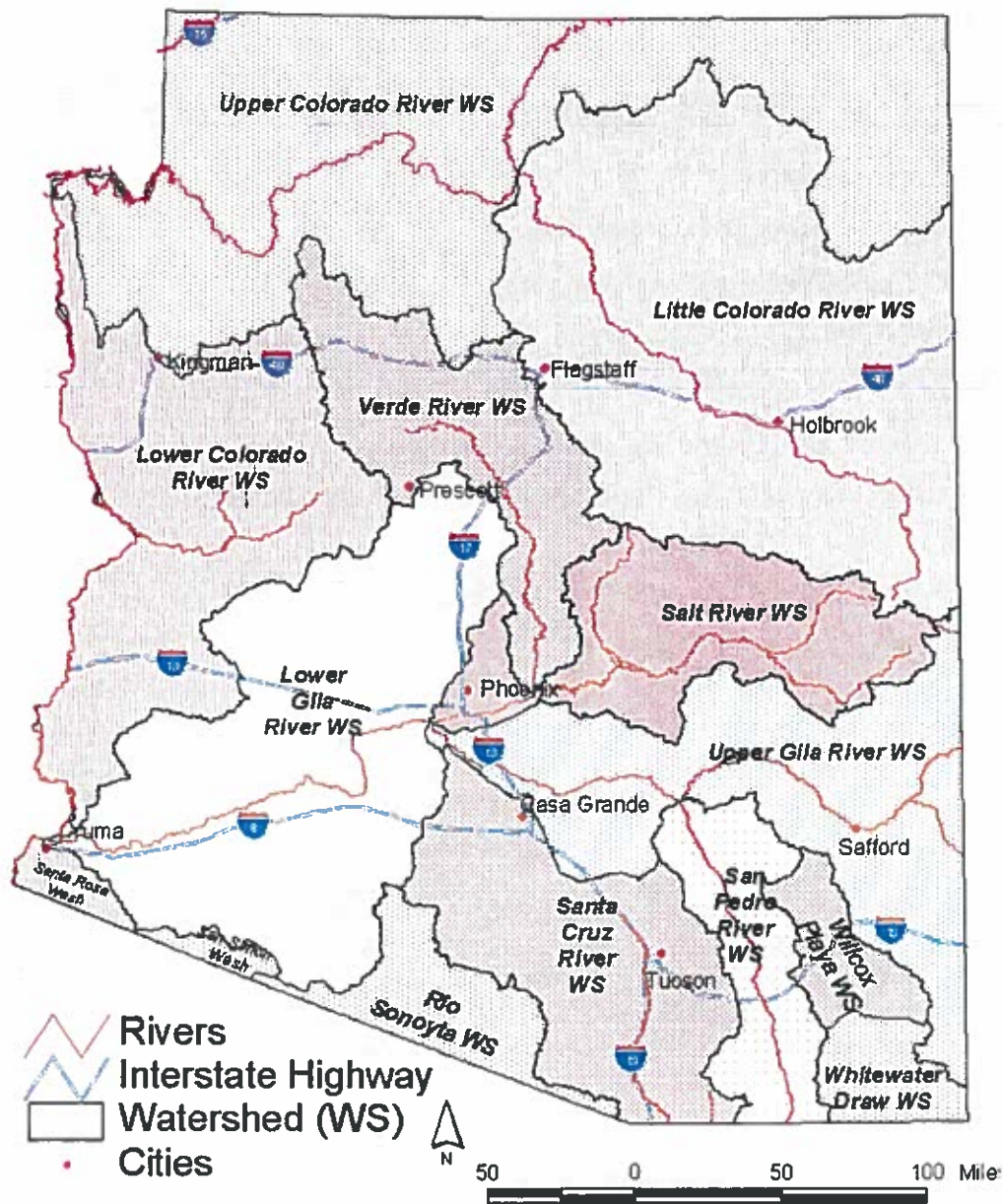


**Arizona Water Protection Fund
Application Cover Page
FY 2019**

Title of Project: Headwater Stream Restoration: Coyote Springs, Museum of Northern Arizona, Flagstaff											
Type of Project: <input checked="" type="checkbox"/> Capital or Other <input type="checkbox"/> Water Conservation <input type="checkbox"/> Research	Stream Type: <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral										
Your level of commitment to maintenance of project benefits and capital improvements: <input type="checkbox"/> < 5 years <input type="checkbox"/> 5-10 years <input type="checkbox"/> 11-15 years <input checked="" type="checkbox"/> 16-20 years											
Applicant Information: Name/Organization: Museum of Northern Arizona/Springs Stewardship Address 1: 3101 N. Fort Valley Rd. Address 2: City: Flagstaff State: Arizona ZIP Code: 86001 Phone: 928-774-5411 x230 Fax: Tax ID No.: XXXXXXXXXX											
Inside an AMA: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, which AMA: <input type="checkbox"/> Phoenix <input type="checkbox"/> Tucson <input type="checkbox"/> Prescott <input type="checkbox"/> Pinal <input type="checkbox"/> Santa Cruz											
Contact Person: Name: Dr. Larry Stevens Title: Director, Springs Stewardship Institute Phone: 928-774-5211 x218 Fax: e-mail: larry@springstewardship.org											
Any Previous AWPf Grants: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please provide Grant #(s):											
Arizona Water Protection Fund Grant Amount Requested: \$31,996.00 If the application is funded, will the Grantee intend to request an advance: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Matching Funds Obtained and Secured: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;"><u>Applicant/Agency/Organization:</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>Amount (\$):</u></th> </tr> </thead> <tbody> <tr> <td>1. Applicant</td> <td style="text-align: right;">14,212.00</td> </tr> <tr> <td>2.</td> <td></td> </tr> <tr> <td>3.</td> <td></td> </tr> <tr> <td colspan="2" style="text-align: right;">Total: 14,212.00</td> </tr> </tbody> </table>	<u>Applicant/Agency/Organization:</u>	<u>Amount (\$):</u>	1. Applicant	14,212.00	2.		3.		Total: 14,212.00	
<u>Applicant/Agency/Organization:</u>	<u>Amount (\$):</u>										
1. Applicant	14,212.00										
2.											
3.											
Total: 14,212.00											
Has your legal counsel or contracting authority reviewed and accepted the Grant Award Contract General Provisions? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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.											
Carrie M. Heinonen Typed Name of Applicant or Applicant's Authorized Representative	CEO & Executive Director, 928-774-5211, Ext. 225 Title and Telephone Number										
 Signature	9.5.18 Date Signed										

Arizona Watershed Map FY 2019



Title of Project: Headwater Stream Restoration: Coyote Spring

Location (include UTM's & Township/Range/Section): Coyote Spring: 12N 439916.17m E, 3899051.28m N; SENW/T0210N/R0070E

(Location must include at least one Section delineation for large scale projects)

Project Location & Environmental Contaminant Information FY 2019

Project Location Information			
1. County: <u>Coconino</u>	2. Section(s): <u>SENW</u>	3. Township: <u>T0210N</u>	4. Range: <u>R0070E</u>
<p>5. Watershed: <u>Little Colorado River</u></p> <p>6. 8 or 10 Digit Hydrologic Unit Code (HUC): <u>15020015</u></p> <p>7. Name of USGS Topographic Map where project area is located: <u>Flagstaff West</u></p> <p>8. State Legislative District: <u>6</u> (Information available at: http://azredistricting.org/districtlocator/)</p> <p>9. Land ownership of project area: <u>Private - Museum of Northern Arizona</u></p> <p>10. Current land use of project area: <u>The area is primarily used for environmental education</u></p> <p>11. Size of project area (in acres): <u>0.35 DIRECT</u></p> <p>12. Stream Name: <u>Un-named Highway 180 drainage; Coyote Spring</u></p> <p>13. Length of stream through project area: <u>200 feet</u></p> <p>14. Miles of stream benefited: <u>0.25 miles</u></p> <p>15. Acres of riparian habitat: <u>1 acres</u> will be:</p> <div style="margin-left: 400px;"> <input type="checkbox"/> Enhanced <input type="checkbox"/> Maintained <input checked="" type="checkbox"/> Restored <input type="checkbox"/> Created </div>			
<p>16. General description and/or delineation for the area of impact of the project within the watershed. <u>The direct impact will be at Coyote Springs (0.3 acres), a headwater stream site that feeds a perennial stream tributary to the Rio de Flag (Little Colorado River drainage). Indirect benefits, in terms of increased water quality and a more natural flow regime, will be realized over approximately 0.25 miles of stream before the stream drains to the Rio de Flag for a total of approximately 1 acre of restored riparian and stream habitat.</u></p>			
<p>17. Provide directions to the project site from the nearest city or town. List any special access requirements: <u>The site is on the research campus of the Museum of Northern Arizona in Flagstaff, Arizona. The spring and stream system can be accessed from Highway 180 and Research Center Drive.</u></p>			
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

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: Arizona Water Protection Fund
2. Project Title: Headwater Stream Restoration: Coyote Spring
3. Applicant Name and Address: Springs Stewardship Institute, 3101 N Fort Valley Rd., Flagstaff, AZ 86001
4. Current Land Owner/Manager(s): Museum of Northern Arizona
5. Project Location, including Township, Range, Section: Flagstaff, Arizona, on the Museum of Northern Arizona's property; SENW/T0210N/R0070E
6. Total Project Area in Acres (or total miles if trail): 0.22 acres direct, 1 acre direct/indirect

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 spring and its associated channel will be re-graded to decrease channelization impacts in the channel and to allow water access to the surrounding marsh and downstream stream channel. A large concrete springbox will be removed, and nonnative plants will be eliminated and replaced by native species.

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 site has experienced ground disturbance via construction of two springboxes. The historic springbox is approximately 5 feet x 3 feet x 3.5 feet. The non-historic concrete springbox is approximately 10 feet x 3.5 feet x 4 feet. Photographs attached.

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 ☐ UNKNOWN

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.

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:

STATE OF ARIZONA HISTORIC PROPERTY INVENTORY FORM

Please type or print clearly. Fill out each applicable space accurately and with as much information as is known about the property.

PROPERTY IDENTIFICATION

For properties identified through survey: Site No. _____ Survey Area: _____

Historic Names (enter the name(s), if any that best reflect the property's historic importance): _____

Address: _____

City or Town: Flagstaff ☐ Vicinity County: Coconino Tax Parcel No.: _____

Township: T0210 Range: R0070E Section: SENW Quarters: _____ Acreage: _____

Block: _____ Lot(s): _____ Plat (Addition): _____ Year of plat (addition): _____

UTM Reference – Zone: 12N Easting: 439916.17m Northing: 3899051.28m

USGS 7.5' quadrangle map: Flagstaff West

ARCHITECT: _____ ☒ not determined ☐ known Source: _____

BUILDER: _____ ☒ not determined ☐ known Source: _____

CONSTRUCTION DATE: 1935 ☐ known ☒ estimated Source: _____

STRUCTURAL CONDITION

- ☒ Good (well maintained; no serious problems apparent)
☐ Fair (some problems apparent) Describe: _____
☐ Poor (major problems; imminent threat) Describe: _____
☐ Ruin/Uninhabitable

USES/FUNCTIONS

Describe how the property has been used over time, beginning with the original use: historic structure is a spring box that was used to cover the source of Coyote Spring.

Sources: _____

PHOTO INFORMATION

Date of photo: _____
View Direction (looking towards): _____

Attach a recent photograph of property in this space.
Additional photographs may be appended.

SIGNIFICANCE

To be eligible for the National Register, a property must represent an important part of the history or architecture of an area. The significance of a property is evaluated within its historic context, which are those patterns, themes, or trends in history by which a property occurred or gained importance. Describe the historic and architectural contexts of the property that may make it worthy of preservation.

A. HISTORIC EVENTS/TRENDS – Describe any historic events/trends associated with the property: _____

B. PERSONS – List and describe persons with an important association with the building: _____

C. ARCHITECTURE – Style: _____ ☐ no style

Stories: _____ ☐ Basement Roof Form: _____

Describe other character-defining features of its massing, size and scale: _____

INTEGRITY

To be eligible for the National Register, a property must have integrity (i.e. it must be able to visually convey its importance). The outline below lists some important aspects of integrity. Fill in the blanks with as detailed a description of the property as possible.

Location - ☒ Original Site ☐ Moved: Date: _____ Original Site: _____

DESIGN

Describe alterations from the original design, including dates: _____

MATERIALS

Describe the materials used in the following elements of the property:

Walls (structure): _____

Walls (sheathing): _____

Windows: _____

Roof: _____

Foundation: _____

SETTING

Describe the natural and/or built environment around the property: Residences have been built near the property, but have not affected the spring area itself. The downstream channel has been heavily modified by the construction of Highway 180.

How has the environment changed since the property was constructed? The spring area has not changed dramatically with new development, the downstream channel however has been diverted by the creation of Highway 180.

WORKMANSHIP

Describe the distinctive elements, if any, of craftsmanship or method of construction: Spring-box uses local basalt blocks/rocks.

NATIONAL REGISTER STATUS (if listed, check the appropriate box)

☐ Individually Listed; ☐ Contributor; ☐ Non-contributor to _____ Historic District

Date Listed: _____ ☐ Determined eligible by Keeper of National Register (date: _____)

RECOMMENDATIONS ON NATIONAL REGISTER ELIGIBILITY (opinion of SHPO staff or survey consultant)

Property ☐ is ☐ is not eligible individually.

Property ☐ is ☐ is not eligible as a contributor to a listed or potential historic district.

☐ More information needed to evaluate.

If not considered eligible, state reason: _____

Headwater Stream Restoration: Coyote Springs, Museum of Northern Arizona, Flagstaff

Museum of Northern Arizona Springs Stewardship Institute
3101 N. Fort Valley Rd.
Flagstaff, AZ 86001
CHeinonen@musnaz.org
larry@springstewardship.org

Executive Summary (500 words):

The Springs Stewardship Institute (SSI) proposes to complete a headwater stream restoration project at Coyote Springs on the research campus of the Museum of Northern Arizona (MNA). Coyote Springs is a perennial water source and tributary to the Rio de Flag, itself a tributary of the Little Colorado River. It is one of the last remaining functional springs in the San Francisco Peaks. The purpose of this project is to restore natural flow to a wet meadow and a perennial stream channel through the removal of a non-functioning spring box, re-contouring the wet meadow to allow for a natural hydroperiod, and restructuring the run-out stream channel to reduce incision. A small section of the meadow will be fenced to exclude elk grazing and protect springs-dependent sedges that are rare in Arizona. A public outreach component of this proposal will include workshops on springs inventory and restoration. SSI has regularly used the spring site as a natural classroom for these workshops for the last 15 years. SSI will also hold a one-day springs restoration workshop specific to Arizona at the MNA Branigar Auditorium. SSI will develop a web page with images, video clips, and documentation of the restoration progress on the SSI website (springstewardship.org).

Unique aspects of this proposal include the location of the restoration (a spring on private land used for 15 years for environmental education and outreach), the fact that all permitting and compliance is complete, and that the purpose of this restoration activity is to restore a headwater perennial stream system. Much of the restoration will be completed using Hopi youth, increasing outreach to the Tribe and enhancing its long-standing relationship with the Museum of Northern Arizona. Funding will be leveraged by in-kind matches of volunteer time, Dr. Larry Stevens' time, the Springs Online database, and available county funding for this specific restoration site.

Project Overview: (2 pages)

The Coyote Springs ecosystem, located on the grounds of the Museum of Northern Arizona (MNA), is a high elevation wet meadow springs complex that is a perennial water source of the Rio de Flag, a tributary of the Little Colorado River in northern Arizona. Coyote Springs is one of the last remaining flowing helocrenic springs in the San Francisco Peaks district, emerging as a wet meadow and contributing directly into the Rio de Flag. Many bird and mammal species use the site for water, and the spring supports one of the last remaining populations of aquatic insects in the region. Coyote Springs includes three sources of groundwater, of which one is free-flowing, one is capped with a historic springs box but flows into a channel, and the third is capped with a 1950's concrete box that restricts flow much of the year. The springs have a long history of human use as attested to by the 1935 historic spring box, old fencing, compacted soils, leaky piping, and a hand-excavated well. The springs are owned by MNA, which acquired the water rights through the estate and bequest of Mrs. Colton, co-founder of MNA.

Though degraded by past use, Coyote Springs is used as a training site for the MNA Springs Stewardship Institute's (SSI) springs inventory and assessment workshop, of which more than a dozen have been held since 2011. These trainings have provided more than 250 private, NGO, state, Tribal, and federal agency staff with essential in-the-field training about conceptual approaches, technical methods, information recording and databasing, and the use of such information for assessment of ecological integrity. This important SSI effort has resulted in considerable private, Tribal, and governmental attention to the dire state of southwestern headwater ecosystems, and has resulted in springs stewardship becoming an important element of National Forest, BLM, and state land use planning. Thus, Coyote Springs is important as a natural laboratory, one that MNA intends to continue to use to expand awareness of the conservation crisis and opportunities surrounding springs ecosystems through ecosystem assessment, restoration planning and implementation, monitoring, and feed-back integration. (Stevens and Meretsky 2008; Kraemer et al. 2015).

This restoration project is designed to re-introduce and expand natural flow at this headwater stream system to improve aquatic, wetland, and riparian habitat from the source, through the wet meadow perennial stream channel, and the two acre surrounding wet meadow. Restoration will occur in 2019 and 2020 with post-restoration monitoring planned over the next 20 years (supported by MNA).

To prepare for this AWP application, MNA first sought and received \$5,000 funding from Coconino County in 2016 to conduct Army Corps of Engineers, State Historic Preservation Office, and Arizona Department of Environmental Quality construction compliance for restoration of Coyote Springs in 2016-2017. Coconino County funding supported permitting and compliance, but was insufficient to support site restoration, post-restoration monitoring, and outreach. Of this funding, \$3,000 remains to support restoration efforts. In addition, the MNA staff met with the Coyote Springs Homeowners Association (homeowners adjacent to the MNA-owned springs) to learn about their concerns and to describe potential restoration options. The homeowners expressed clear interest in restoration.

With federal and state compliance and stakeholder outreach accomplished (see attached documentation), MNA here proposes to proceed with springs restoration. MNA proposes the following tasks: 1) detailed site mapping and planning for wet meadow and channel restoration and monitoring; 2) site rehabilitation including: removal of the 1950's concrete tank, removal of old piping to restore flow to the east source, infilling the abandoned well and borrow pit, and removal of encroached woody vegetation. SSI will also rehabilitate the site by realigning and re-watering the abandoned wet meadow habitat, developing an open water pool to enhance access to water for birds and bats, and restoring channel flow through recovered east-source water to the stream channel and lower meadow, and translocate non-sensitive native wetland plants and invertebrates into the stream. These improvements, with the assistance of Hopi Tribal Youth, should more than triple the wetland and riparian habitat area. 3) SSI and MNA will monitor the site using standardized protocols, including SSI Level 3 springs protocols (Stevens et al. 2016), long-term game camera and spring flow monitoring, and annual visits by SSI springs inventory and assessment workshop attendees. 4) SSI will produce and disseminate from the SSI website (springstewardship.org) educational materials to the public and future SSI springs inventory, assessment, restoration, and monitoring trainings and workshops to support education about the need and tools available for springs and headwater stream restoration. Thus, we propose to restore Coyote Springs to enhance the site's ecological integrity and its use for educational outreach on the importance of improving springs stewardship, and to conduct a thorough and well-monitored restoration project at this important headwater stream ecosystem.

The objectives (tasks) of this restoration project include the following:

- 1) Develop a comprehensive site rehabilitation plan that includes a monitoring schedule, adaptive management strategies, restoration metrics, and an avenue for feedback from MNA, local homeowners, and stakeholders.
- 2) Restore the geomorphology of a headwater stream system both as a direct benefit to water quality and wildlife, and also as a demonstration for education and trainings on springs restoration through MNA's Summer Adventures children's education program, local primary and secondary school presentations, and the Springs Stewardship Institute.
- 3) Monitor restoration effectiveness to refine spring and headwater stream restoration techniques.
- 4) Provide public outreach to expand springs and headwater stream restoration capacity in Arizona through a one day springs restoration workshop, online video clips, and a restoration flier/handout.

Project Location and Environmental Contaminant Information: Please see attached form.

Scope of Work

Over the last two years, the Springs Stewardship Institute collected all necessary permits and compliance documents to conduct work at the Coyote Springs site using funding provided by Coconino County. The scope of work for this project builds on the previous funding and efforts

and includes the development of a rehabilitation plan, the actual restoration activities, post-restoration monitoring, and public outreach to expand regional restoration capacity.

The spring flow is currently being diverted and is contained by two spring boxes, one of which is historical and will not be impacted by our restoration actions. The second spring box is concrete and will be removed manually to return flow to the channel and marsh area downstream. The incised channel will be re-graded, and channel meanders will be re-introduced to create a more natural outflow and avoid future channel incision. Fairly intense grazing impacts by elk and deer are occurring at this site, and we plan to install enclosure fences to reduce the grazing pressure. Finally, nonnative plant species will be removed and the site will be re-vegetated with native flora, particularly rare Arizona wetland species.

Task 1: Rehabilitation plan

Task description: The rehabilitation plan will be developed using expertise from Dr. Larry Stevens, Jeri Ledbetter, Ed Schenk, and Gloria Hardwick using experience with previous stream, spring, and headwater restoration projects. The plan will include components for monitoring, adaptive management of the site post-restoration, and developing methods to allow for feedback from stakeholders for on-going maintenance and monitoring of the site. The final plan will be included as a deliverable in the final report to AWPf.

Task objective: Create a plan that successfully guides the restoration process, monitoring, and on-going maintenance of the site.

Responsible personnel: Larry Stevens, Jeri Ledbetter, Jeff Jenness, Tierney Schipper, Ed Schenk, and two technicians.

Deliverable description: A written restoration and monitoring plan.

Deliverable due date: June 2019

Task cost: \$7,134

Task 2: Site restoration

Task description: Restoration will occur using hand-tools. We intend to engage Hopi Tribal youth in the restoration project, both as a temporary job creation opportunity and as an educational opportunity for both the youth team and the MNA staff. Restoration will include removing the concrete springbox, re-contouring the wet meadow to allow for a longer water residence time, fencing to reduce grazing pressure, and re-contouring the stream channel to repair previous stream incision and straightening. The site restoration will directly impact 0.22 acres and indirectly improve one acre of riparian, stream, and wetland habitat. Downstream benefits, in terms of naturalized flow and water quality will be quantified to the Rio de Flag. We assume that the restoration will have beneficial impacts for a footprint greater than the one acre in-direct site benefits.

Task objective: Directly restore the Coyote Springs ecosystem, in-directly restore natural flow and water quality to the perennial stream.

Responsible personnel: Larry Stevens, Jeri Ledbetter, Jeff Jenness, Tierney Schipper, Ed Schenk, and two technicians.

Deliverable description: A capital improvement to a headwater stream system, Coyote Spring.

