Marsh Site Restoration, Maintenance,and Monitoring.

Purpose/objective: Implement Leopard Frog Marsh site design, including tamarisk control, habitat reconfiguration (if needed), and site maintenance plan.

Task Description: The grantee will implement the Task 6 plan. Tamarisk control will be implemented as recommended in the plan, and frog, ambersnail, and other target wildlife species habitats will be restored, as recommended in the plan.

Deliverable Description: Quarterly and annual progress reports.

Deliverable Due Date: 30 September 2011, 31 December 2011, 30 April 2012, 31 July 2012, 30 September 2012, 31 December 2012, 30 April 2013, 31 July 2013, 30 September 2013, 31 December 2013 (final report)

AWPF Reimbursable Cost: $54,674

Task 8: Evaluation of Potential Leopard Frog and *Oxyloma* Ambersnail Population Restoration/rehabilitation.

Purpose/objective: Based on 3.6 (above), assist the NPS evaluate the potential for and implementation needs of Northern Leopard Frog reintroduction and *Oxyloma* ambersnail population restoration.

Task Description: A physical or teleconference meeting will be convened with AGFD, NPS, UDW, USFWS, and NGO staff, and interested public to scope northern leopard frog and ambersnail reintroduction/rehabilitation. Experts attending the meeting will review the synthesis of historical literature and information on these two species, as well as the site map and plan. Questions to be resolved at this meeting will include: overall feasibility; compliance issues; stock availability; capture, holding and pre-release treatment; timing of reintroduction; replication of reintroductions over time; interactions with other species; monitoring and incorporation of feedback; and duration of effort; as well as other topics.

Deliverable Description:

8.1) Northern Leopard Frog and *Oxyloma* ambersnail Restoration Review Report;

8.2) Stock Collection, Handling, and Translocation Plan, including population size and timing.

Deliverable Due Date: 28 February 2013

AWPF Reimbursable Cost: $6,825

Task 9: Restoration/rehabilitation of northern leopard frog and *Oxyloma* ambersnail populations at Leopard Frog Marsh.

Purpose/objective: To assist the NPS conduct population reintroduction/rehabilitation of Northern Leopard Frog and *Oxyloma* ambersnail at Leopard Frog Marsh.
Task Description: Assist the NPS complete reintroduction compliance; capture, hold and pre-release treat (as needed) northern leopard frogs; conduct translocation of frogs and ambersnails; monitor reintroduction/rehabilitation success and interactions with other species; review monitoring data and make recommendations on future efforts.
Deliverable Description: Quarterly and annual progress reports on frog and ambersnail population reintroduction/rehabilitation effort.
Deliverable Due Date: 31 July 2013, 30 September 2013, 31 December 2013.
AWPF Reimbursable Cost: $25,237

Task 10: Final Report
Task Description: We will prepare and submit a comprehensive final report consistent with the Final Report Guidelines in AWPF Policies and Application Guidelines Manual.
Purpose/objective: A final report on the overall project will be presented, both to inform AWPF as to project success, and to help guide the next steps of riparian restoration in GLCA. The report will include an evaluation of restoration and monitoring techniques, and how they may contribute to riparian restoration of the next prioritized sites in the reach.
Deliverable description: The final report will include a summary of tasks, with methods used, outcomes, analyses of project data, and suggestions for future changes needed in the project, as well as an evaluation of the project's success measured against the objectives.
Deliverable due date: 30 March 2014
AWPF Fixed Cost: $16,275

Cost Proposal for GCWC Glen Canyon NRA RESTORATION PROPOSAL 2011-2014

Task	Type of Cost	Item	Job Classification	Qty	Unit	Unit Cost	Total
1. Obtain Permits, Authorizations, Clearances and Agreements							
Direct Labor Costs	Salary	Apply for and obtain permits	Project Scientist	105	hour	$85	$8,925
	Salary	Apply for and obtain permits	Project Coordinator	105	hour	$65	$6,825
Other Direct Costs	Office charges	Postage, paper, phone		1	all	$500	$500
	Travel coordination trips - mileage	5 round trips from Flagstaff to Page	Coordinator, Scientist	100	gal	$3.00	$300
	Per diem	6 round trips from Flagstaff to Page	Coordinator, Scientist	10	days	$35	$350
Subtotal	*all*	*all*	*all*	*all*	*all*	*all*	*$16,900*
Administrative costs 5%	Administrative overhead (5%)	all	all	all	all	all	$845
Total Task 1 Cost	**all**	**all**	**all**	**all**	**all**	**all**	**$17,745**
2 Compilation and Assessment of Background Information							
Outside Services	Salary	Land Survey	Surveyor	60	hour	$100	$6,000
	Imagery	Aerial Survey	Aerial mapping Consultant	6	hour	$1,000	$6,000
	Data	Multi-layered GIS Map	GIS map services	60	hour	$75	$4,500
	Maps,photos	Historical and vegetation map and photo assessment	Consultant	60	hour	$100	$6,000
Direct Labor Costs	Report preparation	Report	Project Scientist	40	hour	$85	$3,400
	Report preparation	Report	Project Coordinator	40	hour	$65	$2,600
	Salary	Leopard Frog and ambersnail habitat requirements research	Project Scientist	80	hour	$100	$8,000
	Salary	Field trips for habitat assessment 1 per@$200	Project Scientist	5	day	$200	$1,000
	Salary	2 per @ $200	Field Biologist	10	day	$400	$4,000
Other Direct Costs	Per Diem	Per Diem, 1per, 15days	Project Scientist	5	person/day	$35	$175
	Per Diem	Per Diem, 2per, 15days	Field Biologist	10	person/day	$35	$350
		Boat travel and fuel costs, insurance		10	day	$190	$1,900
		Travel , vehicle rental		15	day	$100.00	$1,500
		Fuel, average 15 mpg		175	gal	$3.00	$525
	Office charges	Postage, paper, phone		1	all	$500	$500
Sutotal	*All*	*All*	*All*	*All*	*All*	*All*	*$46,450*
Administrative costs	Administrative costs 5%	All	All	All	All	All	$2,323
Total Task 2 Cost	**All**	**All**	**All**	**All**	**All**	**All**	**$48,773**
Task 3. Prepare Plans							
Direct Labor Costs	Salary	Plan preparation	Project Coordinator	160	hour	$65	$10,400
		Plan preparation	Project Scientist	160	hour	$85	$13,600
Other Direct Costs	Office charges	Postage, paper, phone		1	all	$500	$500
Sutotal	*All*	*All*	*All*	*All*	*All*	*All*	*$24,500*
Administrative costs	Administrative costs 5%	All	All	All	All	All	$1,225
Total Task 3 Cost	**All**	**All**	**All**	**All**	**All**	**All**	**$25,725**
Task 4. Monitor Wildlife.							
Direct Labor Costs	Salary	Compile existing historical & monitoring data	Project Scientist	60	hour	$85	$5,100

		Compile existing historical & monitoring data	Project Coordinator	20	hour	$65	$1,300
		Report on historical data	Project Scientist	25	hour	$85	$2,125
		Report on historical data	Project Coordinator	15	hour	$65	$975
		Conduct monitoring	Project Scientist	45	day	$400	$18,000
		Field biologist 2 per@$200	Field biologist	26	day	$400	$10,400
		Reporting	Project Scientist	60	hour	$85	$5,100
			Project Coordinator	24	hour	$65	$1,560
Other Direct Costs	Travel	Per diem, 2 per, 10 days	Project Scientist	45	day	$35	$1,575
		Per diem, 2 per, 10 days	Field biologist	54	person/day	$35	$1,890
		Boat travel and fuel costs, insurance		45	day	$190	$8,550
		Travel, vehicle rental		30	day	$100.00	$3,000
		Fuel, average 15 mpg		320	gal	$3.00	$960
		Equipment, traps, bait, specimen containers		1	each	$2,000	$2,000
	Office charges	Postage, paper, phone		1	all	$500	$500
	Subtotal *All*	*All*	*All*	*All*	*All*	*All*	***$63,035***
Administrative costs	Administrative costs 5%						$3,152
Total Task 4 Cost	All	All	All	All	All	All	**$66,187**

