

Pinetop-Lakeside Aquatic Wildlife Enhancement Project

**Arizona Water Protection Fund Grant Application – FY 2019
Arizona Game and Fish Department; Pinetop Regional Office**

Executive Summary

The Pinetop-Lakeside Aquatic Wildlife Enhancement Project (“Project”) intends to address a water shortage at the Pinetop Arizona Game and Fish Department Regional Headquarters. A sustainable water source is needed to support two fish rearing ponds, a created wetland and the eight raceways within the historic hatchery building. The fish ponds are used to raise tiger trout and other sport fish, as well as native fish that may need to be salvaged from areas affected by wildfires. The wetland is used to raise the federally threatened narrow-headed gartersnake and northern leopard frogs. The indoor raceways have been used to breed and rear the federally threatened Chiricahua leopard frog.

The Pinetop Hatchery historically was fed by surface flow from Pinetop Springs until the 1950s when this source became unreliable. A well drilled on the Game and Fish property unsuccessfully attempted to reach the Coconino aquifer also in the mid-1950s. After drilling into a porous cinder pocket at about a 900 foot depth the well was capped at 300 feet within the Pinetop aquifer. The well was used intermittently but did not produce the large volume of water needed to run a trout hatchery. With disuse the well became nonfunctional.

Pinetop Spring water production was sufficient for limited frog and fish rearing in the 1990s and early 2000s. However, at the end of this period the spring became unreliable so the existing Pinetop well was renovated with a new pump, plumbing and a 5,000 gallon storage tank in 2008. This system provided sufficient water to produce more than 60,000 frog tadpoles over a decade, but the newly-constructed fish ponds and wetland require more water than the current well can supply. Chiricahua leopard frog rearing activities were suspended when the ponds and wetland came online.

The Project is beneficial in several ways by providing a sustainable water source while not removing almost 2 million gallons of water from the relatively shallow Pinetop aquifer, which feeds many local springs and seeps. The Pinetop aquifer is under increased pressure from use by numerous domestic wells and increased residential and commercial development.

Adequate water supply for the fish ponds and wetland would require enough inflow to create a constant outflow. Outflow could feasibly drain directly into upper Billy Creek and help recover a portion of this riparian area upstream of the reach restored with a previous AWPf grant #08-154

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Billy Creek Riparian Restoration Project 2008. Infrastructure improvements would include a well pump upgrade, electrical upgrade and 10,000 gallon storage tank to accommodate additional water flow. The current well site infrastructure will be utilized for the project as much as possible therefore reducing expenditures and increasing overall project efficiency by possibly deepening the existing well.

Importance of wetland and riparian areas could be demonstrated to the general public through the Project with outreach programs and interpretive signage on the site of the created wetland. Classroom activities could also be developed using actual hydrological data derived from the wireless and internet connected sensors.

Project Overview

Background

The purpose of the Project is to provide a sustainable and consistent amount of quality water to allow the full use of the newly constructed fish rearing ponds, wetland refugia, and indoor raceways at the Pinetop Game and Fish Regional Headquarters, in Pinetop-Lakeside, Arizona. The Project would also assist in protecting the flow to local springs and seeps, fed by the shallow, sensitive Pinetop aquifer as well as returning all pass-through water into the Billy Creek drainage.

The Pinetop Hatchery was constructed between 1929-1930, and became operational using surface water from Pinetop Springs. Annual precipitation dropped during the 1940s, desiccating the shallow aquifer that fed Pinetop Springs. A well was drilled to 250 feet (1950) tapping into the Pinetop aquifer to remedy the surface water shortage. Circa mid -1950s, attempts were made to reach the Coconino aquifer since the original well produced only a limited supply of water. During drilling activities the drilling crew encountered a cinder pocket at 900 feet, the well dried up, and was capped at 300 feet. Later, in 1987 well water production was an estimated 65 gallons per minute (GPM). Since that time, well capacity has decreased and coincides with the increase in residential and commercial development, additional domestic wells, and lack of sufficient precipitation necessary to fully recharge the Pinetop aquifer.

Unfortunately, most of the original hatchery raceways and ponds fell into disrepair from non-use due to lack of sufficient water. Newer, more efficient hatcheries also reduced the need for the Pinetop Hatchery. During 2008, the existing well received significant maintenance, was tested, and fit with new infrastructure consisting of a well pump and 5,000 gallon storage tank. The renovation supported the Chiricahua leopard frog breeding and rearing activities conducted in raceways within the historic hatchery building.

A grant to renovate two fish ponds and create a wetland for rare and unique species was approved through the USDA-Natural Resources Conservation Service with project construction completed in 2014. The new facility includes two, one-third acre fish rearing ponds; a one-third acre (created) wetland with a simulated spring reach, wetland stream, and small pond. Water is

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pumped continuously from the pond to the top of the spring run and circulates through the wetland area before re-entering the pond. The wetland and pond area are lush with vegetation, composed of native species, some of which was obtained from the Arboretum at Flagstaff. An ADA accessible elevated platform was constructed to overlook the wetland and one fish pond, with educational signage space available.

During summer 2017, the well was incapable of sufficient recharge required to provide enough fresh water to avoid algal blooms in the fish ponds. The well water storage monitoring system indicated that wetland water levels could not be maintained, and the process of spilling water continuously through the wetland was not possible. During the next winter season (2017/18), the wetland experienced an aquatic wildlife (frogs and fish species) die off that was possibly caused by water quality issues. This might have been avoided if more water was continually refreshed within the wetland.

To meet the well water deficiency, water was trucked in from another well and domestic water was purchased for the 2018 spring/summer season to maintain the fish ponds' water levels. The carrying capacity of the ponds was definitely limited by the lack of enough fresh water to maintain acceptable water quality. All rearing activities of the threatened Chiricahua leopard frogs within the hatchery building were suspended due to the freshwater deficiency.

Goals

1. Provide an increased, sustainable volume of water on a consistent and reliable basis to maximize full potential for the Pinetop fish rearing ponds, wetland refugia and indoor raceways.
2. Reduce use associated with the shallow Pinetop aquifer that feeds local springs, seeps and lakes.
3. Allow the flow-through water to help restore upper Billy Creek.
4. Use this project's highly visible location at AGFD Pinetop Regional Headquarters to reach the general public with educational signage and outreach programs.

Objectives

1. The primary objective of this project is to drill the existing or a new AGFD Pinetop Regional Headquarters well into the Coconino aquifer to sustainably support fish ponds, wetland refugia and indoor frog breeding and rearing raceway operations.
2. The secondary objective is to restore upper Billy Creek by providing pass-through water.
3. A complementary objective is to provide educational signage at the wetland overlook platform and outreach programs emphasizing the role of riparian areas in Arizona.

Statement of solutions

More water on a consistent and sustainable basis would allow the full potential use of the two new fish rearing ponds and the wetland refugia at the Pinetop Regional Headquarters. Water quality issues could be avoided; fish, reptile and amphibian production could be increased; die-

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offs could be averted; and public education of riparian issues could be expanded with the award of this grant request.

Flow-through water that leaves the Game and Fish property could be used to help restore upper Billy Creek and or to maintain water levels in nearby reservoirs and wetlands. A community-based project composed of diverse interests is certainly possible due to the shared value of water conservation for recreation and producing fish and crops.

Construction of this project could facilitate widespread coverage by the media, allowing more opportunities for public education of riparian habitat issues and the support provided by the AWPf.

Statement of project years of benefit to the resource and general public

Typical life expectancy for a well usually exceeds 20 years; water pump life expectancy is half that period or 10 years. A new pump is budgeted every 10 years. The fish ponds and wetland will be functional for at least 20 years with periodic maintenance such as sediment and vegetation removal, and wetland small pond pump replacement schedules every 5-10 years. Pump replacement will be the responsibility of the grantee.

Over the course of 20 years, the fish ponds have the potential for salvaging valuable native fish from streams impacted by drought, wildfire, or other risks but it is impossible to quantify this benefit due to the uncertainty of these events. The ponds will also opportunistically rear sport fish such as tiger, Apache and possibly rainbow trout for release into White Mountain waters. The wetland could provide invaluable information to the public and scientific community over the course of 20 years regarding semi-natural propagation techniques of the threatened narrow-headed gartersnake. Offspring produced in this wetland refugia could become transplant stock for unoccupied habitats within their range. Northern leopard frogs produced five egg masses which hatched thousands of young frogs during the wetland's first year of operation. If this rate could be sustained over 20 years, this transplant stock could populate dozens of currently unoccupied sites in the White Mountains.