Deliverable due date: June 2020

Task cost: \$14,171

Task 3: Site monitoring

Task description: We propose to conduct the following monitoring activities: a) Monitor project effectiveness and success, including administrative reporting; b) Monitor springs flow and water quality, including field parameters (pH, water temperature, alkalinity, specific conductance, dissolved oxygen) and laboratory analyses of stable isotopes at the springs source and along Highway 180 (continuously during the restoration using pressure transducers, quarterly for the next three years, and annually for the foreseeable future following the three year mark); c) Monitor recovery of site vegetative productivity by twice annual clipping and weighing of 12 replicated, randomly selected circular plots (0.1 m²) in restored and reference areas (three years of semi-annual monitoring, and then annually thereafter); d) Monitor wildlife use of the springs using motion-activated game cameras for two years; e) Determine aquatic and riparian invertebrate responses to the restoration treatments using quarterly sampling outlined in Stevens et al. (2016). We also will monitor and remove non-native riparian vegetation on an annual basis using visually estimated percent cover by stratum and standardized SSI springs vegetation monitoring methods (Stevens et al. 2016).

Task objective: Successfully monitor the restored site to determine the direct and in-direct benefits of the restoration and to make adaptive management decisions to maintain the site.

Responsible personnel: Larry Stevens, Jeri Ledbetter, Jeff Jenness, Tierney Schipper, Ed Schenk, and two technicians.

Deliverable description: monitoring data will be entered into the Springs Online database (springsdata.org).

Deliverable due date: Ongoing, funded monitoring will extend to the end of the project, end of 2020, long-term monitoring will continue using MNA staff and external funding.

Total cost: \$4,340

Task 4: Public outreach

Task description: Public outreach will include using the Hope Tribal youth group to restore the site, continued SSI springs inventory workshops at the site (for the foreseeable future), other environmental education opportunities on-site (e.g. Colton summer science camps, NAU hydrology class visits), and specific outreach listed in this proposal including a one day springs restoration workshop at the Museum of Northern Arizona, short restoration video clips hosted on springstewardship.org, and restoration handout fliers available at workshops, online, and at water related community meetings.

Task objective: to provide Arizona watershed managers, and the public, with information about headwater stream restoration, and springs ecosystems.

Responsible personnel: Larry Stevens, Jeri Ledbetter, Tierney Schipper, Ed Schenk, and a public outreach coordinator.

Deliverable description: a one day springs restoration workshop at the Museum of Northern Arizona, short restoration video clips hosted on springstewardship.org, and restoration handout fliers available at workshops, online, and at water related community meetings.

Deliverable due date: December 2020

Total cost: \$6,351

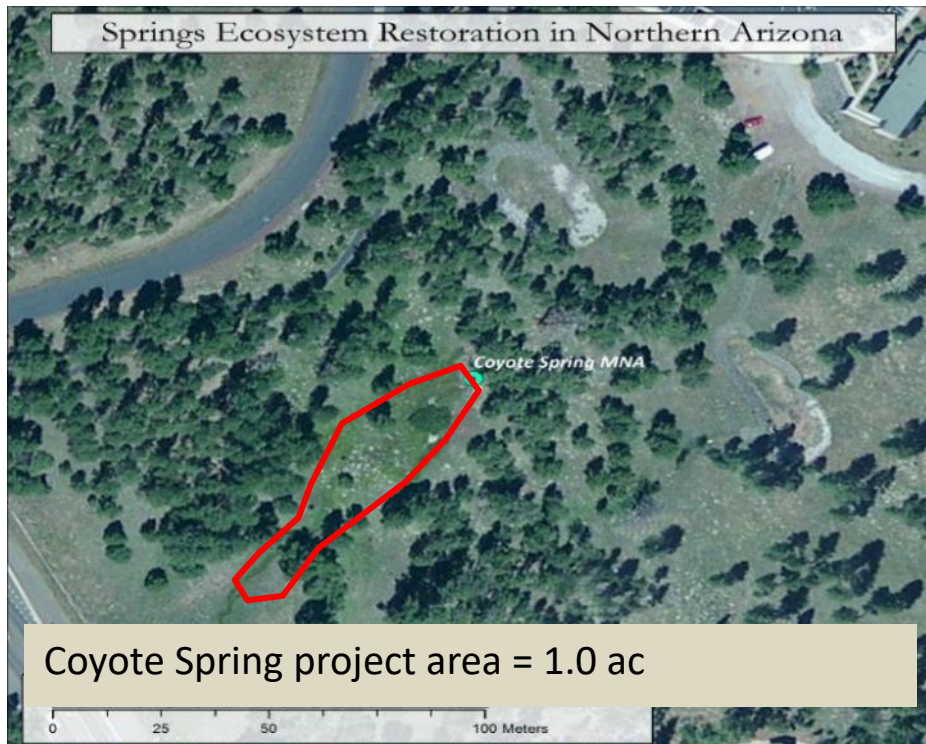
Budget

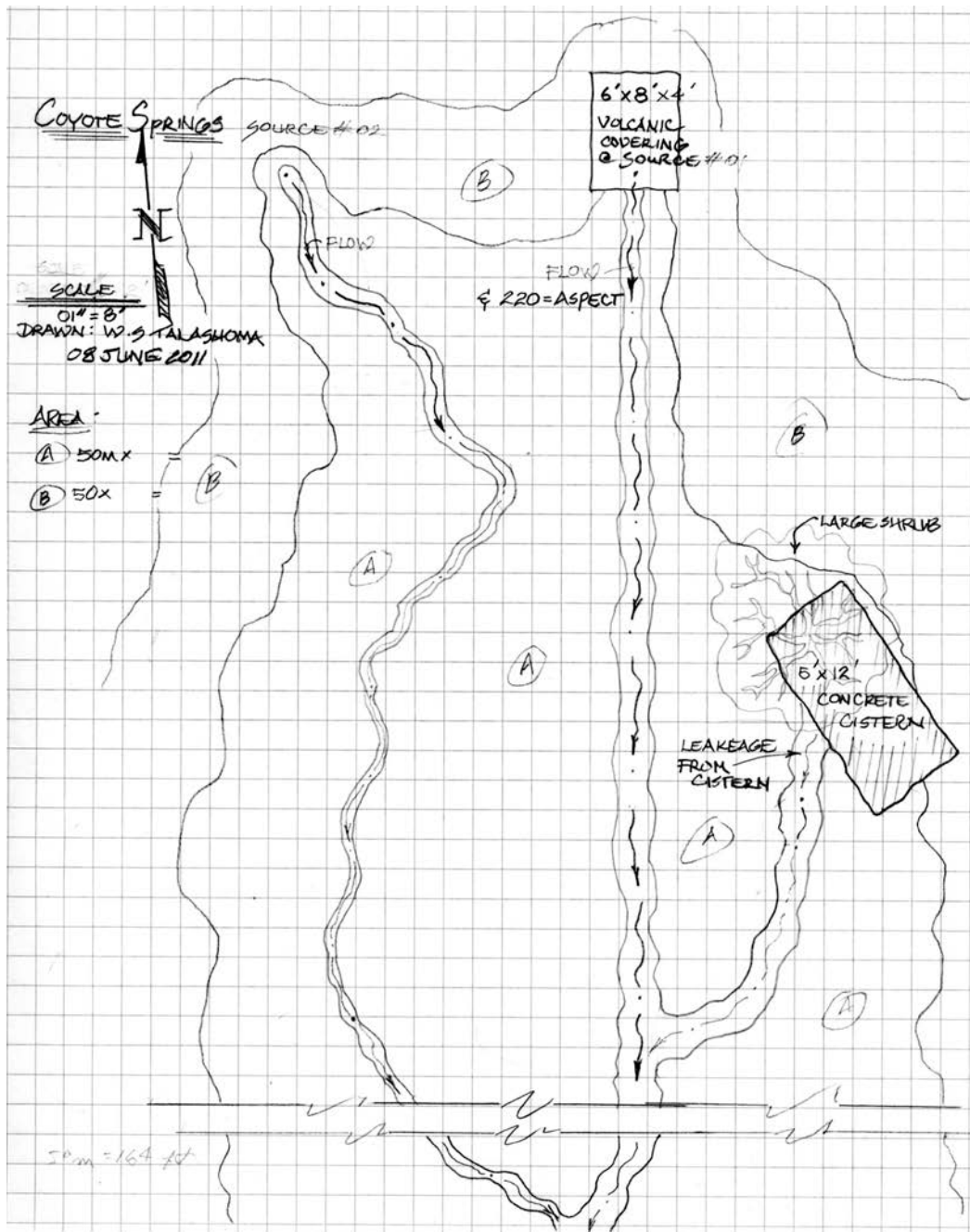
See attached Microsoft Excel file.

Matching Funds

A total of \$14,212 of in-kind matching funds will be available during the proposed project time period. This is an addition to \$2,000 of expended county funds prior to this project for permitting and compliance and an estimated \$3,000 in volunteer time by Dr. Larry Stevens in planning, compliance and permitting writing, and homeowner stakeholder outreach. A total of \$5,000 has already been spent on this site that are not included in the \$14,212 in-kind matching funds. More details are available in the attached Excel budget file.

Project Map – the Arizona Watershed Map is attached to this document





SUPPLEMENTAL INFORMATION

Key Personnel:

LAWRENCE E. STEVENS, PhD (Project Coordinator)
MNA Springs Stewardship Institute, Director
Museum of Northern Arizona
3101 N. Fort Valley Rd.
Flagstaff, AZ 86001 (928) 380-7724
larry@springstewardship.org

A. EXPERTISE

Biodiversity of the Colorado Plateau and western North America; biogeography of large, deep canyons; museum collections curation; invertebrate taxonomy; data entry and analysis; springs ecosystem ecology; river and riparian ecology; rare species ecology.

B. PROFESSIONAL PREPARATION

<u>College/University</u>	<u>Major</u>	<u>Degree & Year</u>
Prescott College, Prescott, Arizona	Biology and fine arts (honors)	B.A., 1974
Northern Arizona University	Biology	M.S., 1985
Northern Arizona University	Zoology	Ph.D., 1989

C. ACADEMIC/PROFESSIONAL APPOINTMENTS

2010-present: Director, Springs Stewardship Institute, Museum of Northern Arizona, Flagstaff
2006-present: Curator of Ecology and Conservation, Museum of Northern Arizona, Flagstaff
2006-present: Grand Canyon National Park, ATBI Coordinator
2006-present: Senior Ecologist, Grand Canyon Wildlands Council, Flagstaff
2004-2006 Board of Directors, Museum of Northern Arizona, Flagstaff
2002-present: Principal Investigator, Stevens Ecological Consulting, LLC, Flagstaff
1994-1999: Data Analyst, Bureau of Reclamation and Applied Technology Associates, Inc.
1988-1994: Ecologist, Grand Canyon National Park
1974-present: Commercial river guide and trip leader, Colorado River, Grand Canyon.

D. SELECTED PUBLICATIONS

Stevens, L.E. and A.S. Menke. 2014. Biogeography of *Ammophila* (Hymenoptera: Sphecidae) in the Grand Canyon ecoregion, southwestern USA. *Western North American Naturalist* 74:216-222.

Stevens, L.E. 2012. The biogeographic significance of a large, deep canyon: Grand Canyon of the Colorado River, Southwestern USA. Pp. 169-208 in Stevens, L.E., editor. *Global Advances in Biogeography*. InTech Publications, Rijeka. [ISBN: 978-953-51-0454-4](https://doi.org/10.5772/12345). Available on-line at: <http://cdn.intechopen.com/pdfs/34661/InTech>.

Stacey, C.J., A.E. Springer, and L.E. Stevens. 2011. Have aridland springs restoration projects been effective in restoring hydrology, geomorphology, and invertebrate and plant species composition comparable to natural springs with minimal anthropogenic disturbance?

Collaboration for Environmental Evidence Review 10-002 (SR87).

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Scarborough, A.G., L.E. Stevens, and C.R. Nelson. 2012. Synopsis of the *albibarbis* complex of *Efferia* Coquillett from the Grand Canyon region, southwestern USA, with description of new species (Diptera: Asilidae). *Pan-Pacific Entomologist* 88:58-86.

Stevens, LE and RA Bailowitz. 2009. Odonata biogeography in the Grand Canyon ecoregion, southwestern U.S.A. *Annals of the Entomological Society of America* 102:261-274.

Perla, B.S. and L.E. Stevens. 2008. Biodiversity and productivity at an undisturbed spring, in comparison with adjacent grazed riparian and upland habitats. Pp. 230-243 in Stevens, L.E. and V. J. Meretsky, editors. *Aridland Springs in North America: Ecology and Conservation*. University of Arizona Press, Tucson.

Springer, A.E. and L.E. Stevens. 2008. Spheres of discharge of springs. *Hydrogeology Journal* DOI 10.1007/s10040-008-0341-y.

Springer, A.E., L.E. Stevens, D. Anderson, R.A. Parnell, D. Kreamer, and S. Flora. 2008. A comprehensive springs classification system: integrating geomorphic, hydrogeochemical, and ecological criteria. Pp. 49-75 in Stevens, L.E. and V. J. Meretsky, editors. *Aridland springs in North America: ecology and conservation*. University of Arizona Press, Tucson.

Stevens, L.E. 2008. Every last drop: future of springs ecosystem ecology and management. Pp. 332-346 in Stevens, L.E. and V. J. Meretsky, editors. *Aridland Springs in North America: Ecology and Conservation*. University of Arizona Press, Tucson.

Stevens, LE and JT Polhemus. 2008. Biogeography of aquatic and semi-aquatic Heteroptera in the Grand Canyon ecoregion, southwestern USA. *Monographs of the Western North American Naturalist* 4:38-76.

Stevens, L.E., F.B. Ramberg, and R.F. Darsie, Jr. 2008. Biogeography of Culicidae (Diptera) in the Grand Canyon region, Arizona, USA. *Pan-Pacific Entomologist* 84:92-109.

Stevens, L. 2008. Water and biodiversity on the Colorado Plateau. Plateau: *The Land & People of the Colorado Plateau* 4(1): 48-55.

Stevens, LE and VJ Meretsky, editors. 2008. *Aridland Springs in North America: Ecology and Conservation*. University of Arizona Press, Tucson.

Stevens, LE, TL Griswold, O Messinger, WG Abrahamson II, and TJ Ayers. 2007. Plant and pollinator diversity in northern Arizona. *The Plant Press* 31:5-7.

E. SYNERGISTIC ACTIVITIES

1. Director, Springs Stewardship Institute, Museum of Northern Arizona, Flagstaff, 2010-present

2. Conservation Representative for GCWC on the Federal Advisory Committee Glen Canyon Dam Adaptive Management Work Group and Technical Work Group, 2006-present
3. Board of Directors, Museum of Northern Arizona, Flagstaff, 2004-2006
4. Grand Staircase National Monument, Chair and Science Advisor, 2003-2005
5. Grand Canyon Wildlands Council, Inc., Senior Science Advisor, 2000- present

Co-editors (last 2 years): A.E. Springer, J.D. Ledbetter, M. Joyce

Graduate Advisors: D.W. Blinn, P.W. Price, C. N. Slobodchikoff, T.G. Whitham.

Senior and Masters Theses and Dissertation Advisor since 1990 (total: 16 women, 7 men):

J. Barnes, K.A. Buck, C. Cooley, R. England, S. Ferrier, V. Hallam, K. Hamman, R. Harms, K. Junghans, A. LaBrake, J.D. Ledbetter, S.G. Mortenson, E.G. North, K. Paffett, K. Rowell, J. Schultz, J.P. Shannon, G.M. Siemion, K. Slutz, K. Sparks, D. Stanitski-Martin, K. A. Whitley, G. Wimp.

JERI D. LEDBETTER, MGIS
MNA Springs Stewardship Institute, Program Manager
3101 N. Fort Valley Rd., Flagstaff AZ 86001
(928) 774-5211 ext 231
jeri@springstewardship.org

(a) Expertise:

GIS analyst with extensive experience in relational database design for scientific field work, project and natural resource management, and biological inventory. GIS analysis using ESRI ArcMap and ArcGIS for Server 10.x software, development of relational databases using MySQL, design and development of web mapping and database technologies, and custom geospatial applications.

(b) Professional Preparation:

Prescott College, Prescott, Arizona, 2009
The Pennsylvania State University, 2011
(MGIS)

BA Mass Communications
MS Geographic Information Systems

(c) Appointments:

2010-present Program Manager, Springs Stewardship Institute, Museum of Northern AZ, Flagstaff
2010-present Data Management Consultant, METI, Inc., El Paso, TX
2010-2012 Team Field Leader, Northern Arizona University, Flagstaff, AZ
2000-2005 Membership Director, Executive Director, Glen Canyon Institute, Flagstaff AZ
2005-2006 President, Grand Canyon River Guides, Inc.
1990-1996 Membership Director, Board of Directors, Grand Canyon River Guides, Flagstaff AZ
1989-present Commercial river guide and trip leader, Colorado River, Grand Canyon.

(d) (i) Five Publications Most Closely Related to the Proposal Research

2015. Ledbetter, Jeri D. Desert LCC Springs: publicly available data. Mapping Service. Available at <http://dlcc.databasin.org/datasets/e4bff9b28ade42a391fa145512bbd94b>.

2014. Ledbetter, Jeri D., MGIS, Lawrence E. Stevens, PhD, Abraham Springer, PhD, and Benjamin Brandt, MGIS. Springs Inventory Database. Online Database. Springs and Springs-Dependent Species Database. Vers. 1.0. Springs Stewardship Institute, January 2014. Web. September 17, 2015. Available online at springsdata.org.

2014. Springer, A.E., L.E. Stevens, J.D. Ledbetter, E.M. Schaller, K.M. Gill, and S.B. Rood. Ecohydrology and stewardship of Alberta springs ecosystems. Ecohydrology. DOI: 10.1002/eco.1596. Available at <http://onlinelibrary.wiley.com/doi/10.1002/eco.1596/abstract>.

2013. Ledbetter, Jeri D. Groundwater Dependent Ecosystems Database. Developed for USFS. Microsoft Access 2007. Description available at <http://www.fs.fed.us/emc/rig/protocols/master.shtml>.

2013. Pendleton, Burton K., R. Pendleton, C. Woodleif, J. Ledbetter, C. Giffen, L. Boehnke, S. Solem. Final Program Report for 2010-2012. Appendix B - Conservation Agreement Species Fact Sheets and Potential Habitat Models. Monitoring and Evaluation for Conserving Biological Resources of the spring Mountains National Recreation Area. May 3, 2013. Available at <http://www.treeseearch.fs.fed.us/pubs/44827>.

(ii) Five Other Significant Publications

2015. Kreamer, David K., Lawrence E. Stevens and Jeri D. Ledbetter. Groundwater Dependent Ecosystems - Science, Challenges, and Policy Directions (pp. 205-230). Available at https://www.novapublishers.com/catalog/product_info.php?products_id=52986.

2014. Springer, A.E., L.E. Stevens, J.D. Ledbetter, E.M. Schaller, K.M. Gill, and S.B. Rood. Ecohydrology and stewardship of Alberta springs ecosystems. Ecohydrology. DOI: 10.1002/eco.1596. Available at <http://onlinelibrary.wiley.com/doi/10.1002/eco.1596/abstract>.

2013. Solem, Stephen J., B. Pendleton, C. Giffen, M. Coles-Ritchie, J. Ledbetter, K. McKelvey, J. Berg, J. Menlove, C. Woodleif, and L. Boehnke. Final Program Report for 2010-2012. Monitoring and Evaluation for Conserving Biological Resources of the Spring Mountains National Recreation Area. May 3, 2013. Available at <http://www.treeseearch.fs.fed.us/pubs/44827>.

2011. Solem, Stephen J., B. Pendleton, M. Coles-Ritchie, J. Ledbetter, K. McKelvey, J. Berg, K. Nelson, and J. Menlove. 2010 Annual Report: Monitoring and Evaluation for Conserving Biological Resources of the Spring Mountains National Recreation Area. Available at http://www.fs.fed.us/rm/pubs_other/rmrs_2011_solem_s001.pdf.

2005. Ledbetter, Jeri D. Hardly a Deadly Sin: a Documentary Film. <http://perezosoproductions.com/about.htm>.

(e) Synergistic Activities:

2014-present Adjunct professor, Prescott College, Prescott AZ

2005-2006 President, Grand Canyon River Guides, Inc.

1996-present Principal Investigator, Perezoso Media, Flagstaff AZ

1990-2005 Membership Director, Board of Directors, Grand Canyon River Guides, Inc.

1990-present Private pilot, instrument rating, backcountry and mountain/canyon flight training
>1500 hours pilot in command

Collaborators and Other Affiliations:

Co-editors (last 2 years): A.E. Springer, L.E. Stevens, D.K. Kreamer, S.B. Rood, S. Solem, B. Pendleton, M. Coles-Ritchie, K. McKelvey, J. Menlove, J. Berg

Graduate Advisors: Douglas Miller, Penn State

JEFF S. JENNESS, MGIS
MNA Springs Stewardship Institute, GIS Analyst
3001 N. Fort Valley Rd.
Flagstaff, AZ 86001 928-607-4638
jeffj@jennessent.com

A. EXPERTISE

I am a GIS analyst and developer with over 22 years of experience developing analytical applications for a wide variety of spatial analyses, focusing primarily on ecological and wildlife-related projects. I am the primary author of the African Water Resources Database, developed for the Food and Agriculture Organization of the United Nations and distributed to developing countries in Africa. I have developed several analytical GIS tools related specifically to wildlife corridors, species diversity and habitat analysis.

B. PROFESSIONAL PREPARATION

<u>College/University</u>	<u>Major</u>	<u>Degree & Year</u>
Northern Arizona University	Forestry	B.S., 1989
Northern Arizona University	Educational Psychology	M.A., 1993
Northern Arizona University	Wildlife Biology	M.S., 2000

C. ACADEMIC/PROFESSIONAL APPOINTMENTS

2012 – Present: GIS Instructor in the School of Forestry, Northern Arizona University

2008 – Present: Chair and Past-Chair of the Spatial Ecology and Telemetry Working Group of The Wildlife Society.

D. PUBLICATIONS AND TOOLS

Publications Most Closely Related to Proposal

Jenness, J.S., J. Dooley, J. Aguilar-Manjarrez, and C. Riva. 2007. *African water resource database: GIS-based tools for inland aquatic resource management. 1. Concepts and application case studies*. CIFA Technical Paper. No. 33, Part 1. Food and Agriculture Organization of the United Nations. Rome, Italy. 165 pp.

Jenness, J.S., J. Dooley, J. Aguilar-Manjarrez, and C. Riva. 2007. *African water resource database: GIS-based tools for inland aquatic resource management. 2. Technical manual and workbook*. CIFA Technical Paper. No. 33, Part 2. Food and Agriculture Organization of the United Nations. Rome, Italy. 305 pp.

Rudnick, D.A., S. J. Ryan, P. Beier, S.A. Cushman, F. Dieffenbach, C.W. Epps, L.R. Gerber, J. Hartter, J.S. Jenness, J. Kintsch, A.M. Merenlender, R.M. Perkl, D.V. Preziosi, and S.C. Trombulak. 2012. *The role of landscape connectivity in planning and implementing conservation and restoration priorities*. Issues in Ecology. 16:1-20

Jenness, J.S., P. Beier and J.L. Ganey. 2004. *Associations between forest fire and Mexican spotted owls in Arizona and New Mexico*. Forest Science. 50(6):765-772

Drake, J.C., J.S. Jenness, J. Calvert and K.L. Griffis-Kyle. 2015. *Testing a model for the prediction of isolated waters in the Sonoran Desert*. Journal of Arid Environments. 118:1-8

Dickson, B., J.S. Jenness and P. Beier. 2005. *Influence of vegetation topography, and roads on cougar movement in southern California*. Journal of Wildlife Management. 69(1):264-276

Tools Most Closely Related to Proposal

Jenness, J.S., B. Brost and P. Beier. 2010. *Land Facet Corridor Designer*: 30th Annual ESRI International Users Conference - Application Fair, San Diego, California.
http://www.jennessent.com/arcgis/land_facets.htm

Majka, D., J.S. Jenness and P. Beier. 2007. *Corridor Designer: A Suite of ArcGIS Tools to Identify and Evaluate Corridors Between Fragmented Habitat Blocks*. 27th Annual ESRI International Users Conference - Application Fair, San Diego, California.
<http://www.corridordesign.org/downloads>

Jenness, J.S. 2004. *Mahalanobis distances*. 24th Annual ESRI International Users Conference - Application Fair, San Diego, California. <http://www.jennessent.com/arview/mahalanobis.htm>

Jenness, J.S. and J.J. Wynne. 2005. *Cohen's Kappa and classification table metrics 2.0: an ArcView 3.x extension for accuracy assessment of spatially explicit models*. U.S. Geological Survey Open-File Report OF 2005-1363. U.S. Geological Survey, Southwest Biological Science Center, Flagstaff, AZ, USA.