Task 5. Hidden Slough Restoration Implementation, Monitoring, and Maintenance.							
Direct Labor Costs	Salary	Field work supervisor (supervision/support of subcontractor Tamarisk cutting, field assistants) 1 @$300/d	Field work supervisor	50	day	$300	$15,000
		Field Workers, 4 per@$150/d (Pole planting, seed collection, and seed planting)	Field Assistant	30	day	$150	$4,500
		Field worker, 2 per@$150 (Geomorphic maintenance, weeding)	Field Assisstant	40	day	$150	$6,000
		Field Workers, 5 per@$150/d (Irrigation works removal)	Field Assisstant	5	day	$750	$3,750
		Monitoring revegetation	Field Biologist	24	day	$200	$4,800
		Progress Reports (3)	Project Scientist	42	hour	$85	$3,570
			Project Coordinator	30	hour	$65	$1,950
Outside Services	Salary	Tamarisk removal, field work (subcontracted, bid)	contract labor - Field Crew	1	each	$12,000	$12,000
Other Direct Costs	Various	Per Diem		110	person/day	$35	$3,850
		Boat travel and fuel costs, insurance		70	day	$190	$13,300
		Travel, vehicle rental		15	day	$100.00	$1,500
		Fuel, average 15 mpg		300	gal	$3.00	$900
		Equipment, water auger, loppers, hand saws, chain saw and motor maintenance, hogwire		1	each	$3,000	$3,000
	Office charges	Postage, paper, phone		1	all	$500	$500
	Subtotal *All*	*All*	*All*	*All*	*All*	*All*	***$74,620***
Administrative costs	Administrative costs 5%						$3,731
Total Task 5 Cost	All	All	All	All	All	All	**$78,351**

Task 6. Refine Leopard Frog Marsh Non-native Plant Removal and Wetland Restoration Design.							
Direct Labor Costs	Salary	Develop refined restoration design	Project Scientist	45	hour	$85	$3,825
			Project Coordinator	40	hour	$65	$2,600
		Report	Project Scientist	15	hour	$85	$1,275
			Project Coordinator	15	hour	$65	$975
	Office charges	Postage, paper, phone		1	all	$500	$500
Subtotal	*All*	*All*	*All*	*All*	*All*	*All*	***$8,675***
Administrative costs	Administrative costs 5%						$434
Total Task 6 Cost	All	All	All	All	All	All	**$9,109**

Task 7. Implement Leopard Frog Marsh Restoration, Maintenance, and Monitoring.							
Direct Labor Costs	Salary	Field work supervisor (supervision/support of subcontractor Tamarisk cutting, field assistants) 1 @$300/d	Field work supervisor	40	day	$300	$12,000
		Field Workers, 4 per@$150/d (Pole planting, seed collection, and seed planting)	Field Assistant	20	day	$600	$12,000
		Field worker, 2 per@$150 (geomorphic maintenance, weeding)	Field Assisstant	45	day	$150	$6,750
		Monitoring revegetation	Field Biologist	12	day	$200	$2,400
		Progress Reports (3)	Project Scientist	42	hour	$85	$3,570
		Progress Reports (3)	Project Coordinator	30	hour	$65	$1,950
Other Direct Costs	Various	Per diem		160	person/day	$35	$5,600
		Boat travel and fuel costs, insurance		10	day	$190	$1,900
		Vehicle rental		20	day	$100	$2,000
		Fuel, average 15 mpg		300	gal	$3.00	$900
		Equipment, water auger, loppers, hand saws, chain saw and motor maintenance, hogwire		1	each	$2,500	$2,500
	Office charges	Postage, paper, phone		1	all	$500	$500
Subtotal	*All*	*All*	*All*	*All*	*All*	*All*	***$52,070***
Administrative costs	Administrative costs 5%						$2,604
Total Task 7 Cost	All	All	All	All	All	All	**$54,674**

Task 8. Evaluate Potential for Leopard Frog and Niobrara Ambersnail Population Reintroduction/Rehabilitation.							
Direct Labor Costs	Salary	Develop refined restoration design	Project Scientist	40	hour	$85	$3,400
		Develop refined restoration design	Project Coordinator	40	hour	$65	$2,600
Other Direct Costs	Office charges	Postage, paper, phone		1	all	$500	$500
Subtotal	*All*	*All*	*All*	*All*	*All*	*All*	***$6,500***
Administrative costs 5%							$325
Total Task 8 Cost	All	All	All	All	All	All	**$6,825**

Task 9. Restore/rehabilitate Leopard Frog and Niobrara Ambersnail Populations at Leopard Frog Marsh.								
Direct Labor Costs	Salary	Collect, transport, and treat frogs, including reintroduction (15 days @$400/d	Project Scientist	15	day	$400	$6,000
		Assist Project Scientist	Field Biologist	15	day	$200	$3,000
		Progress Reports (3)	Project Scientist	30	hour	$85	$2,550
		Progress Reports (3)	Project Coordinator	30	hour	$65	$1,950
Other Direct Costs	Various	Per diem		15	person/day	$35	$525
		Boat travel and fuel costs, insurance		10	day	$190	$1,900
		Vehicle rental		15	day	$100	$2,000
		Fuel, average 15 mpg		120	gal	$3.00	$360
		Equipment, nets, coolers, disinfectant		1	each	$250	$250
	Office charges	Postage, paper, phone		1	all	$500	$500
Outside Services	Travel	Federal and state agency crew		1	all	$3,000	$5,000
Subtotal	*All*	*All*	*All*	*All*	*All*	*All*	***$24,035***
Administrative costs	Administrative costs 5%						$1,202
Total Task 9 Cost	All	All	All	All	All	All	**$25,237**

Task 10. Final Report							
Direct Labor Costs	Salary	Draft and final report preparation	Project Scientist	100	hour	$85	$8,500
			Project Coordinator	100	hour	$65	$6,500
	Office charges	Postage, paper, phone		1	all	$500	$500
Subtotal	*All*	*All*	*All*	*All*	*All*	*All*	***$15,500***
Administrative costs	Administrative costs 5%						$775
Total Task 10 Cost	All	All	All	All	All	All	**$16,275**