**Project Location & Environmental Contaminant Information
FY 2019**

Project Location Information			
1. County: <u>Navajo</u>	2. Section(s): <u>4</u>	3. Township: <u>8N</u>	4. Range: <u>23E</u>
<p>5. Watershed: <u>Little Colorado</u></p> <p>6. 8 or 10 Digit Hydrologic Unit Code (HUC): <u>15020005</u></p> <p>7. Name of USGS Topographic Map where project area is located: <u>Indian Pine</u></p> <p>8. State Legislative District: <u>7</u> (Information available at: http://azredistricting.org/districtlocator/)</p> <p>9. Land ownership of project area: <u>Owned by Grantee – Az Game and Fish</u></p> <p>10. Current land use of project area: <u>AGFD Regional Headquarters</u></p> <p>11. Size of project area (in acres): <u>One acre on AGFD property & Billy Creek downstream DIRECT</u></p> <p>12. Stream Name: <u>Project adjacent to and feeds into Billy Creek</u></p> <p>13. Length of stream through project area: <u>None in project area proper but flow through water enters Billy Creek near headwaters</u></p> <p>14. Miles of stream benefited: <u>To be determined due to uncertain hydrology of Billy Creek and volume of water pumped and passed through the wetlands and fish ponds. Ideally, water will reach site of AWPf Grant #08-154 which is three miles downstream.</u></p> <p>15. Acres of riparian habitat: <u>one directly, up to 7 indirectly</u> will be:</p> <p style="padding-left: 400px;"> <input checked="" type="checkbox"/> Enhanced <input type="checkbox"/> Maintained <input type="checkbox"/> Restored <input type="checkbox"/> Created </p>			
<p>16. General description and/or delineation for the area of impact of the project within the watershed. <u>The project site is located on 40 acres of Game and Fish property if the currently developed well site is not appropriate. Much of the site is already developed as the Regional headquarters with office buildings, parking lots, and warehouses. Drainage patterns can be controlled relatively easily since most areas are relatively flat.</u></p>			
<p>17. Provide directions to the project site from the nearest city or town. List any special access requirements: <u>The project site is located at 2878 East White Mountain Blvd on the southern edge of Pinetop, AZ. The Regional Headquarters are on the eastern side of Highway 260 (White Mtn Blvd). Vehicle access is available throughout most of the property including the existing well site.</u></p>			

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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

Scope of Work

Task #1: Develop Drilling, Plumbing, and Electrical Construction Plans

Task Description: In coordination with contractor and subcontractor, develop detailed plans for the drilling, plumbing, and electrical phases of the project, including benchmarks, costs, potential problems, and any special needs.

Task Purpose/Objective: To ensure efficient use of available funds to accomplish all objectives in a timely manner, with minimal surprises.

Responsible Personnel: Grantee and Contractors and Subcontractors

Deliverable Description: Written and/or electronic plans that detail project construction activities. Plans would include a timeline and periodic benchmarks to measure progress.

Deliverable Due Date: Prior to any ground disturbing activity.

Reimbursable Task Cost: None. Source: AGFD in-kind match = \$1,455

Task #2: Permits, Authorizations, Clearances and Agreements

Task Description: Obtain all permits, authorizations, clearances, and agreements necessary to conduct the work described in this application, including:

1. Cultural Resource Clearance (SHPO)
2. AGFD Environmental Assessment Checklist (EAC)

3. Notice of Intention to Drill Authorization
4. Other necessary documentation

Task Purpose/Objective: To comply with all local, state, county, and federal permit requirements.

Responsible Personnel: Grantee/Administrator

Deliverable Description: Copies of the following: SHPO clearance; signed EAC; all other approved permits, authorizations, clearances and agreements.

Deliverable Due Date: Prior to any ground disturbing activities.

Reimbursable Task Cost: None. AGFD in-kind match = \$2,340

Task #3: Develop and Install Signage

Task Description: Create educational signage for the viewing platform overlooking the wetland.

Task Purpose/Objective: "To increase public awareness of the function and value of riparian resources in Arizona", AWPf objective from grant manual.

Responsible Personnel: Grantee and Agents

Deliverable Description: Physical signage with water resource message and AWPf logo posted on platform overlooking the wetland and a fish pond.

Deliverable Due Date: Within 8 months of grant award

Reimbursable Task Cost: None. Source: AGFD in-kind match = \$4,715

Task #4: Drill Well to Coconino Aquifer and Install Well Pump

Task Description: Deepen existing well to reach the Coconino aquifer.

Task Purpose/Objective: To obtain a sustainable and consistent amount of water for fisheries, snake, and amphibian operations.

Responsible Personnel: Grantee / Contractor / Subcontractor

Deliverable Description: A well that produces flow characteristic of the Coconino aquifer in this area.

Deliverable Due Date: Within 24 months of grant award (unless unexpected drilling conditions are encountered)

Reimbursable Task Cost: \$210,000 (See Detailed Budget Breakdown)

Town of Pinetop-Lakeside Monetary Match = No to exceed \$31,500 (Resolution No. 18-1468)

Task #5: Install Well Plumbing, Electrical and Other Infrastructure

Task Description: Installation of well related infrastructure such as the plumbing, storage, electrical, and monitoring equipment.

Task Purpose/Objective: To convey well water into the fish ponds and wetland habitats

Responsible Personnel: Grantee / Contractor /Subcontractor

Deliverable Description: Functioning well pump system delivering water through storage to the fish ponds and wetland with a sufficient volume.

Deliverable Due Date: Within 24 months of grant award

Reimbursable Task Cost: None. Source: AGFD in-kind match = \$10,280

Task #6: Monitor Well Output, Water Quality and Riparian Recovery

Task Description: Measure volumes of water pumped, quantity used by the wetland and fish ponds, and basic water quality indicators for the ponds as well as qualitative and quantitative changes in the riparian characteristics of upper Billy Creek.

Task Purpose/Objective: To maximize aquatic wildlife health and production, evaluate cost effectiveness of pumping various amounts of water and document vegetative changes in riparian characteristics of upper Billy Creek.

Responsible Personnel: Grantee

Deliverable Description: Report that details pumping rates, estimated water use, analysis of basic water quality parameters and baseline monitoring data for upper Billy Creek. Report will also include detailed monitoring procedures and equipment specifications.

Deliverable Due Date: With Final Report

Reimbursable Task Cost: None. Source: AGFD in-kind match = \$5,324

Task #7: Conduct Outreach Programs

Task Description: Make public presentations and conduct outreach programs that demonstrate how this project provided measurable benefits to the water resources of Arizona.

Task Purpose/Objective: To stress the importance of riparian habitat in Arizona and how community / AWPf support can address local issues from a grassroots level.

Responsible Personnel: Grantee

Deliverable Description: At least three semi-formal educational presentations or field trips that focus on the importance of wetlands and riparian habitats or wildlife.

Deliverable Due Date: With Final Report

Reimbursable Task Cost: None. Source: AGFD in-kind match = \$822.

Task #8: Facilitate Discussion Regarding Riparian Restoration Opportunities

Task Description: Facilitate a community based group to explore the potential for actions to facilitate the restoration of Billy Creek and augmenting nearby reservoirs and wetlands with additional water.

Task Purpose/Objective: To engage the community in discussions regarding upper Billy Creek stream restoration, focused on the existing restoration work completed downstream of the Pinetop Office (AWPF grant #08-154 Billy Creek Riparian Restoration Project 2008) as a local model.

Responsible Personnel: Grantee / Local Residents

Deliverable Description: At least one, well-promoted, facilitated community meeting to discuss broad objectives with small working group meetings subsequently scheduled as needed.

Deliverable Due Date: With Final Report

Reimbursable Task Cost: None. Source: AGFD in-kind match = \$1,643

Task #9: Final Report and Oral Presentation

Task Description: Produce final report and give oral presentation.

Task Purpose/Objective: To provide final accounting of grant requirements, explain any deviations and answer AWPf questions.

Responsible Personnel: Grantee

Deliverable Description: A comprehensive report that addresses all deliverables in the application and contract agreement along with a final budget accounting including all backup documentation.