Other Significant Publications and Tools

Jenness, J.S. 2004. *Calculating landscape surface area from digital elevation models*. Wildlife Society Bulletin. 32(3):829-839

Jenness, J.S. 2009. *Analyzing raster elevation datasets*. Earth Imaging Journal. September / October 2009, 6(5):32-33.

Jenness, J.S. 2005. *Grid and Theme Regression*. 25th Annual ESRI International Users Conference - Application Fair, San Diego, California.

Jenness, J.S. 2006. *Topographic Position Index for ArcView 3.x*. 26th Annual ESRI International Users Conference - Application Fair, San Diego, California.

de Graaf, G., F.J.B. Martin, J. Aguilar-Manjarrez, and J.S. Jenness. 2003. *Manual on the use of Geographical Information Systems in fisheries management and planning*. FAO Fisheries Technical Paper. No. 449. Rome, FAO. 173p.

Tagil, S. and J.S. Jenness. 2008. *GIS-based automated landform classification and topographic, landcover and geologic attributes of landforms around the Yazoren Polje, Turkey*. Journal of Applied Sciences. 8(6):910-92

E. SYNERGISTIC ACTIVITIES

1. GIS Instructor for Northern Arizona University School of Forestry. I teach GIS to undergraduates in the professional forestry program.
2. GIS Analyst at the Springs Stewardship Institute, Museum of Northern Arizona, Flagstaff, AZ. I perform GIS analysis on issues related to springs, focusing mainly on potential threats to springs due to climate change, human population trends and general evolving conditions at spring locations.
3. Chair and Past-Chair of Spatial Ecology and Telemetry Working Group of The Wildlife Society. I work to enhance the ability of ecological professionals to learn about and use spatial tools and concepts.

Graduate and postdoctoral advisors

Paul Beier (Northern Arizona University), Joe Ganey (USFS Rocky Mountain Research Station) and Charles Van Riper III (USGS)

Project Site Photographs:



Figure 1. Abandoned concrete springbox slated for demolition.



Figure 2. Previously wet meadow that is now dry most of the year due to channelization. This meadow would be restored under this proposal.



Figure 3. Confluence of spring flow from the historic springbox (off-frame to the left) and the concrete springbox source. This area will be restored to its historic wet meadow configuration.



Figure 4. Downstream perennial channel, this channel will be restored to remove incision and allow for seasonal over-bank flow.



Figure 5. View of restoration site from near the concrete springbox (looking downstream). Notice woody encroachment including a juvenile ponderosa pine.

Existing plans, reports, and information

A summary report from Springs Online is attached.

Evidence of Control and Tenure of Land

The land is owned by the Museum of Northern Arizona, the organization submitting this proposal. Water right information for the spring and channel are attached. A land ownership map is attached. Matching funds will be provided by the Museum of Northern Arizona, the organization submitting this proposal.

Evidence of Physical and Legal Availability of Water

See attached water rights document.

Museum of Northern Arizona
Arizona Water Protection Fund 2019 Budget
Task 1 Planning - Year One

Personnel: Salary and wages	Year one				
	hours	rate	salary	AWPF	MNA
Lawrence Stevens, Project Director	40	50	\$2,000	2,000	
Jeri Ledbetter, Project Manager	20	40	\$800	800	
Edward Schenk, Project Foreman	40	25	\$1,000	1,000	
Jeff Jenness, GIS Analyst	40	25	\$1,000	1,000	
Outreach coordinator	40	16	\$640	640	
Technician1	20	14	\$280	280	
Technician2	20	16	\$320	320	
Subtotal Salary & Wages			\$6,040	6,040	
Fringe Benefits					
Lawrence Stevens, Project Director	All		\$220	220	
Jeri Ledbetter, Project Manager	All		\$128	128	
Edward Schenk, Project Foreman	All		\$110	110	
Jeff Jenness, GIS Analyst	All		\$160	160	
Outreach coordinator	All		\$70	70	
Technician1	All		\$31	31	
Technician2	All		\$35	35	
Subtotal Fringe Benefits	All		\$754	754	
Total Salary plus Fringe	All		\$6,794	\$6,794	
Total Direct Costs			\$6,794	\$6,794	\$0
Indirect Costs (5% administrative)			\$340	340	
Forgone Indirect Costs (cost-share)			\$2,286		2,286

			Total	AWPF	Matching
Total Task 1 Costs - Years One and Two			\$9,420	\$7,134	\$2,286

Museum of Northern Arizona
Arizona Water Protection Fund 2019 Budget
Task 1 Planning - Year Two

Year two

No charges

Museum of Northern Arizona
Arizona Water Protection Fund 2019 Budget
Task 2 Restoration - Year One

Personnel: Salary and wages	Year one				
	hours	rate	salary	AWPF	MNA
Lawrence Stevens, Project Director	20	50	\$1,000	1,000	
Jeri Ledbetter, Project Manager	16	40	\$640	640	
Edward Schenk, Project Foreman	36	25	\$900	900	
Jeff Jenness, GIS Analyst	20	25	\$500	500	
Outreach coordinator	20	16	\$320	320	
Technician1	40	14	\$560	560	
Technician2	40	16	\$640	640	
Subtotal Salary & Wages			\$4,560	4,560	
Fringe Benefits					
Lawrence Stevens, Project Director	All		\$110	110	
Jeri Ledbetter, Project Manager	All		\$102	102	
Edward Schenk, Project Foreman	All		\$99	99	
Jeff Jenness, GIS Analyst	All		\$80	80	
Outreach coordinator	All		\$35	35	
Technician1	All		\$62	62	
Technician2	All		\$70	70	
Subtotal Fringe Benefits	All		\$559	559	
Total Salary plus Fringe	All		\$5,119	\$5,119	
Outside Professional Services: Hopi	No.		Amount		
Restoration - hand tool labor	10 person days	100/day	\$1,000	1,000	
Elk fence construction	10 person days	100/day	\$1,000	1,000	
Other Outside Service Costs Subtotal	All		\$2,000	\$2,000	
Total Other Direct Costs					
Volunteers					2,800
Supplies - field tools, first aid kits, tool maintenance, radios, signs, chain saw and accessories, etc.			\$1,200	700	500
Revegetation supplies (hoses, pots, watering, fertilizer, gardening supplies)			\$800	600	200
Equipment rental			\$2,500	1,800	700
Supplies - elk fencing: 4 hedge&corner \$50 ea+ unbarbed wire/400 m/roll X 4 rolls/site @\$85/roll+8' steel post/rod @\$10 ea X 10	0		\$850	850	
Other Direct Costs Subtotal			\$5,350	\$3,950	\$1,400
Total Direct Costs			\$12,469	\$11,069	\$1,400
Indirect Costs (5% administrative)			\$623	623	
Forgone Indirect Costs (cost-share)			\$4,194		4,194

	Total	AWPF	Matching
Total Task 2 Costs - Year One	\$17,286	\$11,692	\$5,594

	Total	AWPF	Matching
Total Task 2 Costs - Years One and Two	\$20,560	\$14,171	\$6,389

Museum of Northern Arizona
Arizona Water Protection Fund 2019 Budget

Task 2 Restoration - Year Two

Year two				
hours	rate	salary	AWPF	MNA
10	50	\$500	500	
4	40	\$160	160	
4	25	\$100	100	
0	25	\$0	0	
10	16	\$160	160	
40	14	\$560	560	
40	16	\$640	640	
		\$2,120	2,120	

All		\$55	55	
All		\$26	26	
All		\$11	11	
All		\$0	0	
All		\$18	18	
All		\$62	62	
All		\$70	70	
All		\$241	241	
All		\$2,361	\$2,361	
No.		Amount		
0	100	\$0	0	
0	100	\$0	0	
All		\$0	\$0	

280

		\$0	\$0	\$0
		\$2,361	\$2,361	\$0
		\$118	118	
		\$794		794

	Total	AWPF	Matching
Total Task 2 Costs - Year Two	\$3,274	\$2,479	\$794

Museum of Northern Arizona
Arizona Water Protection Fund 2019 Budget
Task 3 Monitoring - Year One

Personnel: Salary and wages	Year one				
	hours	rate	salary	AWPF	MNA
Lawrence Stevens, Project Director	4	50	\$200	200	
Jeri Ledbetter, Project Manager	4	40	\$160	160	
Edward Schenk, Project Foreman	8	25	\$200	200	
Jeff Jenness, GIS Analyst	0	25	\$0	0	
Outreach coordinator	4	16	\$64	64	
Technician1	16	14	\$224	224	
Technician2	16	16	\$256	256	
Subtotal Salary & Wages			\$1,104	1,104	
Fringe Benefits					
Lawrence Stevens, Project Director	All		\$22	22	
Jeri Ledbetter, Project Manager	All		\$26	26	
Edward Schenk, Project Foreman	All		\$22	22	
Jeff Jenness, GIS Analyst	All		\$0	0	
Outreach coordinator	All		\$7	7	
Technician1	All		\$25	25	
Technician2	All		\$28	28	
Subtotal Fringe Benefits	All		\$129	129	
Total Salary plus Fringe	All		\$1,233	\$1,233	
Volunteers 400					
Pressure transducers for long-term water monitoring - installation			\$1,000	1,000	
Springs Online database maintenance					800
Other Direct Costs Subtotal			\$1,000	\$1,000	\$800
Total Direct Costs			\$2,233	\$2,233	\$800
Indirect Costs (5% administrative)			\$112	112	
Forgone Indirect Costs (cost-share)			\$751		751

	Total	AWPF	Matching
Total Task 3 Costs - Year One	\$3,096	\$2,345	\$1,551

	Total	AWPF	Matching
Total Task 3 Costs - Years One and Two	\$5,730	\$4,340	\$2,990

Museum of Northern Arizona
 Arizona Water Protection Fund 2019 Budget

Task 3 Monitoring - Year Two

Year two				
hours	rate	salary	AWPF	MNA
4	50	\$200	200	
4	40	\$160	160	
8	25	\$200	200	
0	25	\$0	0	
4	16	\$64	64	
36	14	\$504	504	
36	16	\$576	576	
		\$1,704	1,704	

All		\$22	22	
All		\$26	26	
All		\$22	22	
All		\$0	0	
All		\$7	7	
All		\$55	55	
All		\$63	63	
All		\$195	195	
All		\$1,899	\$1,899	

				400
				800
		\$0	\$0	\$800
		\$1,899	\$1,899	\$800
		\$95	95	
		\$639		639

	Total	AWPF	Matching
Total Task 3 Costs - Year Two	\$2,633	\$1,994	\$1,439

Museum of Northern Arizona
Arizona Water Protection Fund 2019 Budget
Task 4 Outreach - Year One

Personnel: Salary and wages	Year one				
	hours	rate	salary	AWPF	MNA
Lawrence Stevens, Project Director	4	50	\$200	200	
Jeri Ledbetter, Project Manager	4	40	\$160	160	
Edward Schenk, Project Foreman	4	25	\$100	100	
Jeff Jenness, GIS Analyst	0	25	\$0	0	
Outreach coordinator	8	16	\$128	128	
Technician1	0	14	\$0	0	
Technician2	0	16	\$0	0	
Subtotal Salary & Wages			\$588	588	
Fringe Benefits					
Lawrence Stevens, Project Director	All		\$22	22	
Jeri Ledbetter, Project Manager	All		\$26	26	
Edward Schenk, Project Foreman	All		\$11	11	
Jeff Jenness, GIS Analyst	All		\$0	0	
Outreach coordinator	All		\$14	14	
Technician1	All		\$0	0	
Technician2	All		\$0	0	
Subtotal Fringe Benefits	All		\$73	73	
Total Salary plus Fringe	All		\$661	\$661	
Outreach, education materials			\$600	\$600	
Video camera, cables			\$1,600	\$0	\$1,600
Other Direct Costs Subtotal			\$2,200	\$600	\$1,600
Total Direct Costs			\$2,861	\$1,261	\$1,600
Indirect Costs (5% administrative)			\$143	143	
Forgone Indirect Costs (cost-share)			\$962		962

	Total	AWPF	Matching
Total Task 4 Costs - Year One	\$3,966	\$1,404	\$2,562

	Total	AWPF	Matching
Total Task 4 Costs - Years One and Two	\$10,499	\$6,351	\$4,147

Museum of Northern Arizona
 Arizona Water Protection Fund 2019 Budget
Task 4 Outreach - Year Two

Year two				
hours	rate	salary	AWPF	MNA
22	50	\$1,100	1,100	
8	40	\$320	320	
30	25	\$750	750	
0	25	\$0	0	
80	16	\$1,280	1,280	
8	14	\$112	112	
8	16	\$128	128	
		\$3,690	3,690	

All		\$121	121	
All		\$51	51	
All		\$83	83	
All		\$0	0	
All		\$141	141	
All		\$12	12	
All		\$14	14	
All		\$422	422	
All		\$4,112	\$4,112	
		\$600	\$600	
		\$0	\$0	\$0
		\$600	\$600	\$0
		\$4,712	\$4,712	\$0
		\$236	236	
		\$1,585		1,585

	Total	AWPF	Matching
Total Task 4 Costs - Year Two	\$6,533	\$4,947	\$1,585

Museum of Northern Arizona
Arizona Water Protection Fund 2019 Budget
Budget Summary

Task 1: Planning

Forgone Indirect Costs (cost-share)	\$2,286
Total Project Costs	\$9,420
Total Cost to AWPf	\$7,134

Task 2: Restoration

Forgone Indirect Costs (cost-share)	\$6,389
Total Project Costs	\$20,560
Total Cost to AWPf	\$14,171

Task 3: Monitoring

Forgone Indirect Costs (cost-share)	\$2,990
Total Project Costs	\$5,730
Total Cost to AWPf	\$4,340

Task 4: Outreach

Forgone Indirect Costs (cost-share)	\$4,147
Total Project Costs	\$10,499
Total Cost to AWPf	\$6,351

Total Project Costs:	\$46,208
Total Cost to AWPf:	\$31,996



DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
3636 N. CENTRAL AVE, SUITE 900
PHOENIX, AZ 85012-1939

May 21, 2018

SUBJECT: Nationwide Permit (NWP) Verification

Larry Stevens
Museum of Northern Arizona
3101 N Fort Valley Road
Flagstaff, Arizona 86001

Dear Mr. Stevens:

I am responding to your request (SPL-2017-00083-MWL) for a Department of the Army permit for your proposed project, Coyote Spring Wetland Rehabilitation. The proposed project is located at Section 4, Township 21 North, Range 7 East, in the city of Flagstaff, Coconino County, Arizona.

Because this project would result in a discharge of dredged and/or fill material into waters of the U.S., a Department of the Army permit is required pursuant to Section 404 of the Clean Water Act (33 USC 1344; 33 CFR parts 323 and 330).

I have determined construction of your proposed project, if constructed as described in your application, would comply with Nationwide Permit 27, Aquatic Habitat Restoration, Establishment, and Enhancement Activities. Specifically, and as shown in the enclosed figure, you are authorized to remove an existing historic tank structure, and perform channel alteration and replanting activities within the existing wetland for purposes of restoring and enhancing the wetland.

For this NWP verification letter to be valid, you must comply with all of the terms and conditions in Enclosure 1.

This verification is valid through March 18, 2022. If on March 18, 2022 you have commenced or are under contract to commence the permitted activity you will have an additional twelve (12) months to complete the activity under the present NWP terms and conditions. However, if I discover noncompliance or unauthorized activities associated with the permitted activity I may request the use of discretionary authority in accordance with procedures in 33 CFR part 330.4(e) and 33 CFR part 330.5(c) or (d) to modify, suspend, or revoke this specific verification at an earlier date. Additionally, at the national level the Chief of Engineers, any time prior to March 18, 2022, may choose to modify, suspend, or revoke the nationwide use of a NWP after following procedures set forth in 33 CFR part 330.5. It is incumbent upon you to

comply with all of the terms and conditions of this NWP verification and to remain informed of any change to the NWPs.

A NWP does not grant any property rights or exclusive privileges. Additionally, it does not authorize any injury to the property, rights of others, nor does it authorize interference with any existing or proposed Federal project. Furthermore, it does not obviate the need to obtain other Federal, state, or local authorizations required by law.

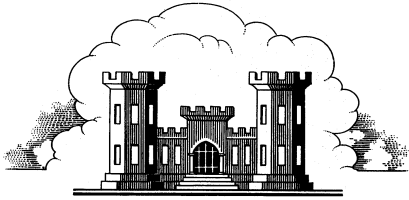
Thank you for participating in the Regulatory Program. If you have any questions, please contact Michael Langley at (602) 230-6953 or via e-mail at Michael.W.Langley@usace.army.mil. Please help me to evaluate and improve the regulatory experience for others by completing the [customer survey](http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey) form at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,



Sallie Diebolt
Chief, Arizona Branch
Regulatory Division

Enclosures



**LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS**

**CERTIFICATE OF COMPLIANCE WITH
DEPARTMENT OF THE ARMY NATIONWIDE PERMIT**

Permit Number: *SPL-2017-00083*

Name of Permittee: *Larry Stevens, Museum of Northern Arizona*

Date of Issuance: *May 21, 2018*

Upon completion of the activity authorized by this permit and the mitigation required by this permit, sign this certificate, and return it by **ONE** of the following methods;

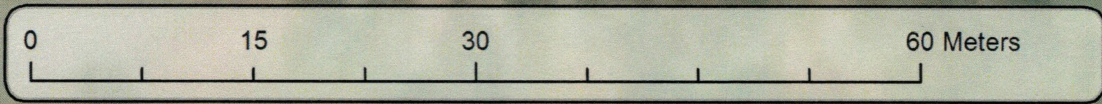
1) Email a digital scan of the signed certificate to Michael.W.Langley@usace.army.mil
OR

2) Mail the signed certificate to
U.S. Army Corps of Engineers
ATTN: Regulatory Division SPL-2017-00083
3636 N. Central Ave, Suite 900
Phoenix, AZ 85012-1939

I hereby certify that the authorized work and any required compensatory mitigation has been completed in accordance with the NWP authorization, including all general, regional, or activity-specific conditions. Furthermore, if credits from a mitigation bank or in-lieu fee program were used to satisfy compensatory mitigation requirements I have attached the documentation required by 33 CFR 332.3(1)(3) to confirm that the appropriate number and resource type of credits have been secured.

Signature of Permittee

Date





Douglas A. Ducey
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera
Director

May 21, 2018

Reading File: SWGP18-0156

Larry Stevens
Museum of Northern Arizona
3101 N. Fort Valley Road
Flagstaff, AZ 86001

**Re: Clean Water Act § 401 Water Quality Certification for Coyote Springs
Rehabilitation**

Dear Mr. Stevens:

The Arizona Department of Environmental Quality (ADEQ) received your application for 401 Water Quality Certification on May 18, 2018. ADEQ's review was conducted pursuant to Section 401(a) of the Federal Clean Water Act (CWA) (33 U.S.C. §1251 et seq.) and the Arizona Revised Statutes § 49-202, which specifies that ADEQ shall process requests by applicants for 401 certification of nationwide or regional general permits required by § 404 of the CWA to determine whether the effect of a discharge will comply with the Arizona's surface water quality standards for navigable waters.

ADEQ has reviewed the information in the application and determined that this project is *conditionally certified* pursuant to the U.S. Army Corps of Engineers Nationwide Permit No.27.

Required Actions

- The applicant is responsible for complying with all general conditions specified in the State of Arizona's CWA § 401 Water Quality Certification of the USACE Nationwide Permit No. 27.

Recommendations

The suggestions below are not required by State law and there are no legal consequences should you choose to disregard them; however, ADEQ appreciates your cooperation and asks you to consider the following:

- The issuance of a State 401 Water Quality Conditional Certification does not imply or suggest that requirements for other permits including, but not limited to: Aquifer Protection Permits, Arizona Pollutant Discharge Elimination System Permits, Construction General Permits, DeMinimis Permits, Pesticide General Permits, and Reclaimed Water permits are met or superseded. Applicant should contact ADEQ to ensure all applicable permits are obtained.

Correspondence

For any correspondence regarding this project, the ADEQ mailing address is:
Arizona Department of Environmental Quality
Rosi Sherrill
Surface Water Section / 401 Certifications / mailstop 5415A-1
1110 West Washington Street
Phoenix, Arizona 85007

For questions or general comments:
Email: LS7@azdeq.gov

Voice: (602) 771-4409

In any correspondence, reference:
Coyote Springs Rehabilitation
USACE File No. SPL-2017-00083
ADEQ LTF No.: 71497
Reading file: SWGP18-0156

Thank you for your efforts to comply with Arizona's environmental requirements. Should you have any comments or questions regarding this matter, please do not hesitate to contact me.

Sincerely,

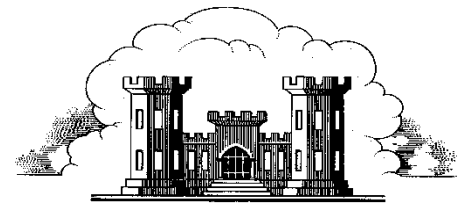
A handwritten signature in cursive script that reads "Rosi Sherrill".

Laurie (Rosi) Sherrill
Surface Water Section
Water Quality Division

electronic copies: U.S. Army Corps of Engineers, Regulatory Branch – Attn.: Michael Langley
USEPA, Wetlands Regulatory Office

NATIONWIDE PERMIT NUMBER 27

AQUATIC HABITAT RESTORATION, ENHANCEMENT AND ESTABLISHMENT ACTIVITIES



US Army Corps of Engineers
Los Angeles District
Regulatory Division/Arizona Branch

A. General Information

This document is an aid to understanding the terms and conditions of your nationwide permit (NWP) by bringing together information issued separately in: (1) the [Federal Register \(82 FR 1860-2008\)*](#), (2) the Special Public Notice for NWP "Reissuance of the Nationwide Permits and Issuance of Final Regional Conditions for the Los Angeles District"*, and (3) the Clean Water Act Section 401 water quality certification decisions (401 WQCs)* issued by the White Mountain Apache Tribe, Hopi Tribe, Hualapai Tribe, Navajo Nation, U.S. Environmental Protection Agency, and Arizona Department of Environmental Quality. Please note that website addresses enclosed herein may have been changed and updated since publication of the original document.