TOTAL PROJECT COST	All	All	All	All	All	All	**$348,899**

Hidden Slough and Leopard Frog Marsh Restoration Project					
Detailed Budget Breakdown					
Matching Funds					
1: Obtain Permits, Authorizations, Clearances and Agreements					
		Qty	*Unit*	*Unit Cost*	*Total*
Outside services:	GLCA Resource Specialist	60	hr	65	3900
	AZGFD Nongame Specialist	20	hr	45	900
Administrative:	GCWC	1	task amount	25% (30%-5%)	4436
					9236
2: Compilation, Evaluation, Assessment, Review					
Outside services:	GLCA Biologist	10	hr	45	450
	AZGFD Nongame Specialist	10	hr	45	450
Administrative:	GCWC	1	task amount	25% (30%-5%)	12193
					13093
3: Prepare Plans					
Outside services:	GLCA Resource Specialist	5	hr	65	325
Administrative:	GCWC	1	task amount	25% (30%-5%)	6431
					6756
4. Monitor Wildlife					
Outside services:	GLCA Resource Specialist	5	hr	65	325
	GLCA Biologist	5	hr	45	225
	AZGFD Nongame Specialist	5	hr	45	225
Administrative:	GCWC	1	task amount	25% (30%-5%)	16547
					17322
5.Hidden Slough Restoration, Implementation					
Outside services:	Maintenance Foreman	68	day	150	10200
	Volunteers (12 people x 7days)	70	day	73	5075
	CRD Upriver haulback		trip		1650
Administrative:	GCWC	1	task amount	25% (30%-5%)	19588
					36513
6. Leopard Frog Marsh Restoration Design					
Outside services:	GLCA Resource Specialist	10	hr	65	650
	GLCA Biologist	20	hr	45	900
	AZGFD Nongame Specialist	20	hr	45	900
Administrative:	GCWC	1	task amount	25% (30%-5%)	2277
					4727
7.Leopard Frog Marsh Restoration, Maintenance, Monitoring					
Outside services:	Volunteer staff (4 people x 6 days)	24	day	73	1740
	GLCA Biologist	20	hr	45	900
	AZGFD Nongame Specialist	20	hr	45	900
Administrative:	GCWC	1	task amount	25% (30%-5%)	13669
					17209
8. Leopard Frog, Ambersnail translocation plan					
Outside services:					
Administrative:	GCWC	1	task amount	25% (30%-5%)	1706
9. Leopard Frog and Ambersnail Translocation					
Administrative:	GCWC	1	task amount	25% (30%-5%)	6309

10. Final Report					
Administrative:	GCWC	1	task amount	25% (30%-5%)	4069
					99619

9) Supplemental Information

STATE HISTORIC PRESERVATION OFFICE
Review Form

In accordance with the State Historic Preservation Act (SHPO), A.R.S. 41-861 *et seq*, effective July 24, 1982, each State agency must consider the potential of activities or projects to impact significant cultural resources. Also, each State agency is required to consult with the State Historic Preservation Officer with regard to those activities or projects that may impact cultural resources. Therefore, it is understood that **recipients of state funds are required to comply with this law** throughout the project period. All projects that affect the ground-surface that are funded by AWPF require SHPO clearance, **including those on private and federal lands.**

The State Historic Preservation Office (SHPO) must review each grant application recommended for funding in order to determine the effect, if any, a proposed project may have on archaeological or cultural resources. To assist the SHPO in this review, the following information MUST be submitted with each application for funding assistance:

- A completed copy of this form, and
- A United States Geological Survey (USGS) 7.5 minute map
- A copy of the cultural resources survey report if a survey of the property has been conducted, and
- A copy of any comments of the land managing agency/landowner (i.e., state, federal, county, municipal) on potential impacts of the project on historic properties.
  NOTE: If a federal agency is involved, the agency must consult with SHPO pursuant to the National Historic Preservation Act (NHPA); a state agency must consult with SHPO pursuant to the State Historic Preservation Act (SHPA),
  OR
- A copy of SHPO comments if the survey report has already been reviewed by SHPO.

Please answer the following questions:

1. Grant Program: Capital

2. Project Title: Hidden Slough and Leopard Frog Marsh Restoration in Glen Canyon, Nat. Rec. Area, AZ

3. Applicant Name and Address: Grand Canyon Wildlands Council, P.O. Box 1594, Flagstaff, AZ 86002

4. Current Land Owner/Manager(s): NPS

5. Project Location, including Township, Range, Section: 24, 35N, 16W

6. Total Project Area in Acres (or total miles if trail): 15

7. Does the proposed project have the potential to disturb the surface and/or subsurface of the ground? ☒ YES ☐ NO

8. Please provide a brief description of the proposed project and specifically identify any surface or subsurface impacts that are expected: The project consists of 1) cutting and removing tamarisk 2) pole planting and seeding of native species, watering and weeding 3) prepare Leopard Frog

Marsh for native species repatriation, 4) monitoring and maintenance. Surface or subsurface impacts may be inserting pole plantings and hand removal of small tamarisk.

9. Describe the condition of the current ground surface within the entire project boundary area (for example, is the ground in a natural undisturbed condition, or has it been bladed, paved, graded, etc.). Estimate horizontal and vertical extent of existing disturbance. Also, attach photographs of project area to document condition: The current ground surface varies. The Hidden Slough portion of the project was surficially burned during tamarisk pile burn. The Leopard Frog Marsh portion of the project is heavily vegetated and overgrown.

From the 2008 NPS GLCA Environmental Assessment of Hidden Slough Pilot Site: "A cultural landscape inventory was conducted by the Bureau of
Reclamation for a portion of the park occurring below Glen Canyon Dam. Two landscapes were originally identified; these were later merged into one landscape called Lees Ferry/Lonely Dell Ranch Historic District. This landscape is approximately 6.5 river miles west of the down steam end of the project area and would not be impacted by the proposed project. Additionally, the Bureau of Reclamation and the National Park Service conducted an extensive survey of the Colorado River riparian zone from Glen Canyon Dam to Lees Ferry (Balsom 1999). No archeological sites were identified from that research at the proposed re- vegetation site. Due to the possibility of inadvertent finds, an archeological monitor will be on site during re- vegetation activities. Should a new site be found, the archeological monitor will have the authority to stop re- vegetation activities in that location pending determination of eligibility for listing on the National Register of Historic Places by park archeologists. The park archeologist would also be responsible for notifying associated tribes. The proposed action is consistent with §1.4.7.1 of NPS 2006 Management Policies. Because no contributing structures are likely present within the project area and there are no known
United States Department of the Interior · National Park Service · Glen Canyon National Recreation Area
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archeological sites, there would be no unacceptable impacts to cultural landscapes or individual archeological sites; therefore this topic has been dismissed from further analysis in this document." This is also the case for Leopard Frog Marsh , 2 miles upstream of Hidden Slough.

10. Are there any known prehistoric and/or historic archaeological sites in or near the project area?
☐ YES ☒ NO

11. Has the project area been previously surveyed for cultural resources by a qualified archaeologist?
☒ YES ☐ NO ☐ UNKOWN

If YES, submit a copy of the survey report. Please attach any comments on the survey report made by the managing agency and/or SHPO

12. Are there any buildings or structures (including mines, bridges, dams, canals, etc.), which are 50-years or older in or adjacent to the project area? ☐ YES ☒ NO

If YES, complete an Arizona Historic Property Inventory Form for each building or structure, attach it to this form and submit it with your application.

13. Is your project area within or near a historic district? ☐YES ☒ NO

If YES, name of the district:

Please sign on the line below certifying all information provided for this application is accurate to the best of your knowledge.

Kelly Burke 8/30/2010 Kelly Burke

Applicant Signature /Date Applicant Printed Name

FOR SHPO USE ONLY
SHPO Finding: ☐ Funding this project will not affect historic properties. ☐ Survey necessary – further GRANTS/SHPO consultation required (*grant funds will not be released until consultation has been completed*) ☐ Cultural resources present – further GRANTS/SHPO consultation required (*grant funds will not be released until consultation has been completed*)
SHPO Comments
For State Historic Preservation Office: Date:

Key Personnel

Kelly J. Burke is the Director of the Grand Canyon Wildlands Council. Starting as a volunteer in March 1996, then as consultant and eventually staff, she cofounded and directed the organization. She coordinates the programs, outreach, and fundraising for the Wildlands Council, as well as participates in the regional ecological assessments and analyses. She received a B.A. with honors in Geology/Art History from the University of California, Santa Barbara and an M.S. in Structural Geology from Northern Arizona University. Ms. Burke has 14 years experience in geological mapping including six years of research trips down the Colorado River in Grand Canyon.