Deliverable Due Date: With Final Report

Reimbursable Task Cost: None. Source: AGFD in-kind match = \$3,015

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Budget Summary by Task

Task	AWPF Request	AGFD Match/ *Town Match	Total
Task #1:Construction Plans		\$1,455	\$1,455
Task #2:Permits & Authorizations		\$2,340	\$2,340
Task #3:Signage		\$4,715	\$4,715
Task #4:Drill Well / Install pump	\$210,000	*\$29,865	\$239,865
Task #5:Install Infrastructure		\$10,280	\$10,280
Task #6:Monitor Results		\$5,324	\$5,324
Task #7:Conduct Outreach		\$822	\$822
Task #8:Discuss Restoration		\$1,643	\$1,643
Task #9: Final Report		\$3,015	\$3,015
Totals	\$210,000	\$59,459	\$269,459

Detailed Budget Breakdown:

Task #4: Drill Well to Coconino Aquifer and Install Well Pump

Outside Services	Estimated Quantity	\$/unit	Total Cost (Estimate)	Overhead (Estimate)	Total Cost (Estimate)
Willis Drilling & Pump			\$205,997	\$4,120	\$210,117
M.D.Merrett Subcontractor			\$20,600.		\$20,600.
Sales Tax			\$9,148		\$9,148
TOTAL					\$239,865

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Detailed Matching Funds Breakdown:

Task #1: Develop Drilling, Plumbing, and Electrical Construction Plans

Direct Labor Cost	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
AGFD Staff	20 hours	\$45	\$900	\$45	\$945
SUBTOTAL					\$945
Other Direct Costs	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
Printing / Copying	20 pages *10 copies	\$0.20	\$400		\$400
Binders	10	\$5	\$50		\$50
Postage	10	\$6	\$60		\$60
SUBTOTAL					\$510
TOTAL					\$1,455

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Task #2: Permits, Authorizations, Clearances and Agreements

Direct Labor Cost	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
AGFD Staff	40 hours	\$45	\$1,800	\$90	\$1,890
SUBTOTAL					\$1,890
Other Direct Costs	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
Printing / Copying	150 pages *10 copies	\$0.20	\$300		\$300
Binders	10	\$5	\$50		\$50
Postage	10	\$10	\$100		\$100
SUBTOTAL					\$450
TOTAL					\$2,340

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Task #3: Develop and Install Signage

Direct Labor Cost	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
AGFD Staff	60 hours	\$45	\$2,700	\$135	\$2,835
SUBTOTAL					\$2,835
Other Direct Costs	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
Signs	4	\$450	\$1,800		\$1,800
Mounting Hardware	4	\$20	\$80		\$80
SUBTOTAL					\$1,880
TOTAL					\$4,715

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Task #5: Install Well Plumbing, Electrical and Other Infrastructure

Direct Labor Cost	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
AGFD Staff	80 hours	\$45	\$3,600	\$180	\$3,780
SUBTOTAL					\$3,780
Other Direct Costs	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
Miscellaneous fixtures, sealant, etc		\$500	\$500		\$500
SUBTOTAL					\$500
Capital Outlay & Equip Costs	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
Storage basin -	10,000 gallons	\$6,000	\$6,000		\$6,000
SUBTOTAL					\$6,000
TOTAL					\$10,280

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Task #6: Monitor Well Output, Water Quality and Riparian Recovery

Direct Labor Cost	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
AGFD Staff (Develop monitoring plan)	20 hours	\$45	\$900	\$45	\$945
AGFD Staff (monitoring)	0.5 hr/week*52 weeks (1 year)	\$45	\$1,170	\$59	\$1,229
SUBTOTAL					\$2,174
Capital Outlay & Equip Costs	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
Equipment Cost	5 sensors	\$600	\$3,000	\$150	\$3,150
SUBTOTAL					\$3,150
TOTAL					\$5,324

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Task #7: Conduct Outreach Programs

Direct Labor Cost	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
AGFD Staff	3 programs * 4 hrs each	\$45	\$540	\$27	\$567
SUBTOTAL					\$567
Other Direct Costs	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
Promotional flyers	60	\$0.50	\$30		\$30
Educational materials	3 kits	\$75	\$225		\$225
SUBTOTAL					\$255
TOTAL					\$822

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Task #8: Facilitate Discussion Regarding Riparian Restoration Opportunities

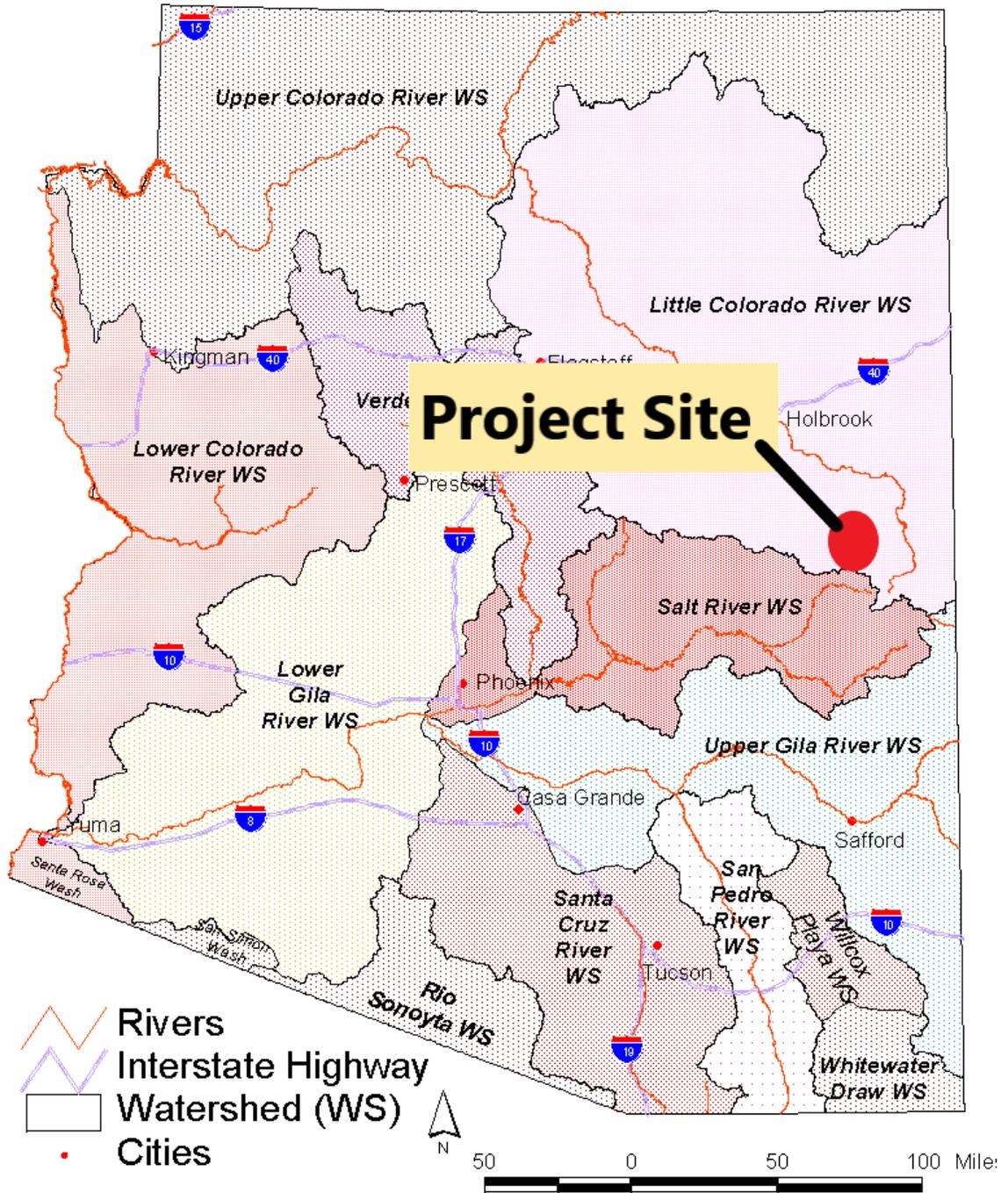
Direct Labor Cost	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
AGFD Staff	30 hours	\$45	\$1,350	\$68	\$1,418
SUBTOTAL					\$1,418
Other Direct Costs	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
Promotional Flyers	50	\$0.50	\$25		\$25
Paid Advertising	4	\$50	\$200		\$200
SUBTOTAL					\$225
TOTAL					\$1,643

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Task #9: Final Report and Oral Presentation

Direct Labor Cost	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
AGFD Staff	60 hours	\$45	\$2,700	\$135	\$2,835
SUBTOTAL					\$2,835
Other Direct Costs	Estimated Quantity	\$/unit	Total Cost	Overhead	Task Match
Print Report	600 pages	\$0.20	\$120		\$120
Binders	10	\$5	\$30		\$30
Postage	6 mailings	\$5	\$30		\$30
SUBTOTAL					\$180
TOTAL					\$3,015

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Title of Project: Pinetop-Lakeside Aquatic Wildlife Enhancement Project

Location (include UTM's & Township/Range/Section): 12S 059946E, 3770445N T8N, R23E, Sec 4
(Location must include at least one Section delineation for large scale projects)

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Supplemental information

Project Timeline

2019												
Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Task #1:Construction Plans			Completed									
Task #2:Permits & Authorizations						Completed						
Task #3:Signage								Completed and ongoing				
Task #4:Drill Well / Install pump												
Task #5:Install Infrastructure												
Task #6:Monitor Results												
Task #7:Conduct Outreach			Completed and ongoing									
Task #8:Discuss Restoration												
Task #9: Final Report												

2020												
Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Task #1:Construction Plans	Completed											
Task #2:Permits & Authorizations	Completed											
Task #3:Signage	Completed and ongoing											
Task #4:Drill Well / Install pump				Completed								
Task #5:Install Infrastructure					Completed							
Task #6:Monitor Results						Completed						
Task #7:Conduct Outreach	Completed and ongoing											
Task #8:Discuss Restoration										Completed		
Task #9:Final Report											Complete	

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Year 3-20													
Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Task #1:Construction Plans	Completed												
Task #2:Permits & Authorizations	Completed												
Task #3:Signage	Completed and ongoing												
Task #4:Drill Well / Install pump	Completed												
Task #5:Install Infrastructure	Completed												
Task #6:Monitor Results	Completed and ongoing												
Task #7:Conduct Outreach	Completed and ongoing												
Task #8:Discuss Restoration	Completed and ongoing												
Task #9:Final Report	Completed												

**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 AWPB require SHPO clearance, **including those on private and federal lands.**

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

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

Please answer the following questions:

1. Grant Program: Capital Well Drilling / Improvement
2. Project Title: Pinetop-Lakeside Aquatic Wildlife Enhancement Project
3. Applicant Name and Address: Chris Bagnoli, Arizona Game and Fish Department, 2878 East White Mountain Blvd., Pinetop, AZ 85935
4. Current Land Owner/Manager(s): Arizona Game and Fish Department
5. Project Location, including Township, Range, Section: Pinetop AGFD Regional Office, T8N, R23E, Sec 4
6. Total Project Area in Acres (or total miles if trail): 1-7
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: This project may deepen an existing operational well or drill a new well nearby. A storage tank may be placed on top of the ground and connected via

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underground pipes and valve boxes to prevent freezing in the winter. Existing underground pipes will be utilized as much as possible.