- 1) Pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and/or Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 401 et seq) the U.S. Army Corps of Engineers (Corps) published the "Issuance and Reissuance of Nationwide Permits" in the Federal Register (82 FR 1860-2008) on January 6, 2017. These NWPs are in effect from March 19, 2017 through March 18, 2022 unless modified, reissued, or revoked before that time. It is incumbent upon the permittee to remain informed of changes to the NWPs.
- 2) The Los Angeles District of the Corps issued a Special Public Notice (March 22, 2017) announcing final regional conditions for NWPs to ensure protection of high value waters within the State of Arizona.
- 3) The Los Angeles District of the Corps requested and obtained for the entire State of Arizona the 401 WQC decision for all NWPs on all tribal lands from the White Mountain Apache Tribe, Hopi Tribe, Hualapai Tribe, Navajo Nation, and U.S. Environmental Protection Agency and on all non-tribal lands from the Arizona Department of Environmental Quality.

A description of all NWPs and 401 WQCs can be found in the "Nationwide Permits for Arizona" Special Public Notice.*

***Note:** The Federal Register can be accessed at <https://www.gpo.gov/fdsys/pkg/FR-2017-01-06/pdf/2016-31355.pdf>

Key Sections:

B. Nationwide Permit Terms (page 1)

C. Nationwide Permit General Conditions (page 2)

D. District Engineer's Decision (page 8)

E. Nationwide Permit Regional Conditions (page 9)

F. 401 Water Quality Certifications (page 10)

B. Nationwide Permit Terms

27. Aquatic Habitat Restoration, Enhancement, and Establishment Activities. Activities in waters of the United States associated with the restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas, the restoration and enhancement of non-tidal streams and other non-tidal open waters, and the rehabilitation or enhancement of tidal streams, tidal wetlands, and tidal open waters, provided those activities result in net increases in aquatic resource functions and services.

To be authorized by this NWP, the aquatic habitat restoration, enhancement, or establishment activity must be planned, designed, and implemented so that it results in aquatic habitat that resembles an ecological reference. An ecological reference may be based on the characteristics of an intact aquatic habitat or riparian area of the same type that exists in the region. An ecological reference may be based on a conceptual model developed from regional ecological knowledge of the target aquatic habitat type or riparian area.

To the extent that a Corps permit is required, activities authorized by this NWP include, but are not limited to: the removal of accumulated sediments; the installation, removal, and maintenance of small water control structures, dikes, and berms, as well as discharges of dredged or fill material to restore appropriate stream channel configurations after small water control structures, dikes, and berms, are removed; the installation of current deflectors; the enhancement, rehabilitation, or re-establishment of riffle and pool stream structure; the placement of in-stream habitat structures; modifications of the stream bed and/or banks to enhance, rehabilitate, or re-establish stream meanders; the removal of stream barriers, such as undersized culverts, fords, and grade control structures; the backfilling of artificial channels; the removal of existing drainage structures, such as drain tiles, and the filling, blocking, or reshaping of drainage ditches to restore wetland hydrology; the installation of structures or fills necessary to restore or enhance wetland or stream hydrology; the construction of small nesting islands; the construction of open water areas; the construction of oyster habitat over unvegetated bottom in tidal waters; shellfish seeding; activities needed to reestablish vegetation, including plowing or discing for seed bed preparation and the planting of appropriate wetland species; re-establishment of submerged aquatic vegetation in areas where those plant communities previously existed; re-establishment of tidal wetlands in tidal waters where those wetlands previously existed; mechanized land clearing to remove non-native invasive, exotic, or nuisance vegetation; and other related activities. Only native plant species should be planted at the site.

This NWP authorizes the relocation of non-tidal waters, including non-tidal wetlands and streams, on the project site provided there are net increases in aquatic resource functions and services.

Except for the relocation of non-tidal waters on the project site, this NWP does not authorize the conversion of a stream or natural wetlands to another aquatic habitat type (e.g., the conversion of a stream to wetland or vice versa) or uplands. Changes in wetland plant communities that occur when wetland hydrology is more fully restored during wetland rehabilitation activities are not considered a

conversion to another aquatic habitat type. This NWP does not authorize stream channelization. This NWP does not authorize the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments.

Compensatory mitigation is not required for activities authorized by this NWP since these activities must result in net increases in aquatic resource functions and services.

Reversion. For enhancement, restoration, and establishment activities conducted: (1) In accordance with the terms and conditions of a binding stream or wetland enhancement or restoration agreement, or a wetland establishment agreement, between the landowner and the U.S. Fish and Wildlife Service (FWS), the Natural Resources Conservation Service (NRCS), the Farm Service Agency (FSA), the National Marine Fisheries Service (NMFS), the National Ocean Service (NOS), U.S. Forest Service (USFS), or their designated state cooperating agencies; (2) as voluntary wetland restoration, enhancement, and establishment actions documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or (3) on reclaimed surface coal mine lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the Office of Surface Mining Reclamation and Enforcement (OSMRE) or the applicable state agency, this NWP also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or establishment activities). The reversion must occur within five years after expiration of a limited term wetland restoration or establishment agreement or permit, and is authorized in these circumstances even if the discharge occurs after this NWP expires. The five-year reversion limit does not apply to agreements without time limits reached between the landowner and the FWS, NRCS, FSA, NMFS, NOS, USFS, or an appropriate state cooperating agency. This NWP also authorizes discharges of dredged or fill material in waters of the United States for the reversion of wetlands that were restored, enhanced, or established on prior-converted cropland or on uplands, in accordance with a binding agreement between the landowner and NRCS, FSA, FWS, or their designated state cooperating agencies (even though the restoration, enhancement, or establishment activity did not require a section 404 permit). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate state agency executing the agreement or permit. Before conducting any reversion activity the permittee or the appropriate Federal or state agency must notify the district engineer and include the documentation of the prior condition. Once an area has reverted to its prior physical condition, it will be subject to whatever the Corps Regulatory requirements are applicable to that type of land at the time. The requirement that the activity results in a net increase in aquatic resource functions and services does not apply to reversion activities meeting the above conditions. Except for the activities described above, this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit would be required for any reversion.

Reporting. For those activities that do not require pre-construction notification, the permittee must submit to the district engineer a copy of: (1) The binding stream enhancement or restoration agreement or wetland enhancement, restoration, or establishment agreement, or a project description, including project plans and location map; (2) the NRCS or USDA Technical Service Provider documentation for the voluntary stream enhancement or restoration action or wetland restoration, enhancement, or establishment action; or (3) the SMCRA permit issued by OSMRE or the applicable state agency. The report must also include information on baseline ecological conditions on the project site, such as a delineation of wetlands, streams, and/or other aquatic habitats. These documents must be submitted to the district engineer at least 30 days prior to commencing activities in waters of the United States authorized by this NWP.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing any activity (see general condition 32), except for the following activities:

(1) Activities conducted on non-Federal public lands and private lands, in accordance with the terms and conditions of a binding stream enhancement or restoration agreement or wetland enhancement, restoration, or establishment agreement between the landowner and the FWS, NRCS, FSA, NMFS, NOS, USFS or their designated state cooperating agencies;

(2) Voluntary stream or wetland restoration or enhancement action, or wetland establishment action, documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or

(3) The reclamation of surface coal mine lands, in accordance with an SMCRA permit issued by the OSMRE or the applicable state agency.

However, the permittee must submit a copy of the appropriate documentation to the district engineer to fulfill the reporting requirement. (Authorities: Sections 10 and 404)

Note: This NWP can be used to authorize compensatory mitigation projects, including mitigation banks and in-lieu fee projects. However, this NWP does not authorize the reversion of an area used for a compensatory mitigation project to its prior condition, since compensatory mitigation is generally intended to be permanent.

C. Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/ or Coastal Zone Management Act consistency for a NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects from Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. (b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status. (c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: <http://www.rivers.gov/>.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur. (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification

must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have “no effect” on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. **(d)** As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWP. **(e)** Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take” means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. **(f)** If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required. **(g)** Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their World Wide Web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.nmfs.noaa.gov/pr/species/esa/> respectively. (Note: Arizona endangered species information is available at <http://www.fws.gov/southwest/es/arizona/Threatened.htm#CountyList>)

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether “incidental take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. **(a)** In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. **(b)** Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106. **(c)** Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. **(d)** For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. **(e)** Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the

circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. . If you discover any previously unknown historic, cultural or archaeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment. **(a)** Discharges of dredged or fill material into waters of the United States are not authorized by NWP 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. **(b)** For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal: **(a)** The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site). **(b)** Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal. **(c)** Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. **(d)** For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)). **(e)** Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses. **(f)** Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332. **(1)** The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation. **(2)** The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)). **(3)** Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation. **(4)** If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). **(5)** If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided. **(6)** Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)). **(g)** Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs. **(h)** Permittees may propose the use of mitigation banks, in-lieu fee

programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management. (i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

“When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

(Transferee)

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include: (a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions; (b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and (c) The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a “USACE project”), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) **Timing:** Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the

information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either: (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information: (1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed activity; (3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity; (4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans); (5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate; (6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act; (8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act; (9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and (10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal. (2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes. (3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state

natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the individual crossings of waters of the United States to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51, 52, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects. For those NWPs that have a waivable 300 linear foot limit for losses of intermittent and ephemeral stream bed and a 1/2-acre limit (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), the loss of intermittent and ephemeral stream bed, plus any other losses of jurisdictional waters and wetlands, cannot exceed 1/2-acre.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters (e.g., streams). The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31, or to evaluate PCNs for activities authorized

by NWP 21, 49, and 50), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

E. Nationwide Permit Regional Conditions

Of the ten regional conditions effective within the Los Angeles District of the Corps, six apply to projects within Arizona (1-4, 9 and 10). The remaining four regional conditions apply to specific geographic areas, resources, or species not located in Arizona.

The following regional conditions must be complied with for any authorization by a NWP to be valid in the State of Arizona:

Regional Condition 1. For all activities in waters of the U.S. that are suitable habitat for federally listed fish species, including designated critical habitat for such species, the permittee shall design all new or substantially reconstructed linear transportation crossings (e.g. roads, highways, railways, trails, bridges, culverts) to ensure that the passage and/or spawning of fish is not hindered. In these areas, the permittee shall employ bridge designs that span the stream or river, including pier- or pile-supported spans, or designs that use a bottomless arch culvert with a natural stream bed, unless determined to be impracticable by the Corps.

Regional Condition 2. Nationwide Permits (NWP) 3, 7, 12-15, 17-19, 21, 23, 25, 29, 35, 36, or 39-46, 48-54 cannot be used to authorize structures, work, and/or the discharge of dredged or fill material that would result in the "loss" of wetlands, mudflats, vegetated shallows or riffle and pool complexes as defined at 40 CFR Part 230.40-45. The definition of "loss" for this regional condition is the same as the definition of "loss of waters of the United States" used for the Nationwide Permit Program. Furthermore, this regional condition applies only within the State of Arizona and within the Mojave and Sonoran (Colorado) desert regions of California. The desert regions in California are limited to four USGS Hydrologic Unit Code (HUC) accounting units (Lower Colorado -150301, Northern Mojave-180902, Southern Mojave- 181001, and Salton Sea-181002).

Regional Condition 3. When a pre-construction notification (PCN) is required, the appropriate U.S. Army Corps of Engineers (Corps) District shall be notified in accordance with General Condition 32 using either the South Pacific Division PCN Checklist or a signed application form (ENG Form 4345) with an attachment providing information on compliance with all of the General and Regional Conditions. The PCN Checklist and application form are available at:

<http://www.spl.usace.army.mil/Missions/Regulatory/PermitProcess.aspx>. In addition, unless specifically waived by the Los Angeles District, the PCN shall include: **a)** A written statement describing how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States; **b)** Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity as well as the location of delineated waters of the U.S. on the site. The drawings shall contain a title block, legend and scale, amount (in cubic yards) and area (in acres) of fill in Corps jurisdiction, including both permanent and temporary fills/structures. The ordinary high water mark or, if tidal waters, the mean high water mark and high tide line, should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation. All drawings shall follow the Updated Map and Drawing Standards for the South Pacific Division Regulatory Program (Feb 2016), or most recent update (available at the South Pacific Division website at: <http://www.spd.usace.army.mil/Missions/Regulatory/PublicNoticesandReferences.aspx>); **c)** Numbered and dated pre-project color photographs showing a representative sample of waters proposed to be impacted on the project site, and all waters proposed to be avoided on and immediately adjacent to the project site. The compass angle and position of each photograph shall be documented on the plan-view drawing required in subpart b of this regional condition. **d)** Delineation of aquatic resources in accordance with the current Los Angeles District's Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (available at: <http://www.spl.usace.army.mil/Missions/Regulatory/Jurisdictional-Determination/>).

Regional Condition 4. Submission of a PCN pursuant to General Condition 32 and Regional Condition 3 shall be required for specific regulated activities in the following locations: **a)** All perennial waterbodies and special aquatic sites throughout the Los Angeles District as well as intermittent waters within the State of Arizona for any regulated activity that would result in a loss of waters of the United States. The definition of "loss of waters of the United States" for this regional condition is the same as the definition used for the Nationwide Permit Program. **b)** All areas designated as Essential Fish Habitat (EFH) by the Pacific Fishery Management Council, and that would result in an adverse effect to EFH, in which case the PCN shall include an EFH assessment and extent of proposed impacts to EFH. EFH Assessment Guidance and other supporting information can be found at: http://www.westcoast.fisheries.noaa.gov/habitat/fish_habitat/efh_consultations_go.html. **c)** All watersheds in the Santa Monica Mountains in Los Angeles and Ventura counties bounded by Calleguas Creek on the west, by Highway 101 on the north and east, and by Sunset Boulevard and Pacific Ocean on the south. **d)** The Santa Clara River watershed in Los Angeles and Ventura counties, including but not limited to Aliso Canyon, Agua Dulce Canyon, Sand Canyon, Bouquet Canyon, Mint Canyon, South Fork of the Santa Clara River, San Francisquito Canyon, Castaic Creek, Piru Creek, Sespe Creek and the main-stem of the Santa Clara River. **e)** The Murrieta and Temecula Creek watersheds in Riverside County, California for any regulated activity that would result in a loss of waters of the U.S. The definition of "loss of waters of the United States" for this regional condition is the same as the definition used for the Nationwide Permit Program. **f)** All waterbodies designated by the Arizona Department of Environmental Quality as Outstanding Arizona Waters (OAWs), within 1600 meters (or 1 mile) upstream and/or 800 meters (1/2 mile) downstream of a designated OAW, and on tributaries to OAWs within 1600 meters of the OAW (see <http://www.azdeq.gov/index.html>). **g)** All waterbodies designated by the Arizona Department of Environmental Quality as 303(d)-impaired surface waters, within 1600 meters (or 1 mile) upstream and/or 800 meters (1/2 mile) downstream of a designated impaired surface water, and on tributaries to impaired waters within 1600 meters of the impaired water (see <http://www.azdeq.gov/index.html>).

Regional Condition 9. Any requests to waive the applicable linear foot limitations for NWP 13, 21, 29, 39, 40 and 42, 43, 44, 51, 52, and 54, must include the following: **a)** A narrative description of the affected aquatic resource. This should include known information on: volume and duration of flow; the approximate length, width, and depth of the waterbody and characters observed associated with an Ordinary High Water Mark (e.g. bed and bank, wrack line, or scour marks) or Mean High Water Line; a description of the adjacent vegetation community and a statement regarding the wetland status of the associated vegetation community (i.e. wetland, non- wetland); surrounding land use; water quality; issues related to cumulative impacts in the watershed, and; any other relevant information. **b)** An analysis of the proposed impacts to the waterbody in accordance with General Condition 32 and Regional Condition 3; **c)** Measures taken to avoid and

minimize losses, including other methods of constructing the proposed project; and **d)** A compensatory mitigation plan describing how the unavoidable losses are proposed to be compensated, in accordance with 33 CFR Part 332.

Regional Condition 10. The permittee shall complete the construction of any compensatory mitigation required by special condition(s) of the NWP verification before or concurrent with commencement of construction of the authorized activity, except when specifically determined to be impracticable by the Corps. When mitigation involves use of a mitigation bank or in-lieu fee program, the permittee shall submit proof of payment to the Corps prior to commencement of construction of the authorized activity.

F. 401 Water Quality Certification (401 WQC)

A 401 WQC is mandatory for any activity that requires a Clean Water Act Section 404 permit. A 401 WQC is required prior to discharging any dredged or fill material into a water of the United States. Only one of the following 401 WQCs listed below will apply to your project. The geographical location of your project will determine which 401 WQC is applicable. The 401 WQCs issued for this NWP will remain in effect through March 18, 2022.

On all "Non-Tribal Lands", lands that are not part of a federally recognized Indian Reservation, the Arizona Department of Environmental Quality (ADEQ) is the agency responsible for issuing the 401 WQC.

On all "Tribal Lands", lands that are part of a federally recognized Indian Reservation, the U.S. Environmental Protection Agency (EPA) is responsible for issuing the 401 WQC except where EPA has delegated the 401 WQC authority to the White Mountain Apache Tribe (Fort Apache Indian Reservation), Hopi Tribe (Hopi Indian Reservation), Hualapai Tribe (Hualapai Indian Reservation), or Navajo Nation (Navajo Indian Reservation).

If "Individual Certification" is required you must apply for, receive, and comply with the 401 WQC issued by ADEQ, EPA, or the appropriate Tribe.

Non-tribal Lands - 401 ADEQ WQCs*

ADEQ 401 WQC definitions:

Not Attaining Waters are surface waters that are identified pursuant to CWA Section 305(b) as not attaining (e.g. not meeting surface water quality standards) and as a result, merit special consideration. The current list of Not Attaining Waters (Category 4A, 4B and 4C) is available on the ADEQ website at www.azdeq.gov.

Native Fill means soil, sand, gravel and other natural materials that are similar in physical, chemical and biological composition to existing natural materials in the project area; and which are free from pollutants in quantities and concentrations that can cause or contribute to an exceedance of applicable Surface Water Quality Standards (SWQS).

ADEQ requires that an applicant submit an application to ADEQ for a Water Quality Certification if the proposed activity will occur within the ordinary high water mark of any of the following: An Outstanding Arizona Water; an impaired water; a water that is listed as not attaining; or a lake.

The following 401 water quality conditions apply to regulated discharges of dredged or fill material occurring within the ordinary high water mark (OHWM) of Waters of the US (WUS) under all applicable NWPs (hereinafter referred to as "certified activities"):

1. Submission of a PCN pursuant to General Condition 32 and Regional Condition 3 shall be required for all waterbodies designated by ADEQ as Not Attaining, within 1600 meters (or 1 mile) upstream and/or 800 meters (or 1/2 mile) downstream of a not attaining water.
2. Any discharge occurring as a result of certified activities of the project shall not cause an exceedance of any Surface Water Quality Standard (SWQS). Applicability of this condition is as defined in A.A.C. R18-11-102.
3. This certification does not authorize the discharge of wastewater, process residues or other waste to any WUS.
4. Runoff of water used for irrigation or dust control for certified activities within WUS shall be limited to the extent practicable and shall not cause downstream erosion, flooding or an exceedance of applicable surface water quality standards (SWQS) in any WUS.
5. Clearing, grubbing, scraping or otherwise exposing erodible surfaces in WUS shall be minimized to the extent necessary for each construction phase or location.
6. Dredged or fill material in WUS shall be placed so that it is stable, meaning after placement, the material does not show signs of excessive erosion, such as gulying, head cutting, caving, block slippage, material sloughing, etc. Dredged or fill material placed in WUS shall not discharge (e.g., via leaching, runoff) pollutants into streams or wetlands at levels exceeding any applicable SWQS.
7. The effectiveness of all pollution control measures, including sediment and erosion control measures, shall be inspected, maintained and modified (as necessary) to reduce pollutants and ensure compliance with SWQS in any WUS.
8. Except where certified activities are intended to permanently alter any WUS, all disturbed areas within WUS shall be restored and (re)vegetated or stabilized. Vegetation shall be maintained on unarmored banks and slopes to stabilize soil and prevent erosion.
9. Silt laden or turbid water resulting from certified activities shall be managed in a manner to reduce sediment load prior to discharging so as not to exceed SWQS in any WUS.
10. Any washing or dewatering of fill material must occur outside of any WUS prior to placement.
11. Acceptable fill material that can be placed in any WUS includes: untreated logs and lumber; natural stone (crushed or not), crushed clean concrete (recycled concrete); native fill; precast, sprayed or cast-in-place concrete (including soil cement and unmodified grouts); steel (including galvanized); plastic; aluminum; and other material that is free from pollutants in quantities or combinations that can cause an exceedance of applicable SWQS. Other fill materials may be placed in WUS with prior written approval from ADEQ.
12. Upon completion of the certified activities, areas within any WUS shall be promptly cleared of all forms, pilings, construction residues, equipment, debris and other obstructions, including temporary structures.
13. If fully, partially or occasionally submerged structures in WUS are constructed of cast-in-place concrete instead of pre-cast concrete, applicant will take steps; e.g., sheet piling or temporary dams, to prevent contact between water (instream and runoff)

and the concrete until it cures and until any curing agents have evaporated or otherwise cease to be available; i.e., are no longer a pollutant source.

14. Any permanent WUS crossings other than fords, shall be equipped with conveyances that direct untreated runoff away from WUS.

15. Permanent and temporary pipes and culvert crossings in WUS shall be adequately sized to handle expected flow and properly set with end section, splash pads, headwalls or other structures that dissipate water energy to control erosion.

16. Debris will be cleared as needed from culverts, ditches, dips and other drainage structures in any WUS to prevent clogging or conditions that may lead to washout.

17. All temporary structures in WUS constructed of imported materials and all permanent structures, including but not limited to, access roadways; culvert crossings; staging areas; material stockpiles; berms, dikes and pads, shall be constructed so as to accommodate overtopping and resist washout by streamflow.

18. Any temporary WUS crossing, other than fords on native material, shall be constructed in such a manner so as to provide armoring of the stream channel. Materials used to provide this armoring shall not include anything easily transportable by flow.

Tribal Lands - 401 WQCs

Fort Apache Indian Reservation (White Mountain Apache Tribe):	Individual Certification required for all projects.*
Hopi Indian Reservation (Hopi Tribe):	Individual Certification required for all projects.*
Hualapai Indian Reservation (Hualapai Tribe):	Individual Certification required for all projects.*
Navajo Indian Reservation (Navajo Nation):	Individual Certification required for all projects.*
All other Indian Reservations (EPA):	401 WQCs issued by EPA: Contact PM

401 WQC Contact Information

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Douglas A. Ducey
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera
Director

May 21, 2018

Reading File: SWGP18-0156

Larry Stevens
Museum of Northern Arizona
3101 N. Fort Valley Road
Flagstaff, AZ 86001

**Re: Clean Water Act § 401 Water Quality Certification for Coyote Springs
Rehabilitation**

Dear Mr. Stevens:

The Arizona Department of Environmental Quality (ADEQ) received your application for 401 Water Quality Certification on May 18, 2018. ADEQ's review was conducted pursuant to Section 401(a) of the Federal Clean Water Act (CWA) (33 U.S.C. §1251 et seq.) and the Arizona Revised Statutes § 49-202, which specifies that ADEQ shall process requests by applicants for 401 certification of nationwide or regional general permits required by § 404 of the CWA to determine whether the effect of a discharge will comply with the Arizona's surface water quality standards for navigable waters.

ADEQ has reviewed the information in the application and determined that this project is *conditionally certified* pursuant to the U.S. Army Corps of Engineers Nationwide Permit No.27.