Kim Crumbo Kim is currently the Director of Conservation for the Grand Canyon Wildlands Council. He is an active member of the Grand Canyon Wolf Recovery Project and The Wildlands Network steering committees, and is a Fellow for The Rewilding Institute. From 2000 to 20010 he has conducted restoration of riparian habitats and roads identified for closure on BLM, NPS, and USFS lands. He served 20 years with the National Park Service in Grand Canyon as the river ranger and later as Wilderness Coordinator where he also led revegetation and trail stabilization projects with volunteers. Kim worked as professional river guide for 10 years and two years as the Utah Wilderness Coordinator for the Sierra Club. Before his experience on rivers and in wilderness activism, science-based conservation and restoration, he spent four years with the Navy's SEAL Team One completing two combat deployments to Vietnam. Kim received a B.S. in Environmental Studies from Utah State University, with postgraduate work in outdoor recreation. In 1999, Kim received the National Park Service's "Director's Wilderness Management and Stewardship Award." In 1999 The Wilderness Society presented him with "Environmental Heroes Award." As a result of his military service, Kim earned several combat decorations, including a Bronze Star. His publications include A River Runners Guide to the History of Grand Canyon, an article in the International Journal of Wilderness titled Wilderness Management at Grand Canyon: Waiting For Godot?, and an article about the ecological impacts of roads in Wild Earth magazine.

Dr. Lawrence E. Stevens is the Senior Ecologist for Grand Canyon Wildlands Council, as well as the Curator of Ecology and Conservation at the Museum of Northern Arizona and the Grand Canyon National Park All Taxa Biological Inventory Coordinator. He received his undergraduate degree from Prescott College and his M.S. and Ph.D. from Northern Arizona University in Flagstaff, Arizona. He is an avid natural historian and river runner, and has spent the past 30 years engaged in ecological research on rivers in the American Southwest. His studies have focused on native and non-native plant-herbivore interactions in riparian habitats, as well as linkage between riparian and aquatic components of aridlands fluvial ecosystems, particularly the Colorado River in the Grand Canyon. Dr. Stevens was the project lead for Grand Canyon Wildlands Council for the Lees Ferry and Hidden Slough restorations in Glen Canyon National Recreation Area, and a tamarisk dendrochronology project and the successful translocation of endangered humpback chub in Grand Canyon National Park. Dr. Stevens will oversee information compilation and planning, and will assist with site restoration planning and implementation.

Robert Andress received a B.S. from Augustana College and an M.S. degree in hydrogeology from Iowa State University. Robert Andress has an extensive background in the planning, design and completion of ecological restoration projects and specializes in habitat restoration projects associated with the recovery of threatened and endangered species. Mr. Andress has completed several successful fish and amphibian habitat design, construction, and restoration projects for the US Fish and Wildlife Service.

RESUME FOR

Kim Crumbo
P.O. Box 1033
Grand Canyon, Arizona 86023
928-638-2304
kcrumbo@grand-canyon.az.us

Wilderness/Wildlife Advocate; 1999 to Present

I am currently the Conservation Director for the Grand Canyon Wildlands Council (GCWC), a regional conservation organization dedicated to the protection and restoration of wild nature in the 36-million acre Grand Canyon Ecoregion. My principal current tasks include direct engagement with the conservationist's working groups for Kaibab, Coconino, and Apache-Sitgreaves national forests Forest Plan Revision and their respective Travel Management Plans, including development of comprehensive scoping comments and other documents. This effort includes developing a comprehensive wildlife conservation strategy for the national forest. During this time I have established and maintained close professional relationships with key staff of conservation organizations including The Wilderness Society, Center for Biological Diversity, The Wildlands Network, Western Wildlife Conservancy, White Mountain Conservation League, Defenders of Wildlife, Arizona Wilderness Coalition, Sierra Club and others.

My work includes active participation on the steering committee for two coalitions dedicated to Southwestern wolf recovery. The first, Mexicanwolves.org, is a collaborative effort of local, regional, and national conservation, scientific and sportsmen's organizations, and concerned citizens using the Internet to help save the endangered Mexican gray wolf. The second coalition is the Grand Canyon Wolf Recovery Project, a Southwest regional coalition working to return wolves to their historic home throughout the Grand Canyon region.

A key element of my current position is the development and implementation of strategic conservation plans for the Grand Canyon Ecoregion. I co-authored the most recent iteration of GCWC's Wildlands Network Design (WND), *Safe Havens, Safe Passages: Protecting Wild Nature in the Grand Canyon Ecoregion.* I was the principal author for two major WND implementation proposals: *Arizona Strip Resource Conservation Area: A Proposal*; and *Mogollon Wildlife Conservation Area: A Proposal.* Both documents were submitted as part of our engagement in BLM and USFS land use management plans. I am currently finalizing our wildlife conservation area proposal for the North Kaibab Ranger District (electronic copies available on request). My responsibilities include updating and implementing the Grand Canyon Ecoregion WND, generally through the agencies' land use planning processes described above.

I am responsible for establishing and maintaining professional relationships with other conservation groups, legislators and their staff, and agency personal as well as general public outreach. I also share grant writing responsibilities with the GCWC Executive Director, receiving sustained funding for our wildlands projects from grants ranging between $5,000 and $90,000. Throughout my career I have made numerous public speaking engagements and I have written a variety of conservation related reports, letters to the editor and opinion editorials, books and magazine articles.

Past Positions and Responsibilities

For two years (2001-2002) I was employed as the Northern Representative for the Arizona Wilderness Coalition. I also worked briefly for the Southwest Forest Alliance. My tasks included direct involvement with the BLM Arizona Strip RMP revision process, including the Grand Canyon-Parashant and Vermilion Cliffs National Monuments, with special emphasis on preserving and restoring habitat through the development of wilderness and Areas of Critical Environmental Concern proposals. During this time I conducted extensive wilderness inventories, including volunteer programs, on the Arizona Strip resulting in formal wilderness proposals exceeding one million acres. This effort involved extensive fieldwork and extensive research into the history of wilderness review on the Arizona Strip, an evolving BLM wilderness policy, and an overview of ecological conditions. I was actively involved with the Monument Defense working group, which included representatives from the Sierra Club, Grand Canyon Trust, and The Wilderness Society.

National Park Service Wilderness Manager- 1979-1999

I served as the river ranger, resource management specialist and Wilderness Coordinator for Grand Canyon National Park from 1980 to 1999. As Wilderness Coordinator, I provided guidance for NPS wilderness preservation and management for park operations and in park documents. I was the principal author for the Park's 1993 Wilderness Recommendation Update and contributed to the wilderness sections of the Park's 1995 General Management Plan. I also provided substantive, detailed contributions to the 1998 Draft Wilderness Management Plan (electronic copies available on request).

I also worked to rehabilitate or mitigate ground surface disturbance within the Grand Canyon National Park proposed wilderness, particularly the river corridor. For fifteen years, I coordinated the Park's wilderness volunteer program including logistics for complex, three-week river-based wilderness projects. I also contributed to NEPA compliance reviews, and assisted in exotic species inventory and removal. During this time I obtained an extensive knowledge of wilderness policy and law, as well as a working knowledge of NEPA, the Endangered Species, and laws governing the protection of wildlife and cultural resources.

Wilderness Advocate
From 1976 through 1977, I worked as the Sierra Club's Utah Wilderness Coordinator. In that capacity I advocated the Club's Utah wilderness preservation program. I researched and inventoried potential wilderness within applicable federal lands, researched and interpreted wilderness legislative and policy, and wrote articles, opinion editorials, and press releases supporting wilderness and other conservation efforts.