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 condition of the current ground surface in the project area varies from paved asphalt to graded gravel roads and parking areas, to relatively undisturbed forested areas. The site recommended for this well by the drillers will be specifically cleared by SHPO before and ground disturbing activities occur. An Arch clearance survey has been previously conducted on this property (see attached report)
10. Are there any known prehistoric and/or historic archaeological sites in or near the project area?
 YES NO
11. Has the project area been previously surveyed for cultural resources by a qualified archaeologist?
 YES NO UNKOWN

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

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. Attached

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: <input type="checkbox"/> Funding this project will not affect historic properties. <input type="checkbox"/> Survey necessary – further GRANTS/SHPO consultation required (<i>grant funds will not be released until consultation has been completed</i>) <input type="checkbox"/> Cultural resources present – further GRANTS/SHPO consultation required (<i>grant funds will not be released until consultation has been completed</i>)

**Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19**

SHPO Comments:

For State Historic Preservation Office:

Date:

Key Personnel

Michael Lopez, Project Coordinator, Region I Aquatic Program Manager

Mike has worked with Arizona Game and Fish Department for 31 years, including assignments in Phoenix, Flagstaff, and Pinetop. His current position oversees all fisheries management activities in the east-central portion of the state in Region I, including operation of the two fish ponds at the Pinetop Regional Office.

Chris Bagnoli, Region I Supervisor

Chris has been with the Game and Fish Department for 30 years, working as a wildlife manager, habitat specialist, Mexican wolf field team leader, and currently as the Regional Supervisor. In his current position, Chris is the Chief Administrative Officer for Game and Fish activities in Region I.

Dan Groebner, Terrestrial Biologist

Dan began work with Arizona Game and Fish Department in 1994 as the Mexican wolf project leader and has been the Region I Nongame Specialist since 1996. Dan designed and maintained the wetland refugia at the Pinetop regional office and has successfully bred threatened Chiricahua leopard frogs for over 10 years.

Subcontractors: Willis Well Drilling, MD Merritt, Inc.

Arizona Game and Fish Department AWP Grant Application Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19

Project Site Photographs



Photo 1: Existing Well House & Storage Tank



Photo 2: Lower Fish Pond



Photo 3: Wetland overview

Monitoring Plans

Water Volume Production and Use Monitoring

- Wireless flow meters on all 5 inlet and outlet pipes to measure use in wetland and ponds
 - Well production in gallons per hour
 - Wetland use in gallons per hour
 - Pond use in gallons per hour
 - Total flow through in gallons per hour

Water Quality Monitoring

- Periodic well, wetland and pond water sampling of:
 - Dissolved oxygen
 - pH
 - Ammonia
 - Dissolved solids
 - Nitrites, Nitrates
 - Copper
 - Calcium

Pond and Wetland Disease Monitoring

- Routine wetland water sampling for chytrid fungus and ranavirus DNA analysis
- Fish Health exam and routine HSSP protocols enforced

Billy Creek Restoration Monitoring

- Identify cooperating landowners to use as sample monitoring plots
- AGFD will develop methods and maintain data
- Possibly involve citizen science methods with willing landowners
- Develop simple but useful procedures such as photopoints or coverboards
- Conduct monitoring in March, May, August, November

Existing plans, reports, information relevant to the project:

Pinetop Springs Hatchery Water Collection Improvements Schematic Design Phase Report (Wilson & Company, Engineers & Architects 1988)

- A schematic design phase report
- Review of existing water supply facilities
- Improvement alternatives using spring and well water

**Arizona Game and Fish Department AWPf Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19**

Hydrologic Analysis of the Pinetop Springs Fish Hatchery (Gookin Engineers and Coen Engineering Corp. 1987)

- Determined hydrologic characteristics of the Pinetop Springs area
- Recommendations to develop and sustain an adequate water supply

Pinetop Springs Hatchery, Schematic Design Report for Arizona Game and Fish Department (Greiner, Inc. 1991)

- Feasibility study for Pinetop Springs Hatchery
- Detailed biological , engineering, economic, construction and operational criteria
- Alternative plan development and recommended plan

A Class III Archeological Survey of the Arizona Game and Fish Department Pinetop Region Headquarters in Pinetop-Lakeside, Navajo County, Arizona (Jacobs. 2013) (included on thumb drive)

- An intensive field cultural resources survey prior to wetland and pond construction
- Provides a cultural resources inventory of the AGFD Pinetop Region headquarters property
- Surveyed entire 35.4 acres of property

Letters of Community Support (See Attached PDF file)

Town of Pinetop-Lakeside (Resolution No. 18-1468)

Save Our Park (SOP)

TRACKs

White Mountain Wildlife and Nature Center, Inc. (WMNC)

Show Low/Pinetop/Woodland Irrigation District

Navajo County (pp 32)

Blue Ridge Unified School District (BRUSD)

White Mountain Audubon Society

White Mountain Land Trust/Alliance

**Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19**

**Letters from those pledging matching funds
Town of Pinetop-Lakeside – Resolution No.**

TOWN OF PINETOP-LAKESIDE

RESOLUTION NO. 18-1468

A RESOLUTION OF THE MAYOR AND TOWN COUNCIL OF THE TOWN OF PINETOP-LAKESIDE, ARIZONA, AUTHORIZING SUPPORT FOR THE ARIZONA GAME AND FISH DEPARTMENT'S APPLICATION TO THE ARIZONA WATER PROTECTION FUND FOR THE PINETOP-LAKESIDE AQUATIC WILDLIFE ENHANCEMENT PROJECT.

WHEREAS, the Town of Pinetop-Lakeside ("Town") is interested in cooperative methodologies for preserving our natural environment and recreational opportunities; and

WHEREAS, Arizona Water Protection Fund is soliciting applications for protecting Arizona's river and riparian resources;

WHEREAS, the Arizona Game and Fish Department – Pinetop Regional Headquarters is submitting the Pinetop-Lakeside Aquatic Wildlife Enhancement Project ("Project") application to the Arizona Water Protection Fund to assist with preserving the newly-constructed fish ponds and wetland located within our Town; and

WHEREAS, the Project enhancements will provide a sustainable, consistent water flow to allow full use of the newly-constructed fish rearing ponds, wetland refugia located at the iconic Pinetop hatchery; and

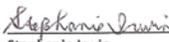
WHEREAS, the Arizona Game and Fish Department has completed preliminary work necessary to improve the success of the application to the Arizona Water Protection Fund including: arc surveying, fish ponds and wetland construction; and

WHEREAS, the Arizona Game and Fish Department request for support involves two elements: 1) In-kind personnel pertaining to project support letters and cursory grant review assistance; 2) Project monetary match for 15% of the necessary infrastructure improvements not to exceed \$31,500 whichever is less.

NOW, THEREFORE, BE IT RESOLVED, that the Mayor and Town Council of the Town of Pinetop-Lakeside, Arizona, approve authorizing support for the Arizona Game and Fish Department application to the Arizona Water Protection Fund for the Pinetop-Lakeside Aquatic Wildlife Enhancement Project; and authorize the Town Manager to execute any and all documents in connection with the project.

PASSED AND ADOPTED by the Mayor and Council of the Town of Pinetop-Lakeside, Arizona, this 6th day of September, 2018.