Required Actions

- The applicant is responsible for complying with all general conditions specified in the State of Arizona's CWA § 401 Water Quality Certification of the USACE Nationwide Permit No. 27.

Recommendations

The suggestions below are not required by State law and there are no legal consequences should you choose to disregard them; however, ADEQ appreciates your cooperation and asks you to consider the following:

- The issuance of a State 401 Water Quality Conditional Certification does not imply or suggest that requirements for other permits including, but not limited to: Aquifer Protection Permits, Arizona Pollutant Discharge Elimination System Permits, Construction General Permits, DeMinimis Permits, Pesticide General Permits, and Reclaimed Water permits are met or superseded. Applicant should contact ADEQ to ensure all applicable permits are obtained.

Correspondence

For any correspondence regarding this project, the ADEQ mailing address is:
Arizona Department of Environmental Quality
Rosi Sherrill
Surface Water Section / 401 Certifications / mailstop 5415A-1
1110 West Washington Street
Phoenix, Arizona 85007

For questions or general comments:
Email: LS7@azdeq.gov

Voice: (602) 771-4409

In any correspondence, reference:
Coyote Springs Rehabilitation
USACE File No. SPL-2017-00083
ADEQ LTF No.: 71497
Reading file: SWGP18-0156

Thank you for your efforts to comply with Arizona's environmental requirements. Should you have any comments or questions regarding this matter, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script that reads "Rosi Sherrill".

Laurie (Rosi) Sherrill
Surface Water Section
Water Quality Division

electronic copies: U.S. Army Corps of Engineers, Regulatory Branch – Attn.: Michael Langley
USEPA, Wetlands Regulatory Office

**A CULTURAL RESOURCES SURVEY OF COYOTE SPRINGS ON
PRIVATE PROPERTY, FLAGSTAFF, COCONINO COUNTY, ARIZONA**

by

David E. Purcell

Submitted to:

Department of the Army
Los Angeles District, U.S. Army Corps of Engineers
3636 North Central Avenue, Suite 900
Phoenix, Arizona 85012-1939

Submitted by:

Kimberly Spurr, M.A.
Supervisory Archaeologist
Museum of Northern Arizona
3101 North Fort Valley Road
Flagstaff, Arizona 86001

REVISED

March 28, 2018

SHPO SURVEY REPORT ABSTRACT

Report Title: A Cultural Resources Survey of Coyote Springs on Private Property, Flagstaff, Coconino County, Arizona

Project Name: MNA Coyote Springs Rehabilitation Project

Project Location: Flagstaff, Coconino County, Arizona

Project Locator UTM: Zone 12, 0439920 mE, 3899052 mN (NAD 83)

Project Sponsor: Springs Stewardship Institute, a Global Institute of the Museum of Northern Arizona

Sponsor Project Number(s): MNA-CS-17-329

Lead Agency: U.S. Army Corps of Engineers

Other Involved Agencies: None

Applicable Regulations: Clean Water Act

Funding Source: Coconino County Board of Supervisors

ASLD ROW Application Number: None

Description of the Project/Undertaking: Museum of Northern Arizona (MNA) is actively involved in the restoration of a natural spring located on the campus of the Museum, known as Coyote Springs. The springs were modified historically by the construction of a malpais spring house or cistern over one spring outlet and the later addition of a poured concrete cistern downstream of the spring house. The channels of the flow emanating from the two or three spring origins were further modified by channelizing. Together, these actions modified what was a wetland. The Springs Stewardship Institute (SSI), a Global Institute of the Museum of Northern Arizona, proposes to remove the poured concrete cistern, restore natural stream characteristics to the spring outflow, and restore the malpais spring house. All restoration activities are proposed as manual, non-mechanical labor, although a jackhammer may be required to demolish the concrete cistern. The vicinity of the springs was determined to be Waters of the United States by the U.S. Army Corps of Engineers (USACOE) in 2017 (Diebolt 2017) based on a jurisdictional determination by the Springs Stewardship Institute under the Clean Water Act, as amended. MNA archaeologists conducted a comprehensive cultural resources inventory of the springs and vicinity in support of a Nationwide 27 (Aquatic Habitat Restoration, Enhancement, and Establishment Activities) Permit, to be issued by the USACOE to the SSI.

Project Area/Area of Potential Effects (APE): An irregular parcel surrounding and downslope from Coyote Springs, including 0.27 acres of Waters of the United States and 0.75 acres of adjacent land to be transformed into potential jurisdictional wetlands. The project area is privately owned, with one half located on the campus of the Museum of Northern Arizona and one half on a private residential lot managed by the Coyote Springs Homeowners Association.

Legal Description: T21N, R7E, Sec. 4 SE¼ of the NW¼ and the NE¼ of the SW¼

Land Jurisdiction: Private (Museum of Northern Arizona and Coyote Springs Homeowners Association)

Total Acres: 0.9

Acres Surveyed: 1.02

Acres Not Surveyed: 0

Consultant Firm/Organization: Museum of Northern Arizona, Archaeology Division

Project Number: MNA 100-270-538

Permit Number(s): No permits were required for private land

Date(s) of Fieldwork: September 4, 2017

Number of IOs Recorded: None

Number of Sites Recorded: 1 (NA287)

Eligible Sites: None

Ineligible Sites: (1)

Unevaluated Sites: None

Sites Not Relocated: None

Site Summary Table

Land Jurisdiction	Identification Status	Site Number/Property Address	Eligibility Status/Criterion/Criteria	Recommended Treatment
Private	Previously recorded	NA287	Recommended not eligible	None

Comments: Coyote Springs contains one archaeological site (NA287), consisting of five features of historic/recent age and a prehistoric and historic artifact scatter. The features were constructed at different times and represent different uses of Coyote Spring, the focus of all activities at the site. NA287 is older than 50 years (except for Feature 5 which is less than 50 years old and retains integrity of location, design, setting, feeling [partial, some having been lost to the construction of The Peaks Senior Center]), and association. NA287 is recommended not eligible to the Arizona and National Registers of Historic Places under any criterion as the site is not considered significant at any level.

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CHAPTER 1

Introduction

Museum of Northern Arizona (MNA) conducted a comprehensive cultural resources inventory of 1.02 acres of the campus of the Museum of Northern Arizona and adjacent private land in Flagstaff, Coconino County, Arizona. The project area is Coyote Springs, one of the last flowing springs in the San Francisco Peaks. The springs were modified historically by the construction of a malpais spring house or cistern over one spring outlet and the later addition of a poured concrete cistern downstream of the spring house (Figure 1). The channels of the flow emanating from the two or three spring origins were further modified by channelizing. Together, these actions modified what was a wetland. The Springs Stewardship Institute (SSI), a Global Institute of the Museum of Northern Arizona, proposes to remove the poured concrete cistern, restore natural stream characteristics to the spring outflow, and restore the malpais spring house. All restoration activities are proposed as manual, non-mechanical labor, although a jackhammer may be required to demolish the concrete cistern. The vicinity of the springs was determined to be Waters of the United States by the U.S. Army Corps of Engineers (USACOE) in 2017 (Diebolt 2017) based on a jurisdictional determination by the Springs Stewardship Institute under the Clean Water Act, as amended. MNA archaeologists conducted a comprehensive cultural resources inventory of the springs and vicinity in support of a Nationwide 27 (Aquatic Habitat Restoration, Enhancement, and Establishment Activities) Permit, to be issued by the USACOE to the SSI.



Figure 1. Overview of the Coyote Springs project area. The historic malpais spring house is visible to the left. The cluster of Bebb's willows at the center of the image conceals the location of the concrete cistern that is proposed for removal. A social trail, visible in the foreground, connects existing paved trails at The Peaks Senior Living Center with Coyote Springs.

Location and Setting

The project area consists of 0.27 acres of the MNA campus determined to be Waters of the United States (Springs Stewardship Institute 2017) and 0.75 acres of adjacent land to be returned to wetlands by the project (a total of 1.02 acres). Coyote Springs is located in the Upper Rio de Flag watershed in Flagstaff, Coconino County, Arizona. The spring origin is at UTM coordinates 0439920 mE, 3899052 mN (Zone 12, NAD 83) in Township 21 North, Range 7 East, Section 4, SE $\frac{1}{4}$ of the NW $\frac{1}{4}$. The project area extends into the NE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Sec. 4, northeast of US Highway 180, and is depicted on USGS 7.5 minute topographic quadrangle *Flagstaff West, AZ* (Figure 2), although the spring location is not depicted.

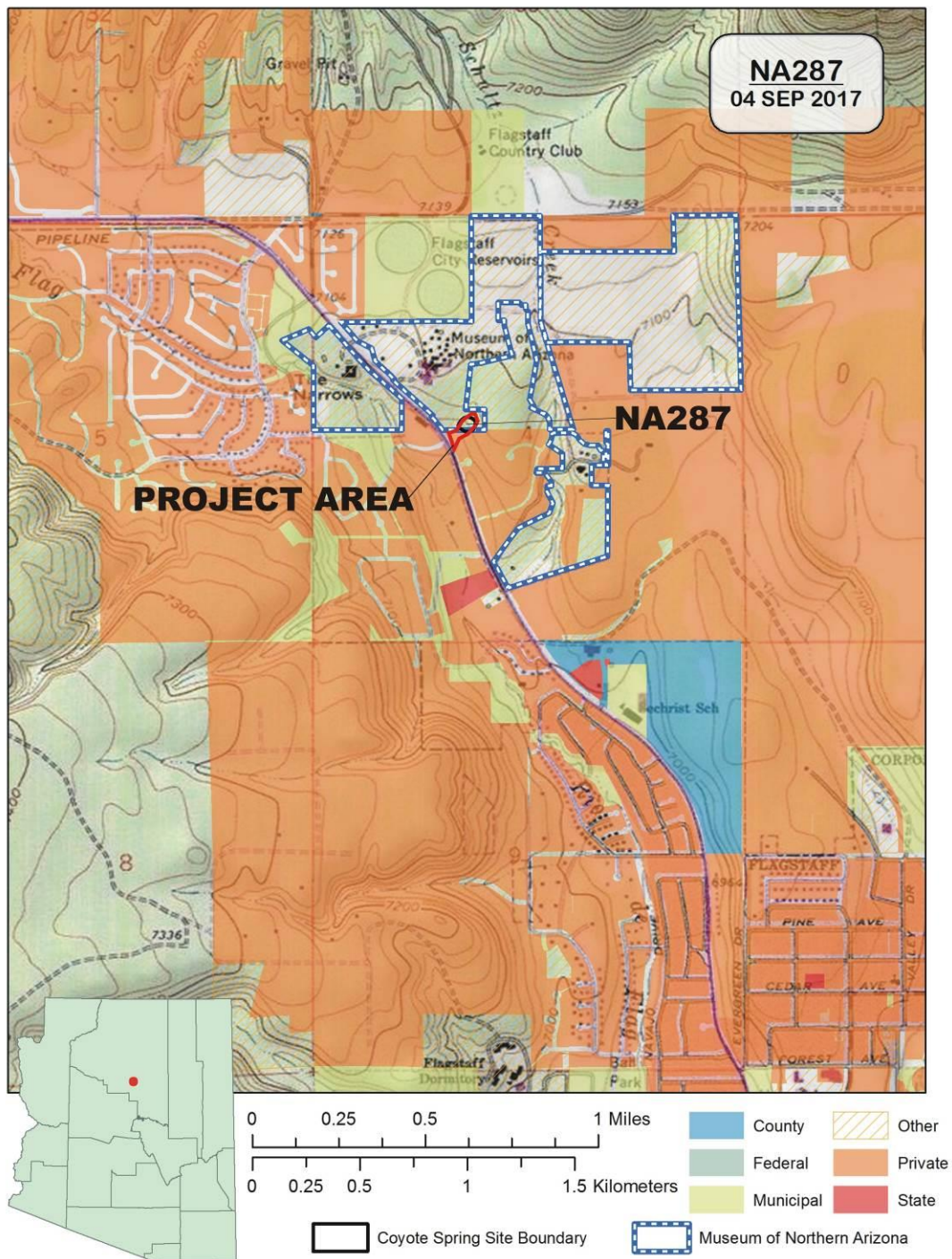


Figure 2. Coyote Springs project area location and Site NA287

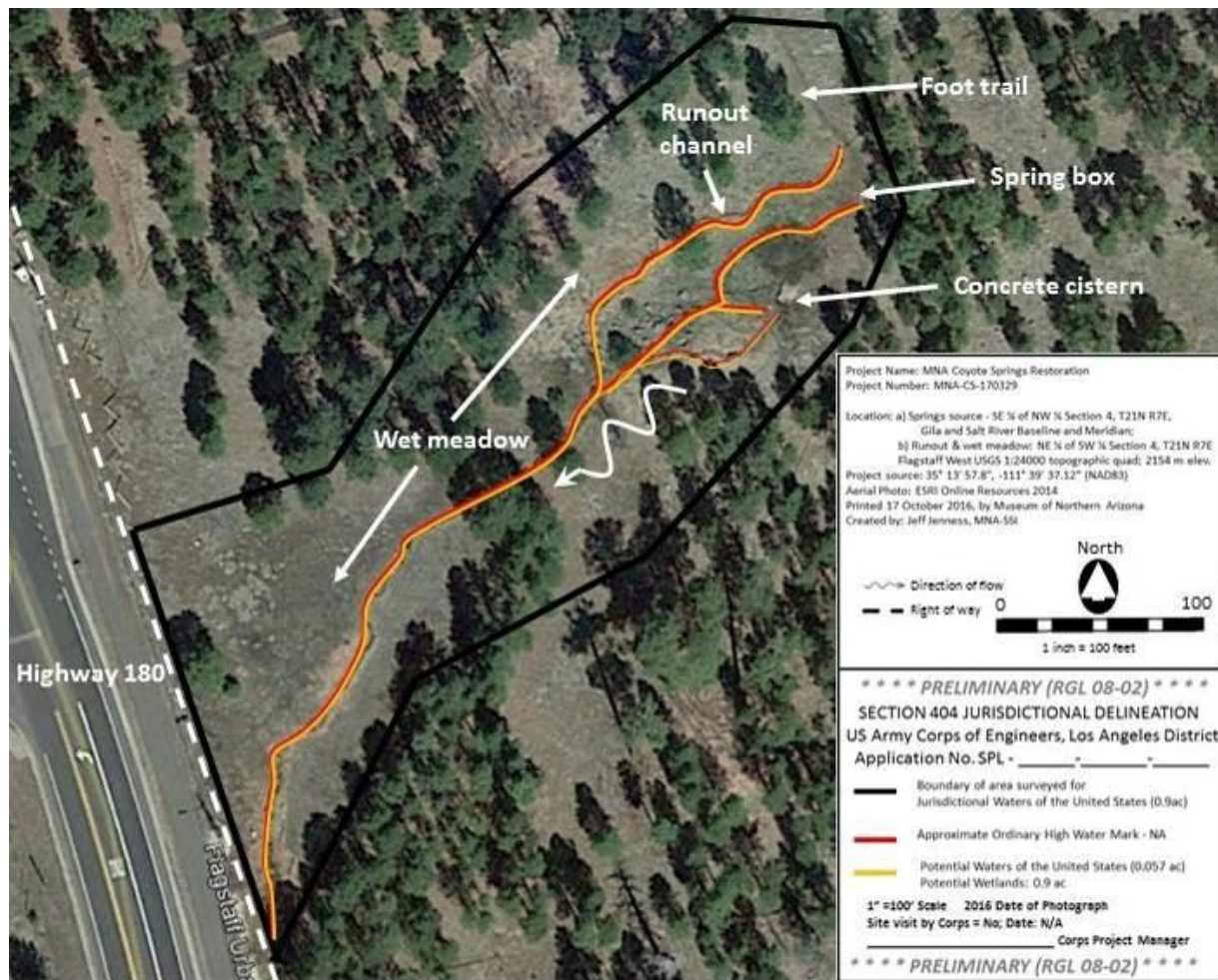


Figure 3. Aerial image of the Coyote Springs Project area and significant features (after SSI 2017: Figure 2). The project area is an open wet meadow surrounded by ponderosa pine forest.

The Springs Stewardship Institute wetland delineation report describes the setting and history of the springs as follows (SSI 2017:2-4):

Coyote Springs is a small hillslope spring that was developed (i.e., flow captured and piped to a concrete cistern) as part of a homestead and pasture in the 1930s (Figure 2). The springs emerge from a forested hillslope underlain by Holocene to middle Pliocene basaltic rocks of the San Francisco volcanic field. The primary emergence occurs inside a stone masonry spring house with an arched roof. Approximate dimensions are 9 ft x 9 ft by 3 ft deep. Water then flows from the spring house into a narrow, generally linear and incised channel approximately 0.6 m wide and 0.1 m deep. Channelized flow is down slope for approximately 172.9 m through a seasonally wet meadow, or slope wetland of approximately 0.116 ha (0.29 ac.) in size before the flow is directed via a culvert under Hwy 180 and into the Rio de Flag approximately 165 m southwest of Hwy 180 (Fig. 1). Spring flow is rarely sufficient to contribute to the base flow of the Rio de Flag.

Project Description and Field Methods

Members of the Springs Stewardship Institute conducted a jurisdictional delineation of the property October 11-17, 2016 (SSI 2017). This project defined the extent of the existing wetland and the proposed area of potential effect (APE).

The Coyote Springs cultural resources survey was completed September 4, 2017 under the field direction of MNA Archaeology Division Director Kimberly Spurr. The crew consisted of MNA Supervisory Archaeologist David E. Purcell. Fieldwork required 1 person day. The entire survey area was walked by Spurr and Purcell as pedestrian transects spaced 10 m (33 feet) apart, conforming to the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation as systematic and "intensive." Transects were walked east-west using UTM coordinates as reference, using handheld GPS units to maintain proper spacing.

No isolated occurrences were identified. Most of the project area falls within the boundaries of archaeological site NA287, which was documented on an MNA site form and mapped using handheld GPS receivers. The site was assessed for current condition and significance under the National Register of Historic Places criteria. The current condition was recorded through digital photographs and narrative description. The NRHP significance was evaluated in terms of site integrity and relevant historic contexts.

Archaeological Records Search

The SHPO Survey Report Standards (Revised, January 2016) requires a discussion of all previous projects and previously documented sites, known historic structures and buildings, and other cultural resources within a one-mile radius of the project area. MNA conducted an online review of the records of the Arizona State Museum and electronic records of the AZSITE consortium on October 10, 2017, with additional review on October 24, 2017. MNA conducted a review of the National Register of Historic Places (NRHP) listings for Flagstaff, Arizona, online, October 9, 2017. The site records of the Museum of Northern Arizona were reviewed October 11-16, 2017, when it became apparent that AZSITE does not contain all of the data curated in the MNA site files. The archives of the Museum of Northern Arizona were consulted October 24, 2017 for information regarding the construction and ownership history of the historic features of Coyote Springs. The records of the Coconino National Forest in this area mirror the MNA site files, and were therefore not consulted for this project. The AZSITE database did not include any Arizona Register of Historic Places (ARHP)-listed properties, so a review of the ARHP for this project area was not undertaken. MNA reviewed a copy of the 1879 General Land Office (GLO) map of Township 21 North, Range 7 West. The current project area is outside of the historic urban center of Flagstaff mapped by the Sanborn-Parris Insurance Company.

A total of 11 projects have taken place within a one mile radius of the Coyote Springs project area (Table 1), and 30 sites have been previously identified in the same radius (Table 2), depicted in confidential Appendix A. One site (NA287) is within the present project. The MNA site files identify this site as "Coyote Springs." The other 29 sites are outside of the present project area and site boundaries.

Arizona State Museum/AZSITE

AZSITE records identify one previously recorded site (NA287) and no projects within the present project area, and eight projects and 14 sites within a one mile radius of the present project area. Appendix A contains plots of the AZSITE data. Site NA287 has not previously been evaluated for eligibility to the NRHP. Three Historic Structures are also plotted in AZSITE within the one-mile-radius: 24730, 36090, and 807402. No information regarding these locations was available through AZSITE. Two (24730 and 36090) are depicted along US 180 near Site NA287, but are outside of the current project area. No sites listed to the Arizona Register of Historic Places are within the current project area.

Table 1. Previous Projects within One Mile of the Coyote Springs Project Area

PROJECT NUMBER	PROJECT NAME	LOCATION ¹ T21N, R7E	REFERENCE ²
A83-60.MNA	Gemini Parkway Study Corridor	Sec. 3, 4 ^{3 4}	Keller 1984
A87-27.MNA	MNA Lands Survey ⁵	Sec. 4	Stebbins 1987
1988-99.ASM	Schultz Wash Survey	Sec. 4, 5, 9 ⁴	None
1990-221.ASM	EPNG San Juan Pipeline Expansion	Sec. 4, 5 ^{3 4}	Dosh and Dechambre 1991
1994-164.ASM	Flagstaff Reservoir	Sec. 4 ³	Wenker 1994
1997-355.ASM	US 180 N. of Flagstaff, MP 216-219.6	Sec. 4, 5, 9 ⁴	Spalding 1997
2003-659.ASM	US 180 – Sechrist School – Fremont Drive	Sec. 4, 9	Breen 2003
2004-716.ASM	US 180 Flagstaff Multi-use Path	Sec. 4, 5, 9	Breen 2004
2006-690.ASM	Schultz Pass Meadows Proposed Utilities	Sec. 5 ⁴	Dosh 2006
2012-618.ASM	US 180, Columbus Avenue-Snowbowl Road	Sec. 4, 5, 9 ⁴	Bowler 2012
SWCA 34852	Assessor's Parcel Number 111-01-016H	Sec. 4	Lutes and Rawson 2016

Notes: Shaded rows indicate projects that were within the current project boundaries;

¹ Location only within the one-mile site file search area;

² As determined from the Project Registration Form or LARC

³ Also in T22N, R7E, Section 33

⁴ Also in T22N, R7E, Section 32

⁵ Lutes and Rawson (2016) incorrectly identify this as the Gemini Road Extension project. Stebbins (1987) inventoried the same 89-acre parcel as SWCA, as well as the parcel later sold off by MNA as the Coyote Springs Development.

Museum of Northern Arizona

MNA Archaeologist Janet Hagopian consulted the paper maps, site cards, and site number registers curated in the MNA site files October 6-11, 2017, identifying three projects (A83-60.MNA, A87-27.MNA, and SWCA 34852) and 15 sites not in the AZSITE database. Additional information regarding NA287 was collected by Purcell on October 19, 2017. Several of the MNA site numbers appear to reference the same site. NA150 (McMillan Spring) was at one time confused with Coyote Spring according to a marginal note in the site number ledger; these are distinct and separate sites. Other sites listed on Table 2 also have multiple MNA site numbers, and are referenced by all known site numbers. Kimberly Spurr consulted the MNA Archives on October 24, 2017, and obtained information relating to the Colton's and MNA's ownership of Coyote Springs, discussed in Chapter 3.