River Guide/Trip Leader-1971-79
During the 1970's I worked as a professional river guide for Ken Sleight Expeditions and Holiday River Expeditions, conducting over 150 river trips as boatman and trip leader on the Colorado, Green Rivers and other rivers. I supervised up to 30 passengers and five staff on 2-14 day river trips in remote areas.

U.S. Navy SEAL-1967-71
Before my work on rivers and wilderness, I served four years with the Navy's SEAL Team One, completing two combat deployments to Vietnam as an automatic weaponsman and later as the Team's combat photographer.

Education
In 1976, I received a B.S. in Environmental Studies from Utah State University, and later obtained postgraduate work in outdoor recreation. I have completed 18 semester hours in Wilderness Management from the University of Idaho's Distance Education Program.

Publications
My published articles include *A River Runners Guide to the History of Grand Canyon*; a chapter in *Grand Canyon: Intimate Views*; a peer-reviewed article in the *International Journal of Wilderness* titled "Wilderness Management at Grand Canyon: Waiting For Godot?" and an article about the ecological impacts of roads in *Wild Earth* magazine.

Awards
My professional awards include a Bronze Star with "V" for Valor in 1970; the National Park Service's 1998 Director's Wilderness Management and Stewardship Award; an award from the Grand Canyon Trust in 1999 for my "Commitment and Dedication to Protecting Wildness and the Lands of the Colorado Plateau," and The Wilderness Society's "Environmental Heroes Award" in 1999.

Board of Directors
- Western River Guides Association, 1977-79
- Grand Canyon River Guides Association, 1984-86
- Grand Canyon Wildlands Council, 1996 to 2006
- Grand Canyon Private Boaters Association, 2000-2001

- Grand Canyon Music Festival, 2004 to 2006
- Arizona Wildlife Federation, 2005 to 2009
- Arizona Wilderness Coalition, 2007 to present
- Grand Canyon Wolf Recovery Project (Steering Committee), 2006 to present
- The Rewilding Institute (Fellow), 2006 to present
- Wildlands Network (Steering Committee) 2007 to present.
- Mexicanwolves.org (Steering Committee), 2008 to present
- Executive Committee, Plateau Group, Grand Canyon Chapter of the Sierra Club, 2007 to present

Memberships

- The Wilderness Society (Lifetime Honorary Member)
- Sierra Club
- Center for Biodiversity
- Defenders of Wildlife

Hobbies, etc

I actively engage in backpacking, river running, jogging and weight lifting, and general nature observation. I enjoy reading, particularly current events, natural and cultural history, philosophy, good novels, and wilderness-related subjects. I also enjoy music including classical, jazz and some rock'n roll.

I'm 61 years old. My wife, Becky, is the principal for Grand Canyon Unified School and coordinator for Grand Canyon School's International Baccalaureate program. My oldest son, Daniel (32), is pursuing a doctorate in Comparative Literature at the University of Arizona. My youngest son, Zachary (30), obtained a Masters of Fine Arts at the University of Washington and now works as a graphic designer at TriSports, a sporting goods outfit specializing in triathlon athletics.

References available on Request

CURRICULUM VITAE: LAWRENCE EDWARD STEVENS, PhD

DATE OF BIRTH: 17 November, 1951, Cleveland, Ohio

MAILING ADDRESS: Curator of Ecology and Conservation
Museum of Northern Arizona
3101 N. Ft. Valley Rd.
Flagstaff, AZ 86001
(928) 774-5211 x 204
farvana@aol.com

EDUCATION:

PhD Zoology, Northern Arizona University, Flagstaff, 1989
MS Biology, Northern Arizona University, Flagstaff, 1985
Selected coursework in biology and fine arts, University of Arizona, 1977-1978.
BA Biology and fine arts, with honors, Prescott College, Prescott, Arizona, 1974
Graduated with honors, Rocky River High School, Rocky River, Ohio, 1970
Born , Cleveland OH 17 Nov. 1951

PERTINENT EXPERIENCE, EMPLOYMENT, BOARDS:

2007 – 2008 Grand Staircase National Monument Advisory Committee Chair
2006-present Curator of Ecology and Conservation, Museum of Northern Arizona, Flagstaff
2006-present Grand Canyon National Park ATBI Coordinator
2005-present Science Advisor for Ecological Monitoring & Assessment, Babbitt Foundation and Northern Arizona University
2004-present Conservation Representative for GCWC on the Glen Canyon Dam Adaptive Management Technical Work Group
2003-2005 Grand Staircase National Monument, Assistant Chair and Science Advisor
2004-2006 Board of Directors, Museum of Northern Arizona, Flagstaff
2003-2005 USFWS-trained WIFL surveyor, Yuma, AZ
2001-present Yuma East Wetlands Restoration Project, vegetation and avifaunal analyses and monitoring
2000-present Senior Science Advisor, Grand Canyon Wildlands Council, Inc.,
1999-present Principal Investigator for Stevens Ecological Consulting, LLC, Flagstaff
1999-2006 Associate editor, Western North American Naturalist
1998-1999 Ecologist, Department of the Interior, Grand Canyon Monitoring and Research Center, Flagstaff, AZ.
1995-1997 Ecological Analyst, Applied Technology Associates, Inc.
1993-present. Adjunct Faculty, Prescott College, Prescott, AZ.
1990-present. Adjunct Faculty Member, Department of Biological Sciences, No. AZ Univ.
1988-1994 Ecologist, Grand Canyon National Park Resource Management and Planning Division, Grand Canyon, Arizona.
1986-present Research Associate, Museum of Northern Arizona, Flagstaff, Arizona.
1989-1991 Summer faculty, No. AZ Univ., Department of Biological Sciences
1986-1989 Doctoral research, Northern Arizona University. PhD completed in May, 1989
1983-present Editor, Red Lake Books,, Flagstaff
1983-1989, 1995-2003, 2006-present -- Whitewater guide in Grand Canyon for Wilderness World, Arizona Raft Adventures and Outdoors Unlimited, the National Park Service, and the Bureau of Reclamation, Flagstaff, Arizona.; >400 trips through Grand Canyon, as a guide or trip leader, primarily guiding 18' oar-powered rafts

ROBERT J. ANDRESS

PO Box 711134 •Salt Lake City, Utah 84171 • phone 801.390.7174 • rjandress@gmail.com

SPECIALTY

Gradient, LLC specializes in the restoration of aquatic ecosystems including springs, streams, and wetlands primarily for sensitive species recovery efforts. Our experience is focused in restoration planning and design, field surveys and assessments, hydrogeology, geomorphology, hydrologic and hydraulic modeling, construction, revegetation, irrigation system design and installation, surface and groundwater quality, habitat monitoring, and water resource issues.

EMPLOYMENT

GRADIENT, LLC — 2010 - present
Owner, Project Manager and Hydrogeologist — *Salt Lake City, Utah*
Gradient, LLC specializes in ecological planning, design, and restoration.

OTIS BAY, INC. — 2003 - 2010
Project Manager and Hydrogeologist — *Reno, Nevada*
Project manager for a wide variety of aquatic habitat restoration and resource management related activities including site assessment and surveys, hydraulic modeling, restoration design and construction, and surface water, groundwater, recreation, and water resource issues.

MONTGOMERY WATSON HARZA — 1999 - 2003
Project Hydrogeologist — *Salt Lake City, Utah*
Hydrogeologist on numerous soil and groundwater investigation and characterization studies. Performed groundwater pump and tracer tests as well as monitoring well and lysimeter installation. Completed soil and groundwater investigation and monitoring field programs.