TOWN OF PINETOP-LAKESIDE


Stephanie Irwin
Mayor

ATTEST:

APPROVED AS TO FORM:


Remilie S. Miller, MMC
Town Clerk


William J. Sims, III
Town Attorney

**Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19**

Arizona 030535

RECORDED AT REQUEST OF NORTHERN ARIZONA TITLE CO. **Photostated**
 October 10th, A. D. 1963 at 10:40 o'clock P. M.
 In Docket 209 Pages 549
 of Coconino County, Arizona
 Edna Mae Thornton County Recorder
 Deputy

The United States of America,

We all to whom these presents shall come, Greeting:

WHEREAS, the Arizona Game and Fish Commission, being the owner of certain tracts of lands situated and included within the limits of the Kaibab National Forest and the Sitgreaves National Forest, Arizona, has, under the provisions of the Act approved March 20, 1922 (42 Stat. 465), entitled "An Act to consolidate national forest lands", as amended by the Act of February 28, 1925 (43 Stat. 1090), as supplemented by the Act of June 11, 1960 (74 Stat. 205) received and relinquished the said tracts to the United States and has, under the provisions of the said Act, selected in lieu thereof the following described tracts of lands:

Gila and Salt River Meridian, Arizona.
 T. 8 N., R. 23 E.,
 Sec. 4, Lots 1 and 2, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$,
 NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$;
 Flagstaff T. 21 N., R. 7 E.,
 Sec. 33, W $\frac{1}{2}$ W $\frac{1}{2}$ NW $\frac{1}{4}$, W $\frac{1}{2}$ E $\frac{1}{2}$ W $\frac{1}{2}$ NW $\frac{1}{4}$.

The areas described aggregate 113.13 acres, according to the Official Plats of the Surveys of the said Lands, on file in the Bureau of Land Management:

NOW KNOW YE, That the UNITED STATES OF AMERICA, in consideration of the premises, HAS GIVEN AND GRANTED, and by these presents DOES GIVE AND GRANT, unto the said Arizona Game and Fish Commission, and to its successors, the tracts above described; TO HAVE AND TO HOLD the same, together with all the rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto the said Arizona Game and Fish Commission, and to its successors and assigns forever. Subject to any vested and accrued water rights for mining, agricultural, manufacturing, or other purposes, and rights to ditches and reservoirs used in connection with such water rights, as may be recognized and acknowledged by the local customs, laws and decisions of courts; and there is reserved from the lands hereby granted, a right-of-way thereon for ditches or canals constructed by the authority of the United States.

PHOTODUPLICATED
INDEXED

Reserving, also, to the United States all coal in the land above described in Section 4, Township 8 North, Range 23 East, with the right to mine and remove the same in accordance with the provisions FILED AND RECORDED AT THE REQUEST OF February 28, 1925 (43 Stat. 1090).

NORTHERN ARIZONA TITLE CO. BY WESTMONY WINDROP, the undersigned authorized officer of
 Oct. 17th A. D. 1963 at 10:40 o'clock A. M. the Bureau of Land Management in accordance with the
 IN DOCKET 191, Off. Records PAGE 465 provisions of the Act of June 17, 1948 (62 Stat. 476), has,
 RECORDS OF NAVAL CONVEYANCE IN ARIZONA in the name of the United States, caused these letters to be
 Made Patent, and the Seal of the Bureau to be hereunto
 BY Edna Mae Thornton DEPUTY GIVEN under my hand, in the District of Columbia, the
 TWENTYTH day of SEPTEMBER in the year of
 our Lord one thousand nine hundred and SIXTY-THREE
 and of the Independence of the United States the one hundred
 and EIGHTY-EIGHTH.



For the Director, Bureau of Land Management.

By Roy A. Cunningham
 Manager, Arizona Land Office.
 U. S. DEPARTMENT OF THE INTERIOR

Patent Number 02-64-0021

DOCKET 191 PAGE 465 DOCKET 209 PAGE 549

Project Location Proof of Ownership

**Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19**

Well Information

Registration number:	628215
Depth and borehole diameter:	300 feet with 8 inch casing upgrade to 1,200 feet of 12 inch casing
Pump size:	Upgrade from 5-Hp to 20-Hp
Estimated depth and length of perforated or screened interval:	At 1,200 feet there is 540 feet of slotted well screen.
Well drilling method:	TBD

Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19

Letters of Support



Bryan Layton
Assistant County Manager

NAVAJO COUNTY

Administration

Glenn Kephart
County Manager

Paige Peterson
Finance Director

We are Navajo County

August 30, 2018

Chris Bagnoli, Pinetop Regional Supervisor
Arizona Game and Fish Department – Pinetop Regional Headquarter
2878 E. White Mountain Boulevard
Pinetop, AZ 85935

Re: Letter of Support – Arizona Water Protection Fund Grant Program
Pinetop-Lakeside Aquatic Wildlife Enhancement Project

Dear Mr. Bagnoli,

On behalf of Navajo County, I am pleased to write this letter of support for the Pinetop-Lakeside Aquatic Wildlife Enhancement Project which represents a collaborative effort between your regional agency and the Town of Pinetop-Lakeside.

Our agencies coordinate and collaborate on numerous projects, especially those that mutually benefit the citizens, visitors and regional area. In the past, Navajo County supported the Billy Creek Riparian Restoration Project funded by the Arizona Water Protection Fund Commission. Navajo County has also collaborated, and supported projects directly associated with the Arizona Game and Fish Department, and especially those relative to wildlife and water-activities such as the Rainbow Lake Water Quality Enhancement Project and more recently, the Rainbow Lake Carp Project monitored by the Arizona Game and Fish Department (AGFD).

The Pinetop-Lakeside Aquatic Wildlife Enhancement Project demonstrates regional impact by incorporating measures and elements that are conducive to water quantity and quality, while benefiting Navajo County's aquatic wildlife and recreational opportunities. The AGFD Pinetop Regional Headquarters supports our region by providing programs for recreational enthusiasts and those interested in just communing with nature at its best.

Navajo County supports the Pinetop-Lakeside Aquatic Wildlife Enhancement Project and recommends this important project to the Arizona Water Protection Fund Commission.

Sincerely,

A handwritten signature in black ink, appearing to read "Glenn Kephart".

Glenn Kephart, Manager P.E.
Navajo County

C: Stephanie Irwin, Mayor – Town of Pinetop-Lakeside
Keith Johnson, Pinetop-Lakeside Town Manager

• 928.524.4112 • Fax: 928.524.4239 • P.O. Box 668 • Holbrook, AZ 86025 •

• navajocountyaz.gov •

Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19



August 27, 2018

Chris Bagnoli, Pinetop Regional Supervisor
Arizona Game and Fish Department
2878 E. White Mountain Boulevard
Pinetop, AZ 85935

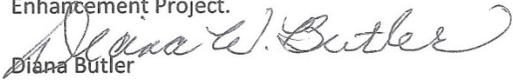
Re: Arizona Water Protection Fund Grant Opportunity
Pinetop-Lakeside Aquatic Wildlife Enhancement Project

Dear Mr. Bagnoli

The White Mountain Wildlife and Nature Center's vision is "Connecting people through nature education, wildlife rehabilitation, and open space preservation in the White Mountains of Arizona." This is accomplished in a variety of ways, but one of the more important components of our vision is our valued partnerships. The Pinetop-Lakeside Aquatic Wildlife Enhancement Project is being submitted by your agency in a collaborative sponsorship with the Town of Pinetop-Lakeside, two of valued partners.

This project's goals clearly align with some of our core values such as appreciation of natural diversity and promotion of good environmental stewardship. Currently, our agencies' collaborate on a number of programs and projects. The Pinetop-Lakeside Aquatic Wildlife Enhancement Project complements joint activities and partnerships by adding a sustainable mechanism and feature to our delicate ecosystem. Upon project completion, the Pinetop-Lakeside Aquatic Wildlife Enhancement Project will supply a riparian area with a sustainable water source to preserve two federally threatened, indigenous species, the narrow-headed garter snake and the Chiricahua leopard frog. The project will also result in less water removal from the relatively shallow Pinetop aquifer which has been under pressure from use by many domestic wells and increased developments. The project will also benefit the upper Billy Creek riparian areas, and directly connects to the Old Hatchery Trail used by hiker and mountain bikers.

Thank you for submitting this project to the Arizona Water Protection Fund Commission, our agency fully endorses this collaborative effort and the Pinetop-Lakeside Aquatic Wildlife Enhancement Project.


Diana Butler
President, White Mountain Wildlife and Center, Inc.

Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19



**SHOW LOW, PINETOP, WOODLAND
IRRIGATION CO.**

51 S. White Mountain Rd
Show Low, AZ 85901
(520) 537-1282

August 24, 2018

Chris Bagnoli, Pinetop Regional Supervisor
Arizona Game and Fish Department – Pinetop Regional Headquarter
2878 E. White Mountain Boulevard
Pinetop, AZ 85935

Re: Letter of Support – Arizona Water Protection Fund Grant Program
Pinetop-Lakeside Aquatic Wildlife Enhancement Project

Dear Mr. Bagnoli

On behalf of the Show Low, Pinetop – Woodland Irrigation Company, Inc., I am pleased to write this letter of support for the Pinetop-Lakeside Aquatic Wildlife Enhancement Project which represents a collaborative effort between your regional agency and the Town of Pinetop-Lakeside.

The Town and our irrigation company have partnered and collectively supported numerous projects in the past, particularly projects that improve overall water quality and provide mutual benefit to the Billy Creek area. The most notable demonstration of collaborative efforts and projects are: Rainbow Lake Water Quality Enhancement Project, Billy Creek Restoration Project and most recently, the Rainbow Lake Carp Project monitored by the Arizona Game and Fish Department.