Table 2. Archaeological Sites Previously Recorded within a One Mile Radius of the Coyote Springs Project Area

SITE NUMBER	REFERENCE	DESCRIPTION/TEMPORAL & CULTURAL AFFILIATION/COMMENTS
AZ I:14:5(ASM) AR-03-04-02-1672	Smith 1984; Weaver 1992; Breen 2004; Bowler 2012	Beale Wagon Road: 1857/Euroamerican
AZ I:14:6(ASM) NA16331	Gallagher and Weaver 1978; NPS 2017	The (Thomas McMillan) Homestead, spring, and spring house: Historic/Euroamerican
AZ I:14:327(ASM)	Wenker 1994	Flagstaff City Reservoir: Historic/Euroamerican
AZ Q:7:74(ASM)	Bowler 2012	US 180 Historic Alignment in Arizona: Historic/Euroamerican

Table 2. Archaeological Sites Previously Recorded within a One Mile Radius of the Coyote Springs Project Area

SITE NUMBER	REFERENCE	DESCRIPTION/TEMPORAL & CULTURAL AFFILIATION/COMMENTS
Coyote Range NA143	NPS 2017	1929 Colton home and outbuildings: Historic/Euroamerican
NA150	MNA site files 1916	McMillan Spring: Historic/Euroamerican
NA152	Colton 1932, 1946; Hargrave 1933	Stone house: Pueblo II/Sinagua
NA153	Colton 1932, 1946; Hargrave 1933	Earth lodge: Unknown/Sinagua
NA155/NA5903	Breternitz 1957	Pithouse with stepped alcove entry: Rio de Flag Phase/Sinagua
NA156/NA5902	Hargrave 1933; Breternitz 1957; Dechambre and Dosh 1990	1-room rock-outlined house and sherds: Rio de Flag Phase/Sinagua
NA279	-	No information in MNA site files or AZSITE
NA287	Lutes and Rawson 2016; MNA site files	Coyote Springs and sherds: no other information – no previous NRPH evaluation - site re-recorded by this project
NA1,199	Unknown	No information available regarding this site
NA5,907	Breternitz 1957	Irrigation ditch: Rio de Flag Phase/Sinagua
NA15,312	MNA site files 1977	Spring and house, possibly McMillan: Historic/Euroamerican
NA16,331	Gallagher and Weaver 1978	McMillan Homestead, spring, and spring house: 1886/Euroamerican
NA18,210	Keller 1984; Bremer 1987; Dosh 1991	Habitation: Rio de Flag Phase/Sinagua
NA18,213	Keller 1984; Bremer 1987; Dosh 1991	Large habitation: Rio de Flag Phase/Sinagua
NA19,180	Ambler 1977	Pithouse settlement: Rio de Flag Phase/Sinagua
NA19,882	Colton 1932; Stebbins 1987; McEnany 1989	Habitation: Rio de Flag Phase/Sinagua
NA19,985	Stebbins 1987	Field house: Rio de Flag Phase/Sinagua
NA20,132	MNA site files 1987	Field house: Rio de Flag Phase/Sinagua
NA20,814	Landis 1991	Habitation: Rio de Flag Phase/Sinagua
NA21,816	MNA site files 1989	Lithic and historic scatter; unknown (Archaic?) and Euroamerican
NA21,006	Bremer 1987	Masonry room and pit house: Rio de Flag Phase/Sinagua
NA21,007	Bremer 1987	Artifact scatter: Rio de Flag Phase/Sinagua
NA21,008	Bremer 1987	Three pit houses: Rio de Flag Phase/Sinagua
NA21,009	Bremer 1987	Two pit houses: Rio de Flag Phase/Sinagua
NA26,742	MNA Site files 1976	Weatherford Toll Road: 1920-1938?/Euroamerican
NA30,849	Lutes and Rawson 2016	Artifact scatter: AD 1875-1885/Euroamerican

Notes: Shaded rows indicate sites that were within the current project boundaries; eligibility status provided only for NA287 per the SHPO Survey Report Standards (2016:5) "Identify / highlight those resources within the APE and include eligibility status (including criterion /criteria and recommended or previously determined."

National Register of Historic Places

The National Register of Historic Places (NRHP) lists 63 properties and districts in the Flagstaff vicinity (NPS 2017). Four of these are located within one mile of the Coyote Springs project area: Coconino County Hospital Complex (listed April 30, 1986), Coyote Range (listed May 14, 1984), The Homestead (listed May 27, 1975), and the Museum of Northern Arizona Exhibition Building (listed April 27, 1993). Two of these are listed on Table 2 (Coyote Range / NA143 and The Homestead / AZ I:14:6(ASM) / NA16,331). The Coconino County Hospital Complex and Coyote Range are southeast of the present project area. Several low ridges and dense ponderosa pine forest prevent the present project area from being visible from these two NRHP properties. The Homestead and the MNA Exhibition Building are located north and northwest of the present project area on the campus of the Museum of Northern Arizona. Although the present project area is visible from both NRHP-listed sites, the proposed wetland restoration project will not impact any of the criteria by which these four properties are listed to the NRHP; rather, restoration of the wetland will help restore some of the integrity of setting and feeling to The Homestead, Coyote Range, and the MNA Exhibition Building. The proposed project therefore does not impose any direct or visual impacts to any NRHP-listed sites or districts.

Historic Maps

The Sanborn-Perris Fire Insurance Company mapped Flagstaff in 1890, 1892, 1895, 1901, 1910, 1916, and 1948, but none of the maps included areas north of Sullivan Avenue, several miles south of the present project area (Library of Congress 2017). The General Land Office surveyed T21N, R7E in 1878 (GLO 1879). This map depicts two wagon roads in Section 4 (Figure 4). The Old Beale Road is shown crossing the northern portion of the section (N½ of the N½) and an unnamed road is shown in nearly the same location as the current US 180, extending north from Flagstaff along the Rio de Flag to Fort Valley. Although a spring is shown in Section 5, Coyote Spring is not depicted. Twelve supplemental or resurvey maps by the GLO in T21N, R7E reference specific sections, not including Section 4 or any adjacent section within one mile of the present project area. The Beale Wagon Road (AZ I:14:5[ASM]/AR-03-04-02-1672) was not observed in the present project area. The right-of-way of US 180 (AZ Q:7:74[ASM]) abuts the southwestern edge of the present project area. US 180 in this location is currently configured as a two lane paved highway with a center left turn lane and partial paved shoulders. No physical remains of the historic wagon road was observed in the present project area (the wagon road recorded as Feature 4 of NA287 clearly terminated at Coyote Springs).

Projects and Sites within One Mile of the Project Area. Eleven projects have been conducted within a one mile radius of the project area. Five of these, all inventories of or along US 180, are adjacent to but not within the current project area (1988-99.ASM, 1997-355.ASM, 2003-659.ASM, 2004-716.ASM, and 2012-618.ASM). Eight of these projects are listed in the AZSITE database, and three in the MNA site files. SWCA Project 34852 was a survey of 89 acres of property owned by the Museum of Northern Arizona north of the present project area. The project was conducted for the Museum of Northern Arizona Endowment Foundation as part of an evaluation of the property for potential sale (Lutes and Rawson 2016). Stebbins previously examined this same property in 1987, but no formal report was produced, as the project was for the internal use of MNA. Keller (1984) conducted a survey for a proposed parkway, extending from Gemini Drive on McMillan Mesa to US 180 northwest of the Museum of Northern Arizona campus; the project was never constructed, and the project is not registered with ASM, nor in the AZSITE database.

Three projects (1997-355.ASM, 2003-659.ASM, and 2004-716.ASM) examined portions of the US 180 highway right-of-way, which is documented as site AZ Q:7:74(ASM) – US 180 Historic Alignments in Arizona. Bowler (2012:17) provides a description of US 180 in the vicinity of the Coyote Springs project area:

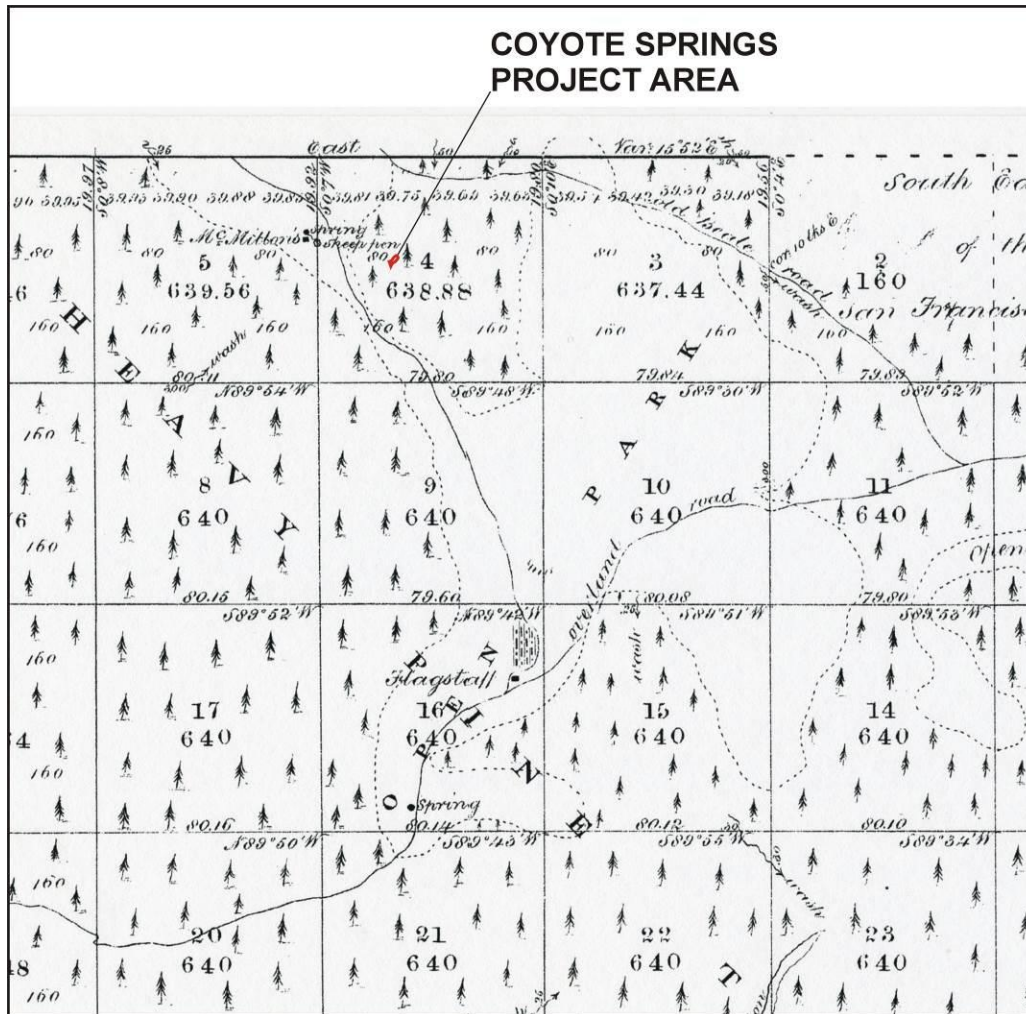


Figure 4. A portion of the General Land Office map of T21N, R7E (1879) showing the location of the Coyote Springs Project Area relative to mapped historic features.

The site is identified as the historic in-use, two-lane US 180 roadway and abandoned segments. The US 180 alignment first appears on a 1938 Arizona Roads map as an unnamed road (Arizona Roads 2012). The current alignment follows the

alignment of a roadway depicted on ADOT ROW plans (SM A-3-T-240) dated September 1941 and labeled the Flagstaff–Fort Valley Hwy. The roadway was realigned in 1981 between MP 220.03 and MP 220.43 (ADOT ROW plans F-067-1-801), and again in 1999 between MP 221.20 and MP 221.75 (ADOT ROW plans F-067-1-806).

The current US 180 alignment is shown on a 1961 Arizona Roads map and is designated State Route (SR) 164. In July 1960, SR 164 became part of the state highway system. Later in 1961, the roadway designation changed from SR 164 to US 180 (Arizona Department of Transportation 2012). Starting at MP 224.00 and continuing westward, US 180 is also known as the —San Francisco Peaks Scenic Road. The roadway was given this designation in March 1990. Only a small portion of the APE (0.6 miles) is located within the scenic road section.

The current alignment of US 180 is in good condition, but has undergone numerous alterations and modifications since the early 1940s, with the addition of medians, sidewalks, curb and gutters, and signage at various locations. The two abandoned segments between MP 220.03 and MP 220.43 and between MP 221.20 and MP 221.75 have either been completely obliterated within the ROW, or modified to the extent that they no longer convey any integrity.

According to the Interim Procedures for the Treatment of Historic Roads (an agreement between FHWA, ADOT, and the State Historic Preservation Office; November 15, 2002), US 180 is recognized as part of

the Historic State Highway System and is thus recommended eligible for inclusion in the National Register of Historic Places (NRHP) under Criterion D, for its information potential pertaining to early transportation in Arizona. The portions of the two abandoned segments located within the APE are recommended to be noncontributing components to the overall eligibility of the site. The proposed project [of AZTEC Engineering in 2012] would not adversely affect the characteristics that qualify historic US 180 for inclusion in the NRHP.

Historic US Highway 180 is not located within the present Coyote Springs project area, but abuts the southwestern edge of the Coyote Springs project area. The current configuration of US 180 incrementally reduces the integrity of feeling of Site NA287, but not to the degree that NA287 would be considered not eligible for the NRHP. Likewise, restoration of Coyote Springs will enhance the integrity of feeling for US 180 by returning the Coyote Springs site area to a pre-1950s condition, thus not adversely affect its eligibility under Criterion (d).

One site (NA287) is located within the current project area, consisting of Coyote Springs, a prehistoric artifact scatter, and five historic/recent features. This site has not been evaluated for ARHP- or NRHP-eligibility prior to this recording. The site was completely re-recorded by the present project, as described in Chapter 3.

CHAPTER 2

Summary of Culture History

North-central Arizona is defined less by boundaries than by the central location within this region of a landmark visible for hundreds of kilometers in every direction: the San Francisco Peaks. This jagged mountain is part of an isolated volcanic field that contains three other volcanic massifs and hundreds of smaller cinder cone vents. During the more recent prehistoric and historic periods the San Francisco Peaks became a place to which peoples of many traditions were attracted. Rather than being on the frontier of adjacent cultures, the San Francisco Peaks fell within the territories of multiple peoples, with many more identifying this feature as part of their sacred landscape. The city of Flagstaff, jointly settled by Mormon and Mexican pioneers in 1876, is located at the base of the mountain, and often lends its name to the north-central region of Arizona. Also within north-central Arizona is Grand Canyon, a canyon of the Colorado River many tribes attribute as, or containing, sacred places associated with creation or emergence into this world. Flagstaff is within the Southwestern cultural region, in which five broad developmental or historical periods have been defined: Paleoindian, Archaic, Agricultural, Protohistoric, and Historic. This terminology is consistent with regional syntheses (Cordell and McBrinn 2012). Dates provided in the following section follow the source format, which may be in radiocarbon years before present (BP), calibrated years before present (cal BP), or correlated with the Christian calendar (BC and AD). Before Present is calculated by convention from AD 1950.

Paleoindian Period

The initial period of human occupation in the Southwest occurred during the Paleoindian period (9500 BC to 8500 BC) and appears to have been intermittent given the limited number of Paleoindian sites. Isolated Clovis points are the most common evidence of Paleoindian occupation (Downum 1993; Hesse 1995; Huckell 1982, 1999). Paleoindian occupations represent a series of distinctive technological innovations in stone tool manufacturing and hunting. Temporally, the Paleoindian period is associated with the terminal Pleistocene era, a significantly cooler and wetter climatic regimen that sustained many animal species that became extinct with the onset of the modern Quaternary era (including but not limited to mammoth, giant sloth, and bison). These species were exploited by dispersed mobile groups that supplemented their diets with collected wild plant materials (Waters 1986). Material remains are typified by well-made spear points, flaked-stone tools, and bone tools. Often the flaked stone is of high-quality, nonlocal material, which further attests to the mobility of the people and the desire for exotic material types (Slaughter et al. 1992). Noticeably absent from the artifact assemblage is ground stone. The two main complexes from the early Paleoindian period include Clovis and Folsom.

The Early Paleoindian period represented continent-wide technological horizons based on apparent specialized hunting strategies. Clovis marks the first universally accepted occupation of the Americas. Clovis people specialized in hunting mammoth and mastodon using a unique suite of stone tools, including a large partially-fluted spear (the Clovis point), blades and blade cores, and crescents, all manufactured using superior technique, materials, and appearance. Due to the sophistication of this technology, the absence of similar technology in regions and time periods preceding the Clovis horizon, and the discovery of stratigraphically earlier deposits at locations in the southeastern North American and in South America, Clovis appears to represent a technological and highly visible innovation of earlier traditions that lacked distinctive characteristics, or visibility.

Clovis is followed by the Folsom horizon, which specialized in the hunting of an extinct species of American bison using a distinctive and completely unrelated lithic technology, despite the superficial similarities of the spear points. Folsom points exhibit a deep hafting flute on both faces that extends the entire length of the blade, with the edges finely retouched into sharp cutting edges, rather than the heavy, piercing design of Clovis points. Folsom tool kits differ from those of Clovis, lacking the blades and blade cores, use of overshot reduction, and crescents. Although Folsom clearly follows the Clovis period, based on radiocarbon dates and stratigraphic positioning, it does not appear to represent a technological development from Clovis. However, some of the succeeding Late Paleoindian traditions (such as Agate Basin and Goshen) do appear to derive from Folsom and Clovis. The Late Paleoindian period is marked by the appearance of regional, rather than continental, traditions, many of which appear to be contemporaneous. Around 6000 BC many of the megafauna became extinct, forcing the Paleoindian peoples to modify their lifeways by hunting smaller game and relying more on foraging (Cordell 1997).

Currently at least 11 Clovis points are known from Coconino County (Huckell 1999), and one stemmed Agate Basin point associated with the Llano Complex has also been found (Peter Pilles, personal communication 1999). Although most finds are limited to isolated projectile-point finds or small camp sites, the Volunteer Prairie area south of Bellemont contains abundant evidence for repeated use during this period (Purcell 2000; Purcell and Tremblay 2008).

Archaic Period

Following climatic amelioration and the extinction of the previously exploited fauna, a new cultural pattern termed the Southwestern Archaic emerged, manifested by small, mobile, residential groups that hunted medium-sized game and foraged for a diversity of floral resources (Huckell 1996). Throughout this lengthy era, the overall subsistence-settlement trend appears to be toward an increased reliance on seasonal gathering, as evidenced by the increased prevalence of grinding tools in the artifact assemblages. This adaptive pattern persisted through the Early (8500 B.C. to 5000 B.C.), Middle (5000 B.C. to 1500 B.C.), and Late (1500 B.C. to A.D. 700) Archaic periods.

The Early Archaic in the southwestern United States is defined by stemmed or serrated projectile points—including Jay and Bajada points—and by one-handed manos and both slab and basin metates (Huckell 1996). Some of the earliest-dated pit structures are associated with this period (Schroedel and Coulam 1994), although evidence of habitation features is absent at most sites.

During the Middle Archaic, highly mobile populations made use of diverse environments including riparian areas, stabilized dune fields, bajadas, and mountain pediment locations (Bayham et al. 1986; Dart 1986; Douglas and Craig 1986; Gregory 1999; Huckell 1984a, 1984b; Sayles and Antevs 1941; Waters 1986). Projectile points of similar style—including Pinto/San Jose points—are encountered across much of the Southwest (Huckell 1996). Sites are generally small and lack dense occupational refuse, elaborate storage facilities, and structures.

The Late Archaic represents a period of substantial change and reflects adaptation to cultigens and a less mobile lifestyle. This change has been attributed to the introduction of maize horticulture, which modified regional subsistence-settlement systems (Huckell 1996). The adaptation of horticulture resulted in decreased residential mobility, and sites during this period were often established in well-watered upland locations or locales along primary or secondary stream courses where crops could be planted (Geib and Keller 2002; Huckell 1996; Mabry 1998).

By the mid-eighth century A.D., and possibly earlier, the Late Archaic cultural pattern in the Flagstaff region gave way to two ceramic-producing agricultural groups: the Northern Sinagua and the Cohonina.

Agricultural Period

The transition from the pure hunter-gatherer economies of the Archaic period to the agricultural lifeways of the Ceramic period occurred among Northern Sinagua and Cohonina groups, whose territories were located northeast and northwest of Flagstaff. The Sinagua occupied the area south and east of the San Francisco Peaks, whereas Cohonina sites are found north and west of the Peaks.

Sinagua

The Northern Sinagua culture has been described as an amalgamation of several cultures, including the Mogollon and Anasazi (Colton 1946; Martin and Plog 1973), whose occupation spanned from the Mogollon Rim above Sedona, northeast to the Little Colorado River near Winslow (Colton 1946). The Northern Sinagua occupation of the Flagstaff area began with small pithouse settlements that contained a distinctive brownware pottery (Pilles 1996). The eruptions of Sunset Crater in the AD 1060s truncated the Northern Sinagua occupation and likely resulted in a brief exodus from the Flagstaff area. After the eruptions ceased and plant and animal life was restored, the Flagstaff area is thought to have experienced a population increase (Colton 1960; Fish et al. 1980; Pilles 1979). This post-eruption occupation apparently consisted of a mix of returning local groups as well as an influx of nonlocals who brought with them elements of the Anasazi, Mogollon, and Hohokam cultures (Colton 1946; Fish et al. 1980). In the late eleventh century, Sinagua pithouses exhibited similarities to those present in the Mogollon and Hohokam areas; Hohokam influence is further expressed by the presence of ballcourts in the region (Fish et al. 1980). After AD 1150, masonry pueblos, such as Ridge Ruin, were the most common residential units of the Northern Sinagua. The largest pueblos, dating from the thirteenth and fourteenth centuries, exceeded 1,000 rooms. By AD 1400, the Northern Sinagua region was depopulated (Landis 1991, 1993).

Cohonina

The Cohonina occupied a territory extending northeast, north, and west, of the San Francisco Peaks. The Cohonina culture was initially defined as a Patayan branch by Colton (1939a, 1939b) based on the distribution of San Francisco Mountain Gray Ware, the primary Cohonina pottery type. Subsequent researchers argue that the Cohonina were more closely related to the Kayenta Anasazi of northeastern Arizona (Cartledge 1979; Euler and Green 1978; Sullivan 1986). Based on ceramic cross-dating and tree-ring dates, the Cohonina occupation extended approximately from the mid AD 700s– AD 1200.

Cohonina sites exhibit a confusing architectural pattern that suggests seasonal occupation of many sites. The “patio houses” and shallow pithouses defined by McGregor (1951) at sites in grasslands and pinon-juniper woodlands between Williams and Grand Canyon were thought to be typical until Cohonina sites with substantial masonry walls were documented at much higher elevations in ponderosa pine forest on the Kaibab National Forest (Cartledge 1979). The Cohonina may have moved between substantial winter dwellings where firewood was plentiful to summer residence in areas better suited for agriculture. The importance of domesticated crops in Cohonina subsistence is debated, however (McGregor 1951; Sullivan 1986).

Protohistoric Period

Few sites can be confidently assigned to the Protohistoric period, which postdates the terminal Sinagua and Cohonina occupations and predates the earliest Spanish, Mexican, and Euro-American intrusions into Arizona. At least two Yuman-speaking tribes, the Havasupai and Hualapai, made use of lands surrounding Flagstaff during the Protohistoric period. Yavapai groups also likely used the area during this time, but probably to a lesser extent as the Yavapai were bitter enemies of the Hualapai and Havasupai.

Although the Navajo occupied an area just west of the Little Colorado River during the 1820s (Begay and Roberts 1996), their territory generally incorporated lands further east. Given the close affinity between the Yavapai and Apache tribes, Western Apache groups may have sporadically occupied areas near Flagstaff as well; however, the only published evidence of an Apache site in the Flagstaff area comes from an undated Apachean roasting pit on the Coconino National Forest (Gilpin and Phillips 1998).