EDUCATION

HYDROGEOLOGY, M.S. — 1999
Iowa State University — *Ames, Iowa*

GEOLOGY, B.S. — 1995
Augustana College — *Rock Island, Illinois*

MAJOR PROJECTS

ASH MEADOWS NATIONAL WILDLIFE REFUGE, NEVADA – (USFWS)
Project Manager/Hydrogeologist/Geomorphologist

- Geomorphic and biologic assessment of the refuge with an

- Project included the assessment of restoration potential for riparian habitat adjacent to the East Fork of the Walker River and the design and construction of restored riparian habitat within USFWS property. Design and installation of wetland and upland revegetation and irrigation.

CARSON RIVER, NEVADA (BLM)
Hydrogeologist/Geomorphologist

- Assessment of the Middle Carson River for the purpose of recovering and sustaining the riverine ecosystem.

MUDDY RIVER, NEVADA (Clark County)
Project Manager/Hydrogeologist/Geomorphologist

- Assessment of the geomorphic processes, riparian forest, and hydrology of the Muddy River and development of restoration and ecological enhancement alternatives.

MOAPA NATIONAL WILDLIFE REFUGE, NEVADA (USFWS)
Hydrogeologist/Geomorphologist

- Project involves the ongoing restoration of spring pool and channel riparian habitat. Past restoration activities have included the removal of recreational swimming facilities and non-native vegetation prior to restoration of spring pool and spring channel habitat. The projects provide habitat for native and endemic fishes and invertebrates that inhabit the system. Studies and projects included the study of the effects on channel habitat due to declining spring flows and the construction of a large spring channel habitat viewing chamber.

TRUCKEE RIVER, NEVADA – VISTA, NEVADA TO PYRAMID LAKE (Army Corps of Engineers)
Hydrogeologist/Geomorphologist

- Truckee River restoration and geomorphic assessment from Vista, Nevada to Pyramid Lake, Nevada to identify sites suitable for future restoration activity.

DESERT NATIONAL WILDLIFE REFUGE, CORN CREEK, NEVADA (USFWS)
Hydrogeologist/Construction Implementation

- The project involved restoration of the spring pools, outflow channels and native vegetation that were once buried, ditched and removed. Also, design and construction of a refugium for the native Pahrump poolfish.

PARKER RANCH, NEVADA (The Nature Conservancy)
Hydrogeologist/Construction Implementation

- The project involved the modification of a former spring-fed irrigation reservoir to spring pools and outflow channels for the purpose of creating habitat suitable for the Amargosa toad and Oasis Valley Speckled dace.

Description of Monitoring/Sampling Plans

Hidden Slough Revegetation Completion, Photographic Monitoring and Maintenance Plan (Tasks 3.3a, 3.7) will describe several monitoring elements, with monitoring conducted on a quarterly basis. 1) The grantee will monitor the density of surviving tamarisk and any tamarisk recolonization (none is expected, as none occurred at the Lees Ferry site). 2) Growth (stem length increase) and survival of 50 randomly selected, marked native plants of each replanted species, where possible. 3) The revegetation plan also will document the general health and appearance of each plant measured. 4) The grantee will conduct and report the visually-estimated percent aquatic, ground-, shrub-, and tree-cover of each plant species in each discrete habitat, and 5) will document any natural changes or recreation impacts or threats to the site. 6) Photographic monitoring will be conducted according to the protocols of AWPF, from several fixed points during each monitoring run.

The site maintenance plan will be informed by the site monitoring plan, and will emphasize: 1) the staffing and timing of maintenance activities; 2) the timing of removal of any surviving or recolonizing non-native tamarisk, 3) any site recontouring or adjustment to the watering schedule; 4) the timing, transport, and disposal, reuse, or storage of irrigation materials; 5) replacement of native plantings; and 6) other site maintenance activities. The plan will include recommended timing and maintenance of long-term information management.

Leopard Frog Marsh Restoration, Photographic Monitoring and Maintenance Plan (Tasks 3.3b, 3.7) will describe monitoring elements, with monitoring conducted on a quarterly basis, in which the grantee will monitor: 1) The density of surviving tamarisk and any tamarisk seedling establishment; 2) Growth (stem length increase) and survival of 50 randomly selected, marked native plants of each replanted species, where possible; 3) The general health and appearance of each plant measured; 4) The visually-estimated percent aquatic, ground-, shrub-, and tree-cover of each plant species in each discrete habitat; 5) Any natural changes or recreation impacts or threats to the site; and 6) Flow, pH, specific conductance, and temperature of the springs near the source, and annual analysis of base cation and anion, and nutrient concentrations. The latter will include collection of a filtered 0.1 L sample of water to be collected for laboratory analyses in a triple acid-washed sample bottle, with samples refrigerated and submitted for analysis within 48 hr. Monitoring of reintroduced/restored Niobrara ambersnail or leopard frog populations is described in the Wildlife Monitoring Plan (below). Photographic monitoring will be conducted according to the protocols of AWPF, from several fixed points during each quarterly monitoring run.

At present, no irrigation works are planned for the Leopard Frog Marsh site. The site maintenance plan will be informed by the site monitoring plan, and will emphasize: 1) the staffing and timing of maintenance activities; 2) recontouring/maintenance of the spring channel or non-spring site geomorphology in response to erosional changes; 3) replacement of native plantings; 4) prevention of *Phragmites* overgrowth; and 5) other site maintenance activities. The plan will include description of metrics of success, and plans for long-term information management.

Hidden Slough and Leopard Frog Marsh Wildlife Monitoring Plan (Task 3.4) will involve the following monitoring activities at Hidden Slough, Leopard Frog Marsh, a similar but untreated control site in the area, and the Lees Ferry restoration site.

1) Monitoring invertebrates in spring, summer, and fall by: a) placement of a Malaise trap for 24 hr, b) UV light trapping for 2 hr/night for one night/site, c) diurnal spot sampling with aerial sweep netting, including sampling of tamarisk leaf beetle density, d) placement of 10 colored pan traps at 2 m intervals in both the lower and middle riparian zones at each site, each containing 50 ml of soapy water, and e) placement of 20 sticky traps for 24 hr to quantitatively snare ground-dwelling invertebrates. Invertebrate specimens will be identified to the lowest taxonomic level, enumerated, and prepared for curation at the Museum of Northern Arizona in Flagstaff, with vouchers provided to the NPS if so requested.

2) Monitoring of diurnal and nocturnal herpetofanua in spring, summer, and autumn on 3 timed, 100 m walks on a 10 m-wide belt through the project area at each of the four sites. All species will be identified to species (captured and released if necessary) and enumerated. Weather conditions and comments will be recorded for each monitoring run.

3) Avifauna will be monitored monthly from April-June, and seasonally thereafter at each site. Avifaunal monitoring will involve on 3 timed, 100 m walks on a 10 m-wide belt through the project area at each of the four sites. All species will be identified to species (captured and released if necessary) and enumerated. Weather conditions and comments will be recorded for each monitoring run.

4 Small mammal trapping will be conducted in spring and fall each year on each site by setting 100 Sherman live traps per site. Traps will be baited with rolled oats. All animals captured will be identified, sexed, weighed, and their reproductive condition will be noted.

5. Specific monitoring of northern leopard frog will follow U.S. Fish and Wildlife Service and Arizona Game and Fish Department recommendations. Niobrara ambersnail monitoring will follow protocols and timelines established by the Arizona Game and Fish Department for Kanab ambersnail.