The Pinetop-Lakeside Aquatic Wildlife Enhancement Project demonstrates regional impact by incorporating measures and elements that are conducive to water quantity and quality, while benefiting our aquatic wildlife and recreational opportunities. The project is not only valuable to our company, but to the human and wildlife communities. In addition, our company and its members strive to be good corporate citizens and preserve the region's recreational opportunities.

The Show Low, Pinetop, Woodland Irrigation Company lends its full support for the Pinetop-Lakeside Aquatic Wildlife Enhancement Project and recommends this important project to the Arizona Water Protection Fund Commission.

Sincerely

Larry Whipple, President

C: Stephanie Irwin, Mayor – Town of Pinetop-Lakeside
Keith Johnson, Pinetop-Lakeside Town Manager

Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19



TRACKS
White Mountains Trail System of Arizona

958 S. Woodland Road, Lakeside, Arizona 85929
928-368-6700 www.trackswhitemountains.org
Trails that let you enjoy the outdoors

August 27, 2018

Chris Bagnoli, Pinetop Regional Supervisor
Arizona Game and Fish Department
2878 E. White Mountains Boulevard
Pinetop, AZ 85935

Re: Arizona Water Protection Fund
Pinetop-Lakeside Aquatic Wildlife Enhancement Project

Dear Mr. Bagnoli

The TRACKS organization (local hiking and trail development) has played a vital role in the development of approximately 200 miles of trails throughout the White Mountains. Our volunteer-based organization (350+ members) has received statewide recognition for its leading role in implementation and construction of trails. We are pleased to have assisted the Arizona Game and Fish Department with trail construction to increase access to the newly-construction fish ponds and wetland located near the Old Hatchery Trail, and your agency's addition of an ADA-compliant trailhead viewing platform for everyone to enjoy.

The proposal to the Arizona Water Protection Fund Commission is an exciting opportunity to protect the projects completed in the past, and allow for additional opportunities in the future. Our environment and access to nature through trails is a primary economic driver within our community and region. The wetland is used to raise the federally threatened narrow-headed garter snake and rear the federally threatened Chiricahua leopard frog. In order to maintain these vital programs, a sustainable water source is required. The Pinetop-Lakeside Aquatic Wildlife Enhancement Project will alleviate this concern.

The TRACKS organization fully endorses the Pinetop-Lakeside Aquatic Wildlife Enhancement Project, and the collaboration between your agency and the Town of Pinetop-Lakeside. We encourage the Arizona Water Protection Fund Commission to fund this important project in our community and region.

Respectfully

A handwritten signature in blue ink that reads "Jim Snitzer".

Jim Snitzer
TRACKS Board President

Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19

August 27, 2018



Chris Bagnoli, Pinetop Regional Supervisor
Arizona Game and Fish Department
2878 E. White Mountain Boulevard
Pinetop, AZ 85935

Re: Arizona Water Protection Fund Grant Opportunity
Pinetop-Lakeside Aquatic Wildlife Enhancement Project

Dear Mr. Bagnoli,

Save Our Park is a grassroots organization that has worked diligently to preserve our natural environment. Our primary focus is associated with Woodland Lake Park located in the Town of Pinetop-Lakeside. Our agency also supports other endeavors such as the Pinetop-Lakeside Aquatic Wildlife Enhancement Project. Water is one of our most valuable resources for sustaining our delicate ecosystem. Riparian preservation is always a main theme within our agency and our community. In the past, our organization has also supported the Billy Creek Riparian Restoration Project, made possible by the Arizona Water Protection Fund.

The Pinetop-Lakeside Aquatic Wildlife Enhancement Project has so many important factors associated with our recreational and economic vitality. The people who visit or live in our region appreciate the ability to commune with nature. Our trail systems intertwine with riparian areas and its abundant wildlife of all types. The Pinetop-Lakeside Aquatic Wildlife Enhancement Project, upon completion, will offer an opportunity for everyone to capture nature at its best while reminding us of the importance of our environment. The project's interpretive signage will inform the visitor of riparian and wetland benefits and our area's indigenous species. The project location is a gateway to the Old Hatchery Trail that is part of the White Mountains 200 mile trail system.

Save Our Park considers the partnership between the Arizona Game and Fish Department and the Town of Pinetop, and the Pinetop-Lakeside Aquatic Wildlife Enhancement Project a perfect fit for the Arizona Water Protection Fund grant. Thank you for the opportunity to support this project and project benefits.

Sincerely,

A handwritten signature in cursive script that reads "K. Barbara Teague". The ink is dark and the signature is fluid and legible.

K. Barbara Teague
President, Save Our Park

Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19

White Mountain Audubon Society



August 27, 2018

Chris Bagnoli, Pinetop Regional Supervisor
Arizona Game and Fish Department
2878 E. White Mountain Boulevard
Pinetop, AZ 85935

Re: Arizona Water Protection Fund Application - Pinetop-Lakeside Aquatic Wildlife Enhancement Project

Dear Mr. Bagnoli

The White Mountain Audubon Society is pleased to support the Arizona Game and Fish Department's application for the Pinetop-Lakeside Aquatic Wildlife Enhancement Project. The White Mountain Audubon Society's mission is dedicated to the enjoyment of birds and other wildlife by providing environmental leadership and awareness through fellowship, education, community involvement, and conservation programs in the White Mountains and surrounding areas. Our mission closely aligns with the Arizona Game and Fish Department project's mission, especially in respect to the riparian and wildlife viewing aspects.

The Pinetop-Lakeside Aquatic Wildlife Enhancement Project will be enjoyed by visitors and communities annually, especially those wishing to engage and commune with wildlife in an easily accessible setting. The combination of all the elements comprising the project will educate the general public while attracting a myriad of wildlife to a central area, including the feathered variety. The project, upon completion, will be an easily ADA accessible environment, with wetland, fish ponds connected to trail systems, and with integrated educational/interpretive signage.

The White Mountain Audubon Society fully supports this endeavor, and if you wish to further discuss the attributes and merits of this project, please feel free to contact me at 928.367.2462.

Sincerely

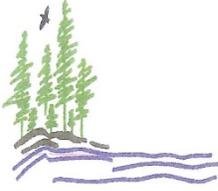
Mary Ellen Bittorf, President
White Mountain Audubon Society

P.O. Box 3042

Pinetop, AZ 85935

928-367-2462

**Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19**



**White Mountains Land Alliance, Inc.
White Mountains Land Trust**

425 S. Woodland Road, Lakeside, Arizona 85929
PO Box 581, Pinetop, Arizona 85935
928-358-3069 www.wmlandtrust.org

Protecting Precious Places in the White Mountains for all to enjoy.

August 27, 2018

Chris Bagnoli, Pinetop Regional Supervisor
Arizona Game and Fish Department
2878 E. White Mountains Boulevard
Pinetop, AZ 85935

Re: Arizona Water Protection Fund
Pinetop-Lakeside Aquatic Wildlife Enhancement Project

Dear Mr. Bagnoli

The White Mountains Land Trust/Alliance is a nonprofit whose overarching goal is to foster a balance between growth and meaningful protection and conservation of natural resources and wildlife. We work to achieve long-term conservation of landscapes, natural areas and wildlife habitat while accommodating responsible growth and economic development. Our agency is recommending the Arizona Game and Fish Department's proposal.

Our mission closely aligns with the Pinetop-Lakeside Aquatic Wildlife Enhancement Project. We believe the proposal encourages the network of natural areas, recreational trails, and protected lands that connect people with nature. The area discussed within the proposal is vital to several riparian areas, and the fact that it is located at the Arizona Game and Fish Department's Pinetop regional headquarters will help insure long-term program sustainability. Sustainability is vital as some of the programs associated with the project nurture several federally threatened species. This project is imperative to their population, and demonstrates responsible stewardship of our environment.

It is our desire that the Arizona Water Protection Fund Commission advance the Pinetop-Lakeside Aquatic Wildlife Enhancement Project for funding.

Respectfully

A handwritten signature in blue ink, appearing to read 'Jim Snitzer', is written over a light blue horizontal line.

Jim Snitzer
President, White Mountains Land Trust

**Arizona Game and Fish Department AWPB Grant Application
Pinetop-Lakeside Aquatic Wildlife Enhancement Project FY-19**



Blue Ridge Unified School District #32
1200 West White Mountain Blvd.
Lakeside, AZ 85929
(928) 368-6126
FAX 928-368-5570
Website: www.brusd.org

Dr. Michael L. Wright
Superintendent of Schools

August 24, 2018

Chris Bagnoli, Pinetop Regional Supervisor
Arizona Game and Fish Department
2878 E. White Mountain Boulevard
Pinetop, AZ 85935

Re: Arizona Water Protection Fund Grant
Pinetop-Lakeside Aquatic Wildlife Enhancement Project

Dear Mr. Bagnoli,

Blue Ridge Unified School District is pleased to support the collaborative effort between the Arizona Game and Fish Department and the Town of Pinetop-Lakeside. The Pinetop-Lakeside Aquatic Wildlife Enhancement Project is an important tool for our region. Wildlife preservation and viewing is a way of life for our community and students. In the past, BRUSD worked in close unison on the Billy Creek Riparian Area Restoration Project, also funded by the Arizona Water Protection Fund.