Historic Period

The earliest European influence occurred when several Spanish expeditions traveled through the region and Spain claimed the Southwest. The Hopi were first visited by Oñate's expedition in 1604, and by 1630 the Spanish had established three missions among the Hopi villages (Scurlock 1991). By 1640, a Spanish mission was established in Zuni, and the Colorado Plateau became sparsely occupied by Spaniards. Spanish presence in northern Arizona decreased after the Pueblo Revolt in 1680; missionaries were killed and churches destroyed, in response to the harsh treatment Native Americans had suffered at the hands of the Spanish. After a lengthy period of colonial occupation, the area now recognized as Arizona became part of the newly independent Mexico in 1822 (Officer 1987).

The region that eventually became Arizona was acquired by the United States as part of New Mexico Territory during the Mexican War, which concluded with the formal ceding of Texas, New Mexico Territory, and California Alto to the United States under the Treaty of Guadalupe Hidalgo in 1848 (Officer 1987). In 1854, the portion of Arizona south of the Gila River was added to the territory through the Gadsden Purchase, but Arizona was not organized as a separate territory until 1863. A series of expeditions across northern Arizona followed the discovery of gold at Sutter's Mill, California in 1848, a rumor dramatically confirmed when Lt. Edward F. Beale dumped a bag of gold nuggets on the desk of the United States President after having personally carried them to Washington from California (Trimble 1986:231). Sitgreaves (1851) and Whipple (1854) scouted the 35th parallel for a possible emigrant route to California, both traversing the Flagstaff area on their way to the Colorado River. Beale followed in 1858–1859, his party mounted in part on camels, surveying and constructing the wagon road that came to bear his name and that was intended as the precursor to a transcontinental railroad line. The Beale Wagon Road opened the area surrounding the San Francisco Peaks to further exploration and settlement (Cline 1976).

Euro-American settlement of the Flagstaff area began with the two “Boston Parties” in 1876, which failed to establish a permanent presence but are often credited with building a flagpole on July 4, 1876 by which Flagstaff was named (Barnes 1988; Cline 1976:75). A few individual settlers (Thomas F. McMillan, Frank Hart and Charles O'Neill) who later helped to establish Flagstaff also arrived in the area about this time (Cline 1976:75). In 1877, the Mormon colonists in the Little Colorado valley near present day Winslow established a cabin at Fort Valley (Leroux Spring) and the Mormon Dairy at Mormon Lake in 1879. During the 1870s sheep men from California began to use the Flagstaff area after a serious drought, bringing many settlers, including Basque shepherders (Cline 1976; Stein 1991). Cattle ranchers soon followed, including the Babbitt Brothers, five brothers who established the C.O. Bar ranch north of Flagstaff, which remains one of the largest working ranches in the west.

CHAPTER 3

Description of Site NA287

Field No: CS-1
Site Type: Artifact Scatter with Features
Cultural Affiliation: Sinagua or Cohonina/Euroamerican
Temporal Affiliation: Agricultural – Rio de Flag Phase (A.D. 900-1070)/Historic – (1930s-present)
ARHP/NRHP Eligible: No

NA287 was first recorded in 1921 by Harold S. Colton as a “spring with sherd area.” AZSITE provides only a plot and UTM coordinates of 0439928 mE, 3899016 mN (Zone 12, NAD 83), which is 8 m east and 36m south of the UTM locator for this project. The site contains a sparse surface scatter of sherds, lithics, and artifacts of industrial manufacture, and five historic or recent features (Figure 5). The features, described in detail below, consist of two constructed spring containers or cisterns (Features 1 and 2), a rock-lined pit (Feature 3), a segment of a road (Feature 4), and a cobble-edged trail (Feature 5).

The prehistoric artifacts are located east, south, and west of, and directly adjacent to Feature 1. These consist of one unidentified Little Colorado White Ware sherd, approximately 10 Rio de Flag Brown sherds, and 15 San Francisco Mountain Grey Ware sherds, suggesting a Cohonina or Sinagua presence. The maximum density of sherds is 10/m². One biface thinning flake of fine grained black volcanic rock, one unmodified piece of obsidian, and two manuport fragments of unmodified Coconino Sandstone are also present at a maximum density of 1/m². There are no other prehistoric artifacts visible on the surface and no visible prehistoric features. Bedrock crops out immediately north of Feature 1 (Figure 6). The area to the west, south and east of Feature 1, containing the artifact scatter, has soil of undetermined depth, but we would not anticipate the presence of a habitation in immediate proximity to a spring. The spring likely provided water to the many habitations in the vicinity (Table 2) and the artifact scatter represents items lost during visits to obtain water. One recent aluminum beer can and a shard of glass are also present between Features 1 and 2.

Feature 1

Feature 1 is a historic malpais spring house that was built below the edge of an old basalt flow using locally available cobbles and small boulders. The building is square, averaging 115 inches on each side at ground level (but with some variation due to the cobble shapes), built in the form of a barrel arch with the door in the center of the west elevation. From ground surface, the top of the spring house is 48 inches on the west and 30 inches on the east. The stones used in its construction are graded from largest at ground level to smallest and more tabular in form on the roof. The masonry is heavily covered with lichens like the surrounding bedrock, and mortared with coarse Portland cement. Some of the stones on top have fallen or been pulled out, but there are no holes that penetrate to the interior, other than the door and the outlet pipe. The current door and jamb is a recent dimensional lumber replacement for another wooden door that was kicked in one to two years ago; the remains of this door are scattered to the east and southeast of the feature. The doors are frequently damaged or removed by curious visitors or by homeless people seeking water, and have been replaced many times (Sat Best, personal communication, 2016). The door threshold is two large, tabular basalt boulders. Underneath the northern edge of the threshold is a 4-inch ceramic pipe, broken at the end, from which the spring water exits the spring house into a constructed channel 16 inches from the front of the structure. The front wall is 11-16 inches thick, averaging 12 inches. The spring house interior is plastered with concrete which shows the 7-inch-wide

boards used as forms. These were laid east-west (72° - 252° at 10.5° E declination) and were apparently secured with iron strapping or flat rebar, some of which is incorporated within the ceiling and is visible in several spalls. Most of the interior exhibits no spalls or cracks and is in very good condition overall. The interior measures 84 inches by 84 inches and 21 inches from the door threshold to the bottom of the tank.

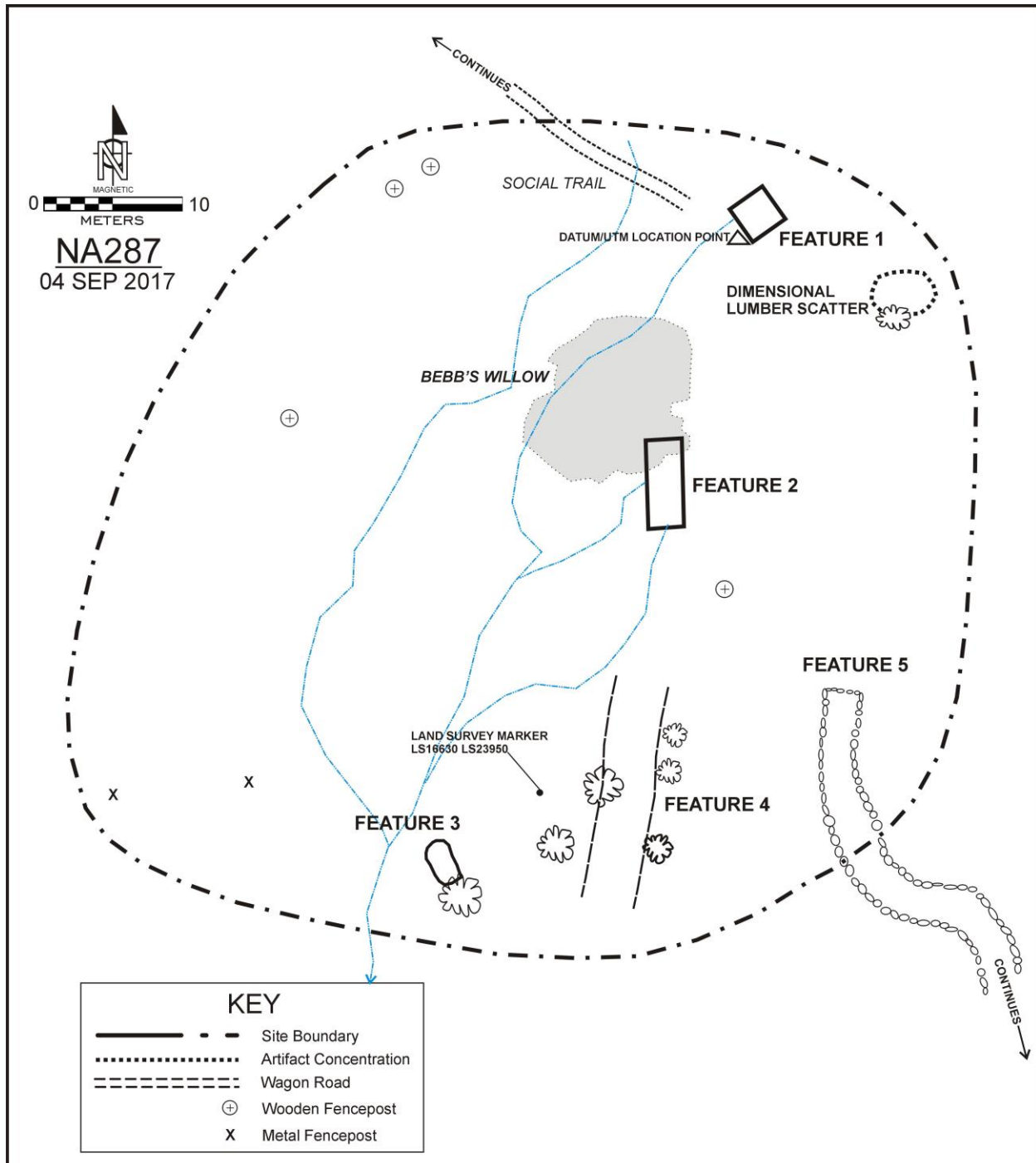


Figure 5. GPS map of Site NA287

This was probably intended to be 24 inches deep, as the bottom contains silt and a large pile of cobbles that have been dumped inside. The water level is currently 19 inches deep, and an aluminum ruler screwed to the west wall to the left of the door monitors the depth. The door jambs were secured with square machine-cut nails, several of which are scattered around the front of the spring house. A large piece of broken concrete slab to the west of the door may have originated from Feature 2.



Figure 6. Site NA287 Feature 1 front elevation

Feature 2

Feature 2 is a poured concrete spring box/cistern southeast of Feature 1, oriented to 20-200 degrees. Feature 2 measures 213 inches in length and 81 inches in width at the top, which is a separate slab 8½ inches thick that extends 2 inches beyond the walls of the lower tank. The top was reinforced with wire mesh and lengths of ¾-inch copper pipe. Access to the interior is through an opening in the top, covered by a poured concrete slab measuring 22½-inches by 25½ inches and 3½ inches thick. Cast into the center of the access slab is a U-shaped iron handle made from metal 1½ inches wide and ¼-inch-thick. The handle opening is 4 inches by 1½ inches, through which a length of chain has been secured by a padlock. The end of the chain once was secured to the top of the feature by a loop of rebar cast into the top, but this is now broken. The feature is heavily overgrown by Bebb's willows, the largest of which is located at the north end and covers more than half of the feature; a smaller willow is growing at the southeastern corner. The concrete in the feature lid and walls is disintegrating, with many broken edges along the top and a hole near the southeastern corner into the interior. Water inside is 66 inches deep in this location. The

spring formerly emptied into a channel below the southern end of the tank, but the western wall of the tank has failed near the center, and the spring water now exits in this location.



Figure 7. Site NA287 Feature 2 east elevation

Feature 3

A rock-lined pit south of Features 1 and 2 was documented as Feature 3. The pit is now an average of 4 feet wide and 10 feet long and appears to have once been rectangular, but is now more oval in shape as a result of deterioration of the walls. The walls slope to the interior, about 2 feet in width at the bottom, which is 24 inches deep at the southeastern end. The pit is oriented 162-342 degrees and is entirely lined with basalt boulders. Some of these have been displaced and cast into the bottom of the pit, which also contains the remains of a recent children's play house made of branches and sticks. The pit is located about 15 feet outside of the barbed wire fence that surrounded Features 1 and 2. The dry remains of a channel extend from the main spring water channel to the pit, which appears to have been constructed as a horse or stock watering trough, to prevent contamination of the springs. The pit is currently dry, and partially filled with pine debris.

Feature 4

Feature 4 is the faintly visible remains of a road that extended from Fort Valley Road north to Features 1 and 2 on a north-south alignment. South of Feature 2 and east of Feature 3 the road climbs a low basalt flow, on an alignment of 10 degrees. In this location, the road bed was cleared of cobbles and boulders,

which were piled in a windrow along the west edge of the road, which is 11 feet in width here. One boulder in this location has concrete adhering to the upper surface, suggesting that something had been mortared in place, or that the rock had been used as a construction stone elsewhere. South of this location, the ground slopes gently down and the road is barely visible, although wheel ruts 60 inches apart on center and 1-4 inches deep are visible in several places. The road does not extend north of the spring, and it is apparent that this developed to provide access to Coyote Springs, and is not part of a wider transportation network.

Feature 5

The remains of a cobble-lined footpath were documented as Feature 5. It originates in the direction of the Coyote Springs residential development to the southeast, and ends near Feature 2. The path has been cleared of loose stones, and is defined by basalt cobbles and boulders that form continuous alignments along both sides. In several places, smaller ponderosa pines were incorporated into the alignment; as these are 20-50 years of age, suggesting a relatively recent date of construction for the path. The former Facilities Manager of MNA confirmed the trail was constructed circa 1997 in association with the development of the Coyote Springs neighborhood (Sat Best, personal communication, 2017). The path varies in width from 28-84 inches and it winds around trees and other obstacles. The path is overgrown and filled with pine duff, and does not appear to be actively used. The northwestern end of the trail is marked by a line of cobbles across the path, between the border alignments, which end here, approximately 60 feet southeast of Feature 2.

Site History

Thomas F. McMillan (1833-19065) was one of the earliest (and possibly THE first) Euroamerican settlers of the Flagstaff area, arriving in May 1876 (Cline 1976:75, 77, 92-96). After settling in three other locations near Flagstaff, McMillan built a two story log cabin now known as “The Homestead” in 1886 (Cline 1976:93). This property is located on the grounds of the Museum of Northern Arizona. The exterior of the house was clad in white clapboard in 1888 by McMillan when he married. After his death in 1906, the house deteriorated until Harold S. and Mary Russel Ferrell Colton bought it and restored it (Wilson 1975). The Homestead was the Colton’s residence until Coyote Range was completed in 1929 (Eberhardt [1983] states that the Coltons resided in Blue Jay House near Coyote Range 1928-1929). The Coltons acquired a number of parcels totaling 100 acres along both sides of the Rio de Flag (Eberhardt 1983), many of which had been part of the McMillan sheep ranch, including the parcel containing Coyote Spring.

Harold S. Colton recorded the site as NA287 in 1921, although he may have previously assigned it site number NA150, due to confusion regarding the names of the several springs on the Colton’s property. At this time, the site consisted of Coyote Spring and a “sherd area.” The Coltons developed the portion of their property east of Fort Valley Road as a farm and ranch in the 1930s (Eberhardt 1983). During the period 1934-1936 the Museum Exhibition building was constructed on the opposite side of the road on 32 acres of land donated by Mrs. Colton (Bartlett 1979). In 1932 Mary-Russel F. Colton applied to the State Land Department for water rights to Coyote Spring, which was described on the application as “Coyote Spring Drain and Coyote Range storage tank.” The application was for domestic use of the water from the spring, which was reported to produce “about 1000 gals. per day” and that the “spring has been used by claimant since 1932” (State Land Department Water Division Application No. A-3216). In this same year, the Coltons constructed a 1500 gallon reservoir and a pipeline of 1 inch galvanized pipe to supply Coyote Range, the various outbuildings, and the farm, according to the application. The reservoir is not further described, but is probably the malpais spring house recorded as Feature 1. Due to complaints from

downstream users of the Rio de Flag water, Mrs. Colton had to refile her water rights claim September 22, 1952. On the permit issued in 1953, it noted that the spring was developed in 1906 by Mr. Henry C. Lockett “who developed and used this water for domestic purposes.” In 1952, the system included a “Spring House 9’ x 9’ x 3’ deep (Stone masonry with arched roof), 1—3” outlet, 14 4” overflow, 1—4” drain,” which is Feature 1, and a “Sump and valve box, 6’ x 17’ x 6’ deep, concrete with 2” outlet pipes,” which describes Feature 2 (Permit No. A-2237). Lockett’s development may be the rock-lined stock tank documented by this project as Feature 3. The Certificate of Water Right was not finalized until January 3, 1961, when it was issued to Mrs. Colton.

The farm operated from the mid-1930s until 1941, when Mrs. Colton donated 20 acres to the Museum as the location of the Research Campus; many of the farm buildings were remodeled and repurposed as part of the research program (Bartlett 1979). An additional 13.98 acres were donated by Mrs. Colton in 1945, and 11.38 acres were added by Mrs. Colton in 1955 (Breunig 1981). The parcel containing Coyote Spring (Parcel “G”) was willed by Mrs. Colton to MNA in 1972, and is the 51.86 acres that also includes the Coyote Range complex.

CHAPTER 4

Management Recommendations

The inventory of the Coyote Springs project area identified one archaeological site and no (zero) isolated occurrences of cultural materials. Site NA287 contains an Agricultural Period and Historic Period artifact scatter and five features of Historic and Recent age. The site was evaluated for ARHP- and NRHP-eligibility and for potential adverse effects of wetland restoration.

Arizona and National Register of Historic Places Eligibility

The criteria of eligibility for listing properties in the National Register provide a means for evaluating whether cultural resources merit protection from the impacts of the proposed undertaking (36 CFR Part 800). The quality of significance of archaeological sites and buildings in relation to American history, architecture, archaeology, and culture can be evaluated through their integrity of location, design, setting, materials, workmanship, feeling, and association, and by at least one of four specific criteria: (a) association with events that have made a significant contribution to the broad patterns of our history; (b) association with the lives of persons significant in our past; (c) embodiment of the distinctive characteristics of a type, period, or method of construction, or representing the work of a master, or possessing high artistic values, or representing a significant and distinguishable entity whose components may lack individual distinction; or (d) having yielded, or having the likelihood to yield, information important in prehistory or history (36 CFR 800.10[a]). These criteria are modified by several additional considerations (36 CFR 800.10[b]), most important of which is the requirement that significant resources must be at least 50 years old unless they are of exceptional importance (Criteria Consideration G).

The NRHP requires that the significance of the site's association with Criteria (a)-(d) be specified, which is why at the survey level of documentation, most archaeological sites contain evidence that bears on their association with Criterion (d), although they could also meet Criteria (a), (b), or (c). Under Criterion (a), a wagon road may be significant for its association with the U.S. military, with politics or government policy, or with the theme of transportation (Stein 1994:50). Sites may be associated with all types of events; however, the association of a wagon road with Criterion (a) must go beyond mere association to the specific association of that site with the event or trends in history (Little et al. 2000:22). As with Criterion (d), this requires that a context be developed to clearly elucidate the association and its significance. "Criterion D most commonly applies to properties that contain or are likely to contain information bearing on an important archaeological research question ... [and] must have characteristics suggesting the likelihood that it possesses configuration of artifacts, soil strata, structural remains, or other natural or cultural features that make it possible to" test important research questions, recover data pertinent to existing data bases pertinent to specific questions, or explain the sequence of occupations in the archaeological record (Garrison 1998). The significance of the association must be formulated in terms of specific research questions identified within the context of previous research and a methodological orientation.

Lastly, application of the seven aspects of integrity requires assessing which essential physical features must be present to represent this significance (using aspects appropriate to the criteria), determine whether these features are visible enough to convey their significance, determine if the site needs to be compared with similar properties, and determine which of the aspects of integrity are vital to the property and if they are present (Table 3). Under Criterion (d), archaeological sites should be evaluated for integrity of location and materials; in this instance, location being the place at which the event occurred,

and materials being the direct, undisturbed association with artifacts and samples (Garrison 1998). Historic roads are also subject to a test of integrity of feeling, as previously used to evaluate segments of Route 66 (Cleeland 1988), in which road segments visually truncated by more recent landscape modifications within site of the horizon are not considered eligible under Criterion (a).

Table 3. Application of Integrity to Property Types by Criterion of Association (after Garrison 1998).

CRITERION	PROPERTY TYPE			
	<i>District</i>	<i>Structure</i>	<i>Site</i>	<i>Object</i>
(a)	L, S, M, F, A	L, M, F, A	L, S, F, A	M, F, A
(b)	L, S, M, A	M, F, A	L, S, A	M, F, A
(c)	S, D, F, M	D, W, M, F	S, D, F	D, W, M, F
(d)	L, M	W, M	L, M	W, M

Note: Location, Design, Setting, Materials, Workmanship, Feeling, Association

Museum of Northern Arizona recommends that NA287 is not eligible to the Arizona and National Registers of Historic Places under any criterion. The site is in fair condition and retains integrity of location, design, setting, feeling (partial, some having been lost to the construction of The Peaks Senior Center), and association. The prehistoric component has been impacted to an undetermined degree by the construction of the historic component, including channelization of the spring outflow and alteration of the wetland. As noted in the site description, Sinagua habitations are unlikely to be present so close to a spring, and the sparse artifact scatter present on the site probably represents items lost by the residents of nearby habitations during visits to the spring to obtain water. Buried features are considered unlikely to be present at this site, in part due to the shallow soil as evidenced by the adjacent bedrock outcrop.

The older historic component (Features 1, 3, and 4) is in fair condition. Feature 3 may have been constructed by Henry Lockett in 1906 after he purchased the property from the estate of Thomas McMillan. Feature 4 may also date to this time, but could be as old as 1886, when The Homestead was constructed. Feature 1 was built in 1932 by the Coltons as part of their farming activities on the former McMillan ranch. Feature 1 routinely experiences minor vandalism, but the masonry fabric of the structure is in good condition; only the wooden hardware (door, jambs, and lintel) has been affected. Feature 3 exhibits natural erosion and has been impacted by some rearrangement by children playing. It is in fair condition. Feature 4 is only visible in a few locations where it crosses bedrock or where wheel ruts are visible. The rest of the road surface is covered by pine duff and vegetation, and aggrading soils. Feature 4 is in fair condition. The newer historic component of the site is in poor condition (Feature 2). Feature 2 was constructed before 1952. Feature 2 is partially collapsed, which has breached the cistern and disrupted the spring channel flow into a new channel. The concrete walls and lid of Feature 2 are in an advanced state of decay, which is beyond repair. Lastly, Feature 5 appears to be a recent addition to the site that is a non-contributing element that has not yet achieved 50 years of age and is not considered to be of exceptional significance. Feature 5 was constructed as part of the Coyote Springs residential development circa 1997, according to the former Facilities Manager of the Museum of Northern Arizona (Sat Best, personal communication, 2017). The association of the features with important early residents of Flagstaff (Thomas McMillan, Henry Lockett, and Harold S. and Mary Russel-Ferrell Colton) is not significant, and other sites listed to the National Register of Historic Places (The Homestead, The Museum of Northern Arizona Exhibition Building, Coyote Range) better commemorate their contributions to local history.