Description of Revegetation/Restoration Plans or Research Designs

Task 3.1. The Hidden Slough Site Restoration Plan will focus on: 1) manual removal of remaining tamarisk stems, with resprout mortality facilitated by tamarisk leaf beetle attack; 2) removal of other fire hazards; 3) seeding the middle riparian zone terrace with Sueda, saltbush, and dropseed, and pole planting Goodding's willow, seepwillow, and limited Fremont cottonwood and box elder in the lower riparian zone; 4) removal of the irrigation works; and 5) restoration of open water in the slough. This plan will be developed using a 0.5 m contour site base map, and may include manual recontouring of unstable points near ephemeral tributary mouths. The plan will include definition of metrics of success.

Task 3.2. **The Leopard Frog Marsh Site Restoration Plan** will include: 1) manual removal of tamarisk stems, with resprout mortality facilitated by tamarisk leaf beetle attack; 2) stratified removal and restructuring the *Phragmites*-dominated spring mouth and runout channel; 3) recontouring northern leopard frogs habitats; 4) replanting outside the spring-dominated area with native riparian Goodding's willow, seepwillow, and other native shrubs in the lower riparian zone, and saltbush and potentially hackberry (*Celtis laevigata*) and other native shrubs or small trees in the middle riparian zone. This plan will be developed using a 0.5 m contour site base map, and may include manual recontouring of unstable points near ephemeral tributary mouths. The extent of restoration to the sparsely vegetated, pre-dam condition of the site will discussed and clearly resolved with the NPS. The plan will include definition of metrics of success.

Task 3.5. **Plan to Restore or Reintroduce Nibrara Ambersnail and Leopard Frog at Leopard Frog Marsh:** The grantee will create a plan to identify the following elements for these two rare, restricted species restricted at Leopard Frog Marsh. 1) Determine habitat availability and suitability at Leopard Frog Marsh for both species; b) Location and status of stock for potential reintroduction; c) Timing, collection and handling of individuals for translocation (frog); d) Timing of achievement of compliance will federal and state agencies; e) Need for replicated translocation. Monitoring is described above. The plan will include definition of metrics of success.

Task 3.6. **Glen Canyon Restoration Outreach/Education Plan:** The outreach plan will include description of the target audiences (general public, river rafters, anglers, scientific community, etc.) in relation to NPS information strategies. The plan will consider: a) the assemblage of restoration information, b) the timing of information release, and c) how to reach the various audiences most effectively. The plan may consider: regular information updates (information sheets or a poster at Lees Ferry); public presentations on-site, in local schools, or to the visiting public at Wahweap; new releases; and scientific publication of results.The Hidden Slough Site is a day-use, picnic site, and information may be made available on-site, if the NPS so wishes. Because of potential sensitive species at Leopard Frog Marsh, the plan is unlikely to recommend on-site information there. The outreach plan will include recommended timing of activities and metrics of success.

Existing Plans, Reports, Information Relevant to the Project

Restoration planning and implementation in the Glen Canyon reach of the Colorado River is based on the enabling legislation of Glen Canyon National Recreation Area (1972), which is "...to provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent thereto... and to preserve scenic, scientific, and historic features contributing to public enjoyment of the area." Other relevant legislation influencing riparian restoration in this reach includes: the Antiquities Act of 1907, the body of laws regulating water storage and release from Glen Canyon Dam (known as "the Law of the River" and beginning with the Colorado River Compact of 1922), the Endangered Species Act (1972, as amended), the Grand Canyon Protection Act (1992), and the 2006 NPS Management Guidelines and updated Code of Federal Regulations. Collectively, this federal and state legal guidance provides for riparian restoration along

the Colorado River in GLCA. In addition, GLCA has produced a General Management Plan and specific management plans for the Glen Canyon Reach. Of most relevance to the restoration actions proposed here is "The Colorado River Riparian Revegetation Plan" (November, 2008), and "The Environmental Assessment for Hidden Slough Pilot Site"(September 2008). These plans describe the background and justification for restoration of the reach, including Hidden Slough and Leopard Frog Marsh and including the restoration/reintroduction of missing native species.

The Arizona Native Plant Society

August 28, 2010

Arizona Water Protection Fund
Arizona Department of Water Resources
3550 North Central Ave.
Phoenix, AZ 85012

Dear Commissioners,

The Arizona Native Plant Society (AZNPS) is a statewide nonprofit organization whose mission is to promote knowledge, appreciation, conservation, and restoration of Arizona native plants and their habitats. AZNPS keeps abreast of conservation issues concerning native species and works with the Southwest Rare Plant Task Force to develop strategies for protecting rare species and their habitats.

For these reasons, we are writing to endorse two proposals submitted to the Arizona Water Protection Fund.

We support the proposal of the Grand Canyon Wildlands Council (GCWC) to undertake riparian restoration and monitoring at two sites in Glen Canyon National Recreation Area: Hidden Slough and Leopard Frog Marsh. Completion and monitoring of the work GCWC has begun at Hidden Slough is essential to maintain and advance the restoration of native vegetation there and to support the scientific analysis that will inform future efforts of this kind. GCWC's expertise, as well as the experience and success they have gained at Hidden Slough, gives us full confidence in their proposal to restore and monitor plant and wildlife habitat at Leopard Frog Marsh in cooperation with the National Park Service.

We also support the Bureau of Land Management proposal to complete the restoration of Pakoon Springs and restore the riparian habitat of Pakoon Wash. This spring complex is the largest on the Arizona Strip and its associated riparian habitat has been identified by the Grand Canyon Wildlands Council as one of the most promising for restoration. This project promises to be a major step toward securing the future of rare riparian plants and wildlife in Arizona.

Sincerely,

Susan L. Bean

Susan Lamb Bean
Conservation Chair, Flagstaff Chapter
Arizona Native Plant Society

Arizona Water Protection Fund
Arizona Department of Water Resources
3550 North Central Ave.
Phoenix, AZ 85012
August 31, 2010

August 31, 2010

Dear Commissioners,

Colorado River Discovery is an authorized concessioner of Glen Canyon National Recreation Area. CRD operates half day and full day trips from the Glen Canyon Dam to Lees Ferry from March to November of each year. Our organization fully supports the proposal submitted to AWPF by the Grand Canyon Wildlands Council to conduct restoration and monitoring activities at Hidden Slough and Leopard Frog Marsh in Glen Canyon. As a company that operates within the areas proposed for this restoration, CRD has a vested interest in this project. The refurbishment of these riparian habitats will provide an educational opportunity for our staff to rediscover an indigenous species to our area of operation. As advocates of the Colorado River and Glen Canyon, we make it a point to pass on our passion for stewardship of this area to each of our guests.

We have worked with GCWC in the past and they have exuded professionalism and efficiency in the projects that we have been involved with their organization. We hope to continue our relationship with GCWC in the future, especially in this proposed project. We have provided transportation of equipment and volunteers to the various sites within Glen Canyon. If we are used in the same capacity for this project, the transportation cost would be offered at 55% off of the rack rate for this service.

Sincerely,
Korey Seyler
Operations Manager
Colorado River Discovery
928-645-9175

GRAND CANYON TRUST

August 30, 2010

Arizona Water Protection Fund
Arizona Department of Water Resources
3550 North Central Ave.
Phoenix, AZ 85012

Dear Arizona Water Protection Fund Commissioners,

Grand Canyon Trust would like to offer its support for Grand Canyon Wildlands Council's (GCWC) proposal to expand their restoration efforts at Pakoon Springs in Grand Canyon Parashant National Monument to include Pakoon Wash. Our organization is dedicated to protecting and restoring the landscapes, flowing rivers, clean air, diversity of plants and animals, and areas of beauty and solitude of the Colorado Plateau, and this proposed work fits well within our mission. Beyond this, we recognize the importance of Pakoon Springs and the adjacent area, in particular, as one of the highest priority springs sites on the Arizona Strip, given its large size and its potential to support species such as the northern leopard frog. We look forward to the opportunity to provide support and assistance to Grand Canyon Wildlands Council to restore this critically important riparian area.