The Pinetop-Lakeside Aquatic Wildlife Enhancement Project offers another venue for our community, and especially our students to visit and to learn about the native aquatic life in our area in a non-traditional classroom setting.

Blue Ridge Unified School District fully endorses the Pinetop-Lakeside Aquatic Wildlife Enhancement Project. The project represents the overall community attitude concerning preservation and enhancement initiatives involving our local and regional assets.

Sincerely,

Dr. Michael L. Wright
Superintendent of Schools

A Class III Archaeological Survey of the Arizona Game and Fish Department Pinetop Region Headquarters in Pinetop-Lakeside, Navajo County, Arizona

Prepared for:

Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85056
(602) 942-3000

Arizona Antiquities Act Blanket Permit No. 2013-031bl
ASM Accession No. 2013-0178

Project Report No. 2013-006

Prepared by:
Michael Stubing

Submitted by:
Mark L. Chenault, PhD, RPA
Manager, Archaeology/Cultural Resources

JACOBS™

101 North 1st Avenue, Suite 3100
Phoenix, Arizona 85003-1902
(602) 253-1200



A Class III Archaeological Survey of the Arizona Game and Fish Department Pinetop Region Headquarters in Pinetop-Lakeside, Navajo County, Arizona

Prepared for:

**Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85056
(602) 942-3000**

**Arizona Antiquities Act Blanket Permit No. 2013-031
ASM Accession No. 2013-0178**

Prepared by:

Michael Stubing

Submitted by:

**Mark Chenault, PhD, RPA
Manager, Archaeology/Cultural Resources Group**

JACOBS™

**101 North 1st Avenue, Suite 3100
Phoenix, Arizona 85003-1902
(602) 253-1200**

Project Report No. 2013-006

December 2013

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Abstract

Project Title: Class III Archaeological Survey of the Arizona Game and Fish Department (AGFD) Pinetop Region Headquarters in Pinetop-Lakeside, Navajo County, Arizona.

Project Description: A non-disturbing Class III (intensive field inspection) cultural resources survey to locate and evaluate cultural resources prior to a proposed pond refurbishment and wetland creation project at the AGFD Pinetop Region headquarters. The survey also provides a cultural resources inventory of the AGFD Pinetop Region headquarters property for any future projects.

Agency: AGFD.

Project Numbers: N/A.

Land Status/Jurisdiction: State of Arizona-owned land, administered by AGFD.

Location: The area of potential effects (APE) consists of the AGFD Pinetop Region Headquarters property located in the town of Pinetop-Lakeside in Navajo County, Arizona. It is situated in the north half of Section 4, Township 8 North, Range 23 East, Gila and Salt River Baseline and Meridian (Indian Pine [1977/1985] and Lakeside [1976/1984] 7.5-minute USGS maps).

Permit Numbers: Arizona Antiquities Act blanket permit number 2013-031(b), issued by the Arizona State Museum (ASM); ASM accession number 2013-0178.

Number of Surveyed Acres: 35.4 acres.

Date(s) of Field Survey: March 26 and 27, 2013.

Number of Cultural Resources: One historic site, four road segments, and one isolated occurrence (IO) of cultural materials.

List of Register Eligible Properties: AZ Q:13:27 (ASM), recommended eligible under criteria A, C, and D.

List of Register Ineligible Properties: Four road segments and one IO, recommended not eligible.

List of Properties for Which Eligibility Is Not Determined: N/A.

Assessment of Effect and Treatment Recommendations: Prior to a proposed pond refurbishment and wetland creation project at the AGFD Pinetop Region

headquarters a Class III archaeological survey was conducted. The proposed project consists of the following tasks: Remove original earthen dams and associated concrete outlets and spillway structures on three existing fish ponds; construct three new earthen dams and associated contouring for two replacement fish ponds and one new wetland; construct an outlet drain system for the ponds and wetland; construct three new concrete control structures within each dam; line two ponds with underlayment and pond liner; construct a water junction box; construct a water delivery pipeline from the water junction box to the ponds and wetland; repair leaks in the original pipeline from the southeast corner of the APE to the hatchery building; construct drainage ditches to prevent water running off parking lots from entering ponds or wetlands; construct an access road from the currently existing paved parking to Dam Number 2; install an electrical line to the ponds and wetland; landscape around the ponds and wetland; construct ungulate exclusion/security fencing around the ponds and wetland; and construct an educational trail and viewing platform, with information signs.

One historic site, four road segments, and one IO of cultural materials were identified as a result of a literature review of site records and a field survey of the APE. AZ Q:13:27 (ASM), the historic site, is recommended as eligible for the National Register of Historic Places (NRHP) under criteria A, C, and D. The four road segments and the IO are recommended as not eligible for the NRHP.

Most of the proposed pond refurbishment and wetland creation project will avoid the features within AZ Q:13:27 (ASM). The project will result in the following impacts to the site:

- The proposed wetland will cover Feature 13 (a portion of a concrete reservoir base),
- Construction of a water junction box within an existing junction box adjacent to Feature 10 (fish hatchery building), and
- Repair leaks to Feature 16 (water pipeline).

In addition, construction of Dam 1 will cover a portion of Road Segment 3.

Although Feature 13 will be covered by the proposed wetland, it will not be destroyed and will be preserved by the wetland. As such, this is not considered an adverse effect to AZ Q:13:27 (ASM). The existing water junction box adjacent to Feature 10 was constructed at a later date than the original building, and is not considered a contributing feature to the hatchery building. As such, construction of a water junction box within the existing box is not considered an adverse effect to the hatchery building or to the site. Repair and maintenance of existing waterlines are considered permissible activities under Arizona State Historic Preservation Office guidelines; therefore work on

Feature 16 should be allowed to proceed. Road Segment 3 is recommended as not eligible for the NRHP, and no further work is recommended for this property.

Based on the above assessment, the proposed pond refurbishment and wetland creation project will result in either no adverse effects to AZ Q:13:27 (ASM) or will utilize permissible activities within the site, and will not affect any other NRHP-recommended properties in the APE. Therefore, no further work is recommended for the APE for this project. Avoidance is recommended for any proposed and future projects that will impact AZ Q:13:27 (ASM). If avoidance is not possible, mitigation plans and memorandums of agreement among the consulting parties should be developed and implemented. It is recommended that a qualified architectural historian document any features of the site that may be affected by any future projects.

No further work is recommended for the four road segments and the IO.

Collections: N/A.

Repositories: Arizona State Museum.