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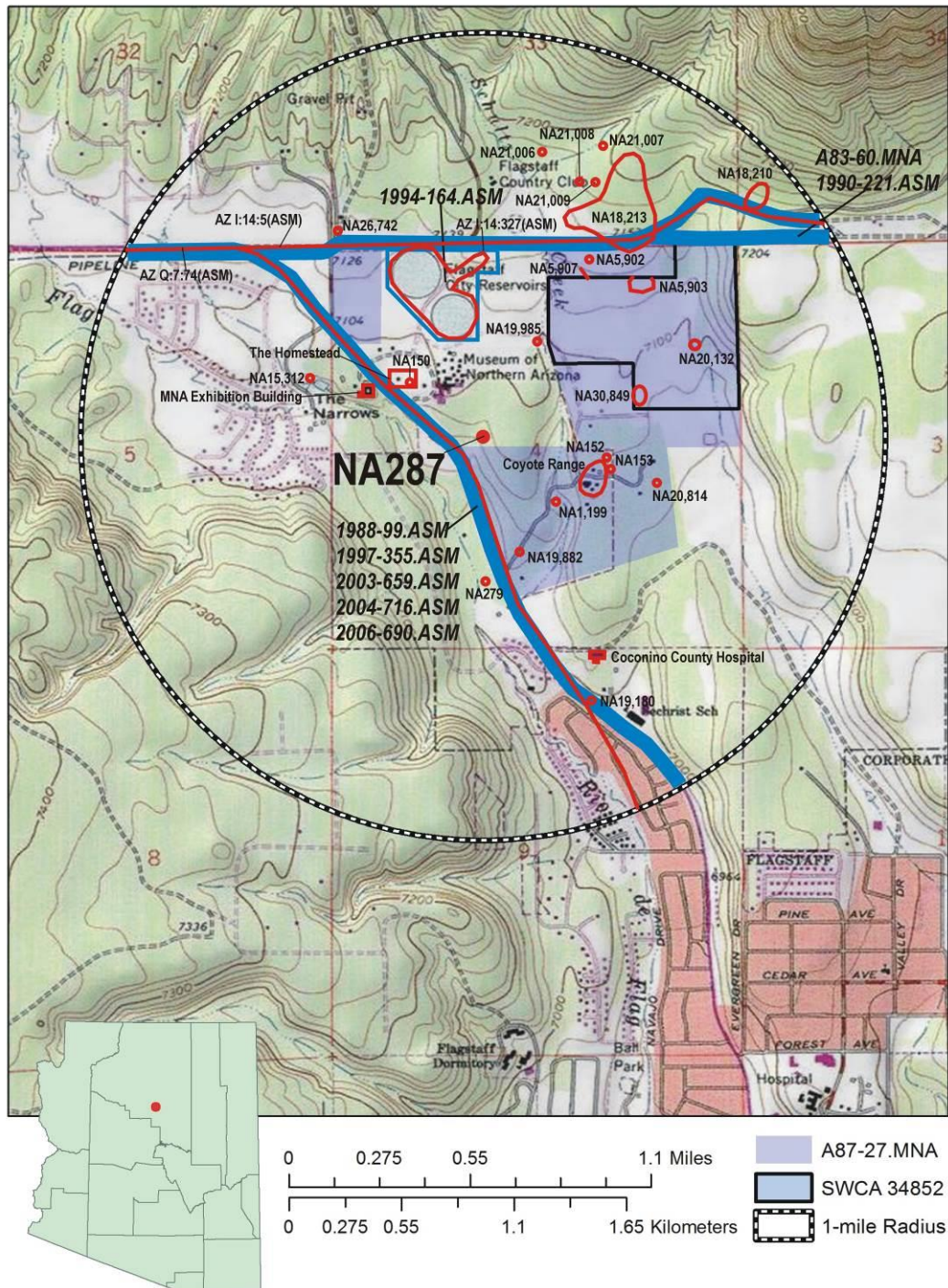
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APPENDIX A: PREVIOUS PROJECTS AND SITES WITHIN ONE MILE



Coyote Spring

Survey Summary Report, Site ID 827

Location: The Coyote Spring ecosystem is located in Coconino County in the Canyon Diablo Arizona 15020015 HUC, managed by the private US owner. The spring is located at 35.232722, -111.660311 in the Flagstaff West USGS Quad, measured using a GPS (WGS84, estimated position error 2 meters). The elevation is approximately 2154 meters. Workshop participants, Larry Stevens, and Jeri Ledbetter surveyed the site on 6/08/11 for 01:15 hours, beginning at 13:15, and collected data in 9 of 12 categories.



Fig 1 Coyote Spring: Panoramic view of the site

Physical Description: Coyote Spring is a hillslope/helocrene spring. This is a small hillslope spring that has been developed 200 m from highway 180 near a residential area. Two of the sources have been enclosed in a spring box. This is one of the last functioning springs in the San Francisco Peaks area. It was used as a homestead and pasture in the 1930s. The microhabitats associated with the spring cover 475 sqm. The site has 2 microhabitats, including A -- a 75 sqm channel and B -- a 400 sqm low gradient cienega. The geomorphic diversity is 0.19, based on the Shannon-Weiner diversity index.

Coyote Spring emerges as a seepage or filtration spring from an igneous, basalt rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 399 meters. The site receives approximately 100% of available solar radiation, with 7333 Mj annually.

Survey Notes: Spring was surveyed on a warm, sunny, breezy day. Some litter and trash was found at the site along with old fencing and barbed wire on the ground.

Table 1 Coyote Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value	Comments
Alkalinity, Total (mg/L)	89.33333333	1 inch "M"
Dissolved Solids (field)	0.2	1 inch "M"
pH (field)	10.24666667	1 inch "M"

Specific conductance (field) (uS/cm)	348.666666667	1 inch "M"
Temperature, air C	25.4	
Temperature, water C	14.5	1 inch "M"

Flora: Larry Stevens was the botanist. Surveyors identified 30 plant species at the site, with 0.0632 species/sqm. These included 17 native and 11 nonnative species; the native status of 2 species remains unknown.

Table 2 Coyote Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	22	8
Shrub	6	1
Mid-canopy	1	0
Tall canopy	1	0
Basal	0	0
Aquatic	0	0
Non-vascular	2	1

Table 3 Coyote Spring Vegetation % Cover in Microhabitats.

Species	Cover Code	Native Status	Wetland Status	A	B
Achillea millefolium	GC	NI	U	1.1	8
Agoseris	GC		U	0	0.01
algae	NV	N		0	1
Brassica	GC	I	F	0	0.11
Carex	GC	N		8	20
Carex nebrascensis	GC	N	W	45	26
Erigeron	GC	N	F	0	0.11
Iris missouriensis	GC	N	F	10	5
Koeleria macrantha	GC	N	F	1	22
Lathyrus	GC	N	R	0	0.01
Lichen	NV	N	U	1	3
Linaria dalmatica	GC	I	F	0	0.2
Medicago lupulina	GC	I	WR	0	3.1
Melilotus	GC	I	WR	0	0.4
Mimulus	GC	N	W	10	0
Onopordum acanthium	GC	I	WR	0	0.4
Opuntia phaeacantha	SC	N	U	0	0.1
Phleum pratense	GC	I	F	0	0.2
Pinus ponderosa	MC	N	F	1	12
Pinus ponderosa	SC	N	F	1	8
Pinus ponderosa	TC	N	F	0	7
Poa pratensis	GC	I	F	13	85
Potentilla	GC	N	F	0	8
Quercus gambelii	SC	N	F	0	1.1
Rosa woodsii	SC	N	F	1	2.5
Rumex	GC	I	WR	0	0.11
Salix lasiolepis	SC	N	R	5	16

Sambucus	SC		F	0	0.3
Sidalcea neomexicana	GC	N	WR	18	8
Stephanomeria pauciflora	GC	I	U	0	0.01
Tragopogon dubius	GC	I	F	0	0.2
Verbascum	GC	I	F	0	0.61

Fauna: Surveyors collected or observed 1 aquatic and 8 terrestrial invertebrates and 7 vertebrate specimens.

Table 4 Coyote Spring Invertebrates.

Species	Lifestage	Habitat	Method	Rep#	Count	Species detail
Coleoptera Hydrophilidae		A				
Lepidoptera Hesperidae Erynnis meridianus		T				
Lepidoptera Hesperidae Thorybes pylades	Ad	T			1	
Lepidoptera Lycaenidae Callophrys		T				
Lepidoptera Nymphalidae Junonia coenia		T				
Lepidoptera Papilionidae		T				
Lepidoptera Pieridae Colias eurytheme		T				
Odonata Coenagrionidae Argia vivida	Ad	T				mating adults
Trichoptera Limnephilidae						species 1
Trichoptera Limnephilidae						species 2

Table 5 Coyote Spring Vertebrates.

Species Common Name	Count	Detection
common raven	1	obs
western bluebird	1	obs
elk	4	sign
vole		obs
Wandering Gartersnake	2	obs
American crow	1	obs
pygmy nuthatch	4	obs
dark-eyed junco	2	obs
pine siskin	10	obs
Steller's jay	1	obs
violet-green swallow	1	obs
American robin	1	obs
broad-tailed hummingbird	1	obs
black-tailed jackrabbit	1	obs

Assessment: Assessment scores were compiled in 6 categories and 9 subcategories, with 33 null condition scores, and 33 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is moderate risk. Geomorphology condition is good with significant restoration potential and there is moderate risk. Habitat condition is good with significant restoration potential and there is moderate risk. Biotic integrity is good with significant restoration potential and there is moderate risk. Human influence of site is moderate with some restoration potential and there is high risk. Administrative context status is good with significant restoration potential and there is moderate risk. Overall, the site condition is good with significant restoration potential and there is moderate risk.

Table 6 Coyote Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.17	3.5
Geomorphology	4	3.2
Habitat	4	3.2
Biota	3.88	3.25
Human Influence	3.67	3.88
Administrative Context	4	3.11
Overall Ecological Score	4.01	3.29

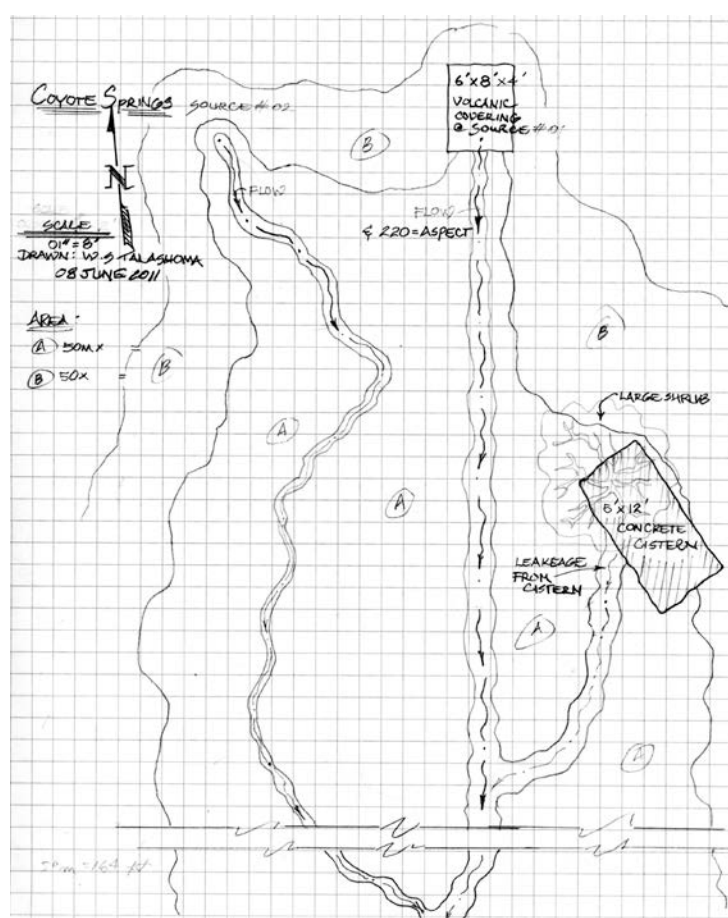


Fig 2 Coyote Spring Sketchmap.



Owner History

To display a specific ownership in details, select this owner from the history list.

Count of records: 1

	#	Owner	Owner status	Instrument	Recording date	Price(\$)
View	100	MUSEUM OF NORTHERN ARIZONA	inactive	2165778	10/29/1998	0

Details of the selected parcel

Parcel No.	11101005C
Status	canceled
Created for tax roll	2007
Canceled for tax roll	2007
Previous Parcel (history records)	
Situs addr	
Surv. Book	0
Surv. Page	0
Surv. Case	0
Surv. Map	0
Surv. Instrument	
Subdivision	
Lot	
Block	
Portion	
Section	4
Town	21N
Range	07E
Tax area code	
Miscel. parcel info	PER WD 3040260 DTD 2-23-00 SPLIT 111-01-005C TO CREATE 111-01-005D (785,355.60 SF., 18.03 AC) & REMAINING PORTION TO CITY OF FLAGSTAFF (.08 AC)

Previous Parcels

Previous parcels (Split Record – This table shows the parent parcel(s) this parcel was created from.)

Prev parcel #	Check digit
11101005B	5

- Parcel

Click this button to display the previous parcel in the sequence of parcel numbers

Owner History

To display a specific ownership in details, select this owner from the history list.

Count of records: 1

	#	Owner	Owner status	Instrument	Recording date	Price(\$)
View	100	MUSEUM OF NORTHERN ARIZONA	active	1082976	4/11/1986	0

Details of the selected parcel

Parcel No.	11101006C
Status	active
Created for tax roll	2007
Canceled for tax roll	0
Previous Parcel (history records)	
Situs addr	3100 N FORT VALLEY RD, ZIP 86001
Surv. Book	0
Surv. Page	0
Surv. Case	0
Surv. Map	0
Surv. Instrument	
Subdivision	
Lot	
Block	
Portion	
Section	4
Town	21N
Range	07E
Tax area code	
Miscel. parcel info	

Previous Parcels

Previous parcels (Split Record – This table shows the parent parcel(s) this parcel was created from.)

Prev parcel #	Check digit
11101006B	8

Surface Water (for given location)

NAME: COLTON, MARY R F

App. No.	File Status	Permit No.	Certificate No.	File Date	Priority Date	County	Water Source	WaterShed
4A-3216.0	ACTIVE - ACTIVE	2237.0	2919.0	9/22/1952	9/22/1952	COCONINO	COYOTE SPRING	LITTLE COLORADO RIVER
Land Owner	Location			POD/POU		Water Uses		Quantity
PRIVATE	SE NW 4 21N 7E			Point of Diversion		DOMESTIC		365,000.00 GPA
	NE SW 4 21N 7E			Place of Use				
	NW SE 4 21N 7E			Place of Use				

NAME: LEWICKY, ROMAN T

App. No.	File Status	Permit No.	Certificate No.	File Date	Priority Date	County	Water Source	WaterShed
38-84403.0	ACTIVE - ACTIVE			5/27/1980	12/31/1950	COCONINO	SAN FRANCISCO PEAKS RUN	LITTLE COLORADO RIVER
Land Owner	Location			POD/POU		Water Uses		Quantity
PRIVATE	NE 4 21N 7E			Place of Use		STOCK		5.00 AFA
						WILDLIFE		

NAME: LOCKETT, HATTIE M

App. No.	File Status	Permit No.	Certificate No.	File Date	Priority Date	County	Water Source	WaterShed
4A-3208.0	ACTIVE - ACTIVE	2241.0	2008.0	7/30/1952	7/30/1952	COCONINO	RIO DE FLAG WASH	LITTLE COLORADO RIVER
Land Owner	Location			POD/POU		Water Uses		Quantity
PRIVATE	4 21N 7E			Point of Diversion		ANNUAL USE		300,000.00 GPA
	NE SW 4 21N 7E			Place of Use		STOCK		
	NW SW 4 21N 7E			Place of Use		STOCK		

App. No.	File Status	Permit No.	Certificate No.	File Date	Priority Date	County	Water Source	WaterShed
4A-3217.0	ACTIVE - ACTIVE	2242.0	2009.0	9/23/1952	9/23/1952	COCONINO	VEIT SPRING	LITTLE COLORADO RIVER
Land Owner	Location			POD/POU		Water Uses		Quantity
PRIVATE	E2 SE 4 21N 7E			Point of Diversion		ANNUAL USE		150,000.00 GPA
	NW SW SW 3 21N 7E			Place of Use		DOMESTIC		50,000.00 GPA
	SW SW SW 3 21N 7E			Place of Use		STOCK		
	SE SE SE 4 21N 7E			Place of Use				
	NE SE SE 24 21N 7E			Place of Use				

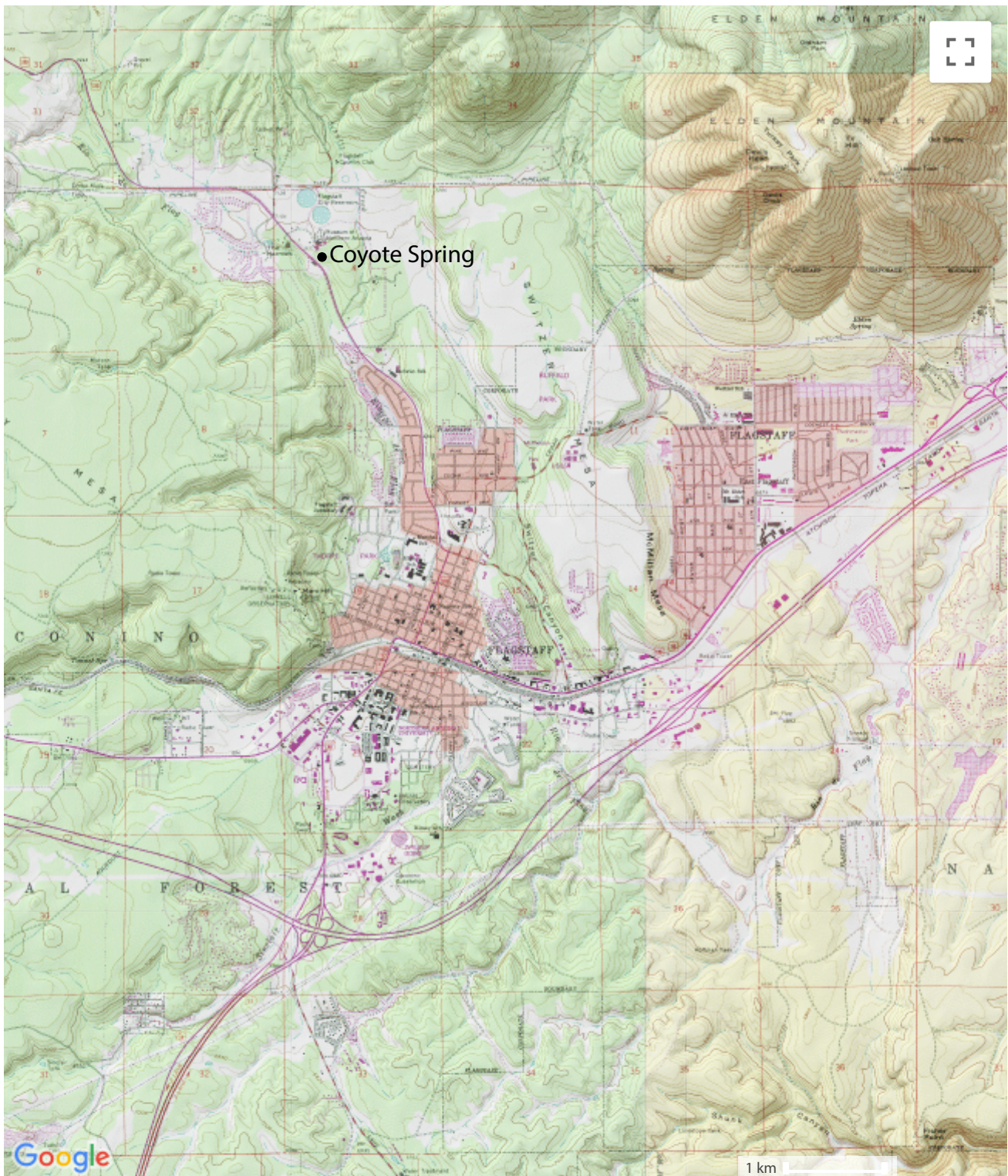
NAME: NORTHERN AZ SOC OF SCIENCE & ART

App. No.	File Status	Permit No.	Certificate No.	File Date	Priority Date	County	Water Source	WaterShed
4A-3215.0	ACTIVE - ACTIVE	2236.0	2013.0	9/22/1952	9/22/1952	COCONINO	MC MILLAN DRAW	LITTLE COLORADO RIVER
Land Owner	Location			POD/POU		Water Uses		Quantity
PRIVATE	SW NW 4 21N 7E			Point of Diversion		DOMESTIC		730,000.00 GPA
	SW NW 4 21N 7E			Place of Use				
	SE NW 4 21N 7E			Place of Use				

Surface Water (for given location)

Number of Rights: 5

Flagstaff Topo Map in Coconino County Arizona



Arizona Water Protection Fund Commission
Attn: Mr. Ruben Teran, Executive Director
1110 West Washington Street, Suite 310
Phoenix, AZ 85007

5 September 2018

AWPF Commission:

As a long-term resident of the Coyote Springs development here in Flagstaff, and as a member of the Coyote Springs Homeowner's Association, I am writing in support of the Museum of Northern Arizona's Springs Stewardship Institute's proposal to AWPF for funding to restore Coyote Springs, a headwaters spring and stream ecosystem located adjacent to our community on the Museum of Northern Arizona land. This lovely, important perennial springs complex is supports one of the last remaining wet meadows on the San Francisco Peaks, including several last-remaining aquatic invertebrate and plant populations that have lost all of their habitat in the district. In addition, the site has great educational value, as the Museum of Northern Arizona uses it for both children's education programs, and by MNA's Springs Stewardship Institute as a training site for those interested in improving knowledge of springs ecosystem ecology, management, and restoration.

MNA and the Coyote Springs homeowners both wish this namesake springs ecosystem to be restored to a healthy, functioning state for our enjoyment and MNA's use of the site for mission-related educational activities, while respecting our desires to not unduly increase attractiveness of the site to visitors. MNA is seeking \$31,996 in Arizona Water Protection Fund support to accomplish the following objectives over the next two years for the following tasks: 1) Planning - assemble available information on the site, including pre-treatment monitoring data ; 2) Restoration - remove the 1950's concrete tank, but leave the historic springbox in place, reroute the stream channel to wet more of the meadow while still delivering water downstream, constructing a stepping stone trail for access to the water to prevent trampling or eroding the site; 3) Monitoring the site; and 4) Developing a springs restoration outreach program for use in the MNA springs ecosystem trainings and children's education programs we hold there each year. With the expertise of the MNA Springs Stewardship Institute, these tasks can be accomplished over the next two years.

MNA received seed funding from Coconino County to undertake pre-restoration compliance, which has been completed, and MNA will use the remaining \$3000 from that seed grant, as well as part of SSI staff time, and Hopi Tribal youth and other volunteers as in-kind match towards support of this project, interactions that are important both to the Museum and its many supporters.

Therefore, I request that you consider fully funding this MNA-SSI proposal, as it will improve wildlife habitat, outreach about springs ecology and restoration, and benefit our cultural and social diversity here in Flagstaff.

Sincerely,

Karen McKinnon

Coyote Springs Homeowner