Sincerely,

Christine Albano
Restoration Program Coordinator
Grand Canyon Trust

GRAND CANYON RIVER GUIDES

P.O. Box 1934
Flagstaff, AZ 86002
(928) 773-1075 Phone
(928) 773-8523 Fax
gcrg@infomagic.net

August 26, 2010

Arizona Water Protection Fund
Arizona Department of Water Resources
3550 North Central Ave.
Phoenix, AZ 85012

Dear Commissioners,

Grand Canyon River Guides, Inc. is a non-profit educational and environmental group with over 1,600 passionate members dedicated to the protection of Grand Canyon and the Colorado River experience. Our organization fully supports the proposal submitted to AWPF by the Grand Canyon Wildlands Council to conduct restoration and monitoring activities at Hidden Slough and Leopard Frog Marsh in Glen Canyon.

As an advocacy organization, GCRG recognizes the necessity and value of on-the-ground restoration and monitoring efforts within this dam-managed system. We feel that GCWC's track record and expertise, coupled with the collaborative nature of this project bode well for a successful outcome that will set the stage for broader restoration efforts in the future. Our members have volunteered for current work at Hidden Slough and this proposal will provide additional opportunities.

Sincerely,

Emily Perry
President
Grand Canyon River Guides, Inc.

Dedicated to the quality of the Grand Canyon Experience

GRAND CANYON YOUTH
discover your nature

P.O. Box 23376 Flagstaff, AZ 86002 Phone: 928.773.7921 Fax: 928.774.8941
info@gcyouth.org www.gcyouth.org

Arizona Water Protection Fund
Arizona Department of Water Resources
3550 North Central Ave.
Phoenix, AZ 85012

Dear Commissioners,

Grand Canyon Youth is a non-profit organization whose mission is to provide youth an experiential education along the rivers and canyons of the Southwest to promote environmental awareness, community involvement, personal growth and teamwork among people of diverse backgrounds. We fully support the efforts of the Grand Canyon Wildlands Council to conduct restoration and monitoring activities at Hidden Slough and Leopard Frog Marsh in Glen Canyon. We look forward to collaborating to achieve the important goals of this effort.

We have a long and successful track-record of youth participating in service projects with government (Grand Canyon National Park and the Grand Canyon Monitoring and Research Center) and non-profit (Grand Canyon Trust and the Arboretum) organizations. Youth have assisted with projects ranging from surveying and invasive species monitoring and removal, to tagging and counting native and non-native fish. We are confident that our participants could be helpful in whatever projects are clearly set-out for them by GCWC. Getting youth involved in river restoration is a valuable enterprise, not only to provide extra hands to get the work finished, but to plant seeds for youth to become future stewards of these special places.

Because we have worked with the Grand Canyon Wildlands Council on other projects and have seen first-hand their commitment to the Southwest, we feel confident that this project would be a success. We would happily support them in their efforts on this section of river, restoring this valuable habitat.

Sincerely,

Emma Wharton, MSW
Executive Director
Grand Canyon Youth

August 30, 2010
5555 Buckboard Tr.
Flagstaff, AZ 86004

Arizona Water Protection Fund
AZ Dept. of Water Resources

Dear Commissioners:

I am writing in support of Grand Canyon Wildlands Council to restore the natural habitat in Hidden Slough, and Leopard Frog Marsh. This past summer, I was on a river trip on the Green River with N.P.S.' weed warrior program, where we removed Tamarisk from various locations along the river in hopes to restore native riparian habitats. The work was very fun and it was incredible to see the tamarisk population steadily decrease through out the day. I am very excited to participate in restoring Glen Canyon's natural habitat.

Sincerely,

Ryan Lindsey

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV
REGION II, 3500 S. LAKE MARY ROAD, FLAGSTAFF, AZ 86001

GOVERNOR
JANICE K. BREWER
COMMISSIONERS
CHAIRPERSON, JENNIFER L. MARTIN, PHOENIX
ROBERT R. WOODHOUSE, ROLL
NORMAN W. FREEMAN, CHINO VALLEY
JACK F. HUSTED, SPRINGERVILLE
BOB HERNBRODE, TUCSON
DIRECTOR
LARRY D. VOYLES
DEPUTY DIRECTORS
GARY R. HOVATTER
ROBERT D. BROSCHEID

August 31, 2010

Arizona Water Protection Fund Commission
c/o Department of Water Resources
3550 N. Central Avenue
Phoenix, AZ 85012

Dear Commissioners:

This letter is in support of the grant proposal entitled ***Hidden Slough and Leopard Frog Marsh Restoration Planning, Implementation, Maintenance, and Monitoring in Glen Canyon National Recreation Area, Arizona*** submitted by Grand Canyon Wildlands Council. This project will help the National Park Service implement the Glen Canyon Riparian Revegetation Plan for preserving and enhancing native plant communities and wildlife habitat within the Colorado River corridor of Glen Canyon National Recreation Area (GCNRA).

This restoration project will improve habitat for northern leopard frogs, a *Species of Greatest Conservation Need* in Arizona. The species has been extirpated from the Colorado River in Arizona, including Leopard Frog Marsh, which had been the last occupied site along the River until recently. Habitat restoration at this site will allow us to repatriate the species to this site and initiate the species' comeback to the Colorado River in Arizona. In recent years the Department has established a northern leopard frog refuge population at nearby House Rock Wildlife Area, using a GCNRA population as its source, precisely for the purpose of re-establishing populations such as this one.

The proposed restoration and repatriation project is a high priority for the Arizona Game and Fish Department and the Department is committed to partnering with Grand Canyon Wildlands Council, Glen Canyon National Recreation Area and the Arizona Water Protection Fund to accomplish the goals identified in this proposal. If this project is funded, the Department can commit to an in-kind contribution of my time and travel of approximately $6,500. This would include time spent planning the restoration project, conducting field assessments, translocating eggs and/or larvae and conducting follow-up monitoring visits. If you have any questions please contact me (928 214-1250 or smacvean@azgfd.gov).

Sincerely,

Susan R. MacVean
Nongame Specialist

United States Department of the Interior

NATIONAL PARK SERVICE
Glen Canyon National Recreation Area
P.O. Box 1507
Page, Arizona 86040

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

August 24, 2010

Arizona Water Protection Fund Commission
c/o Department of Water Resources
3550 N. Central Avenue
Phoenix, AZ 85012

Re: ***Hidden Slough and Leopard Frog Marsh Restoration Planning, Implementation, Maintenance, and Monitoring in Glen Canyon National Recreation Area, Arizona***

Dear Commissioners:

This letter is in support of the grant proposal entitled ***Hidden Slough and Leopard Frog Marsh Restoration Planning, Implementation, Maintenance, and Monitoring in Glen Canyon National Recreation Area, Arizona*** written by the Grand Canyon Wildlands Council. This project will help the National Park Service implement the Glen Canyon Riparian Revegetation Plan for preserving and enhancing native plant communities and wildlife habitat within the Colorado River corridor in Glen Canyon National Recreation Area.

The staff at Glen Canyon National Recreation Area is committed to helping with the project and looks forward to working with the Arizona Water Protection Fund and the Grand Canyon Wildlands Council to complete this important project on lands administered by Glen Canyon National Recreation Area. We intend to complete a cooperative agreement with Grand Canyon Wildlands Council as part of Task 1 as written in the Scope of Work for the project and we are pleased to give access to the project sites to Grand Canyon Wildlands Council. If you have any questions please contact Chief of Resources, Chris Hughes at 928-608-6265.

Sincerely,

Brian Carey
Deputy Superintendent