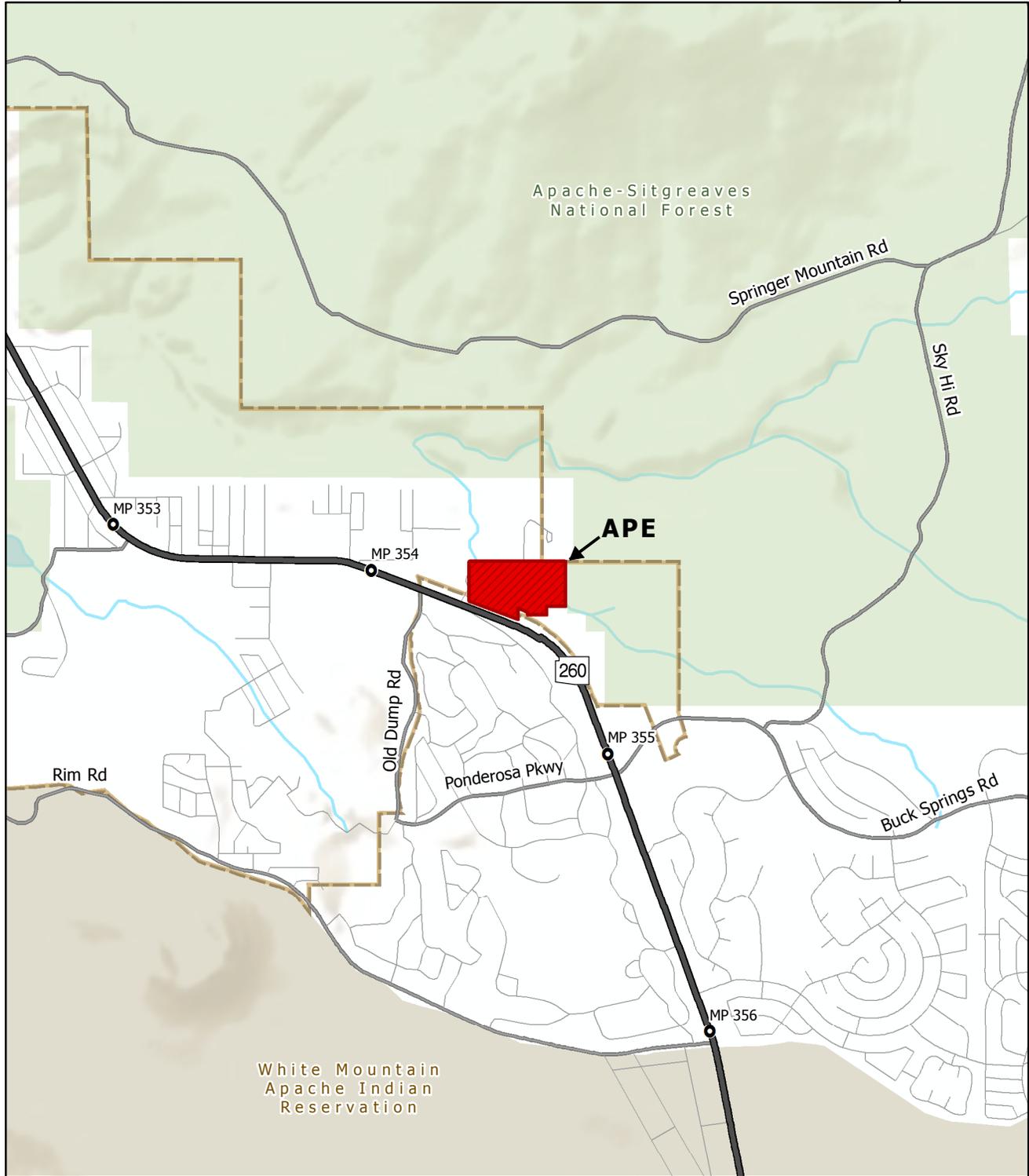
Introduction

This report presents the results of a Class III archaeological survey of the Arizona Game and Fish Department (AGFD) Pinetop Region Headquarters property in Pinetop-Lakeside, Navajo County, Arizona (Figures 1-4). The survey was conducted at the request of the AGFD to determine whether significant cultural resources exist prior to a proposed pond refurbishment and wetland creation project at the AGFD Pinetop Region Headquarters. The survey also provides a cultural resources inventory of the AGFD Pinetop Region headquarters property for any future projects. For the purposes of this investigation, the term "cultural resources" refers to prehistoric or historic archaeological sites or objects and potentially significant historic buildings or structures. The area of potential effects (APE) for this project is situated on State of Arizona-owned land administered by the Arizona Game and Fish Commission. This project will be federally funded; as such, it is considered a federal undertaking as defined in 36 CFR § 800.16 (y), the regulations implementing the National Historic Preservation Act. Improvements include renovation of existing reservoirs at the facility, upgrading of a water pipe, and possible work at several dams located within the property.

The APE consists of an irregularly shaped parcel of land that encompasses the AGFD Pinetop region headquarters facility on the north edge of State Route 260 in Pinetop-Lakeside. The APE has maximum dimensions of approximately 1,704 feet (ft.) east-west by 1,090 ft. north-south; it encompasses approximately 35.4 acres of land. It is situated in the north half of Section 4, Township 8 North, Range 23 East, Gila and Salt River Baseline and Meridian (T8N, R23E, GSRB and M) (Indian Pine [1977/1985] and Lakeside [1976/1984] 7.5-minute USGS maps).

The proposed pond refurbishment and wetland creation project consists of the following tasks: Remove original earthen dams and associated concrete outlets and spillway structures on three existing fish ponds; construct three new earthen dams and associated contouring for two replacement fish ponds and one new wetland; construct an outlet drain system for the ponds and wetland; construct three new concrete control structures within each dam; line two ponds with underlayment and pond liner; construct a water junction box; construct a water delivery pipeline from the water junction box to the ponds and wetland; repair leaks in the original pipeline from the southeast corner of the APE to the hatchery building; construct drainage ditches to prevent water running off parking lots from entering ponds or wetlands; construct an access road from the currently existing paved parking to Dam Number 2; install an electrical line to the ponds and wetland; landscape around the ponds and wetland; construct ungulate exclusion/security fencing around the ponds and wetland; and construct an educational trail and viewing platform, with information signs.

The survey was conducted under an Arizona Antiquities Act blanket permit (2013-031b) and a project accession number (2013-0178) issued to Jacobs by the Arizona State Museum (ASM). Field methods and documentation for this project conform to all applicable professional standards and policies, including those stipulated in *Archeology*



LEGEND

- | | |
|---------------------------------|--|
| State Highway | Town of Pinetop-Lakeside |
| Local Roadways | Apache-Sitgreaves National Forest |
| Streams | White Mountain Apache Indian Reservation |
| Area of Potential Effects (APE) | |



Scale
0 0.25 0.5
Miles

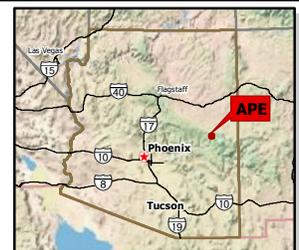


Figure 1. General location of the area of potential effects (APE).

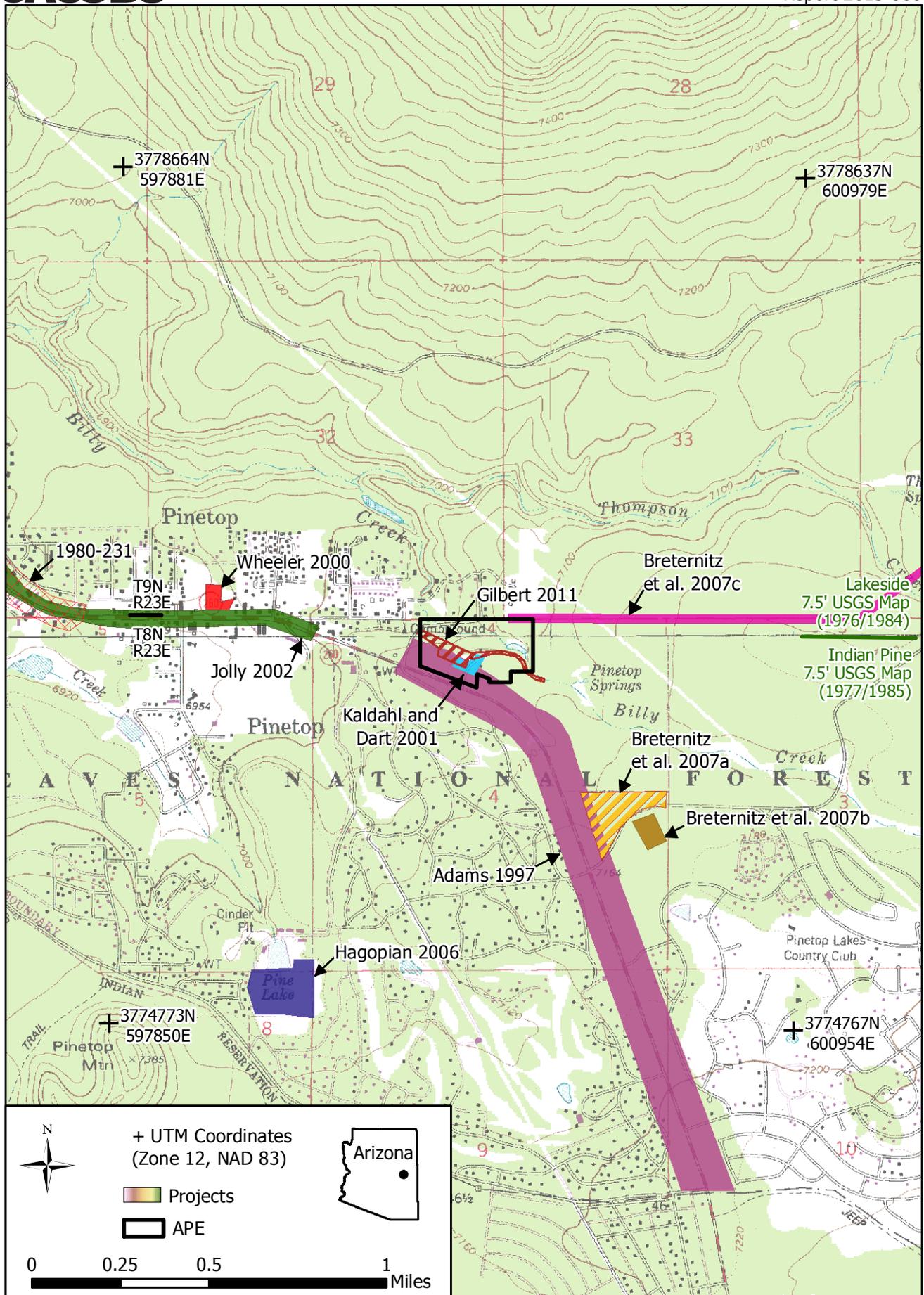


Figure 2. Location of the APE showing previous cultural resource projects within a one-mile radius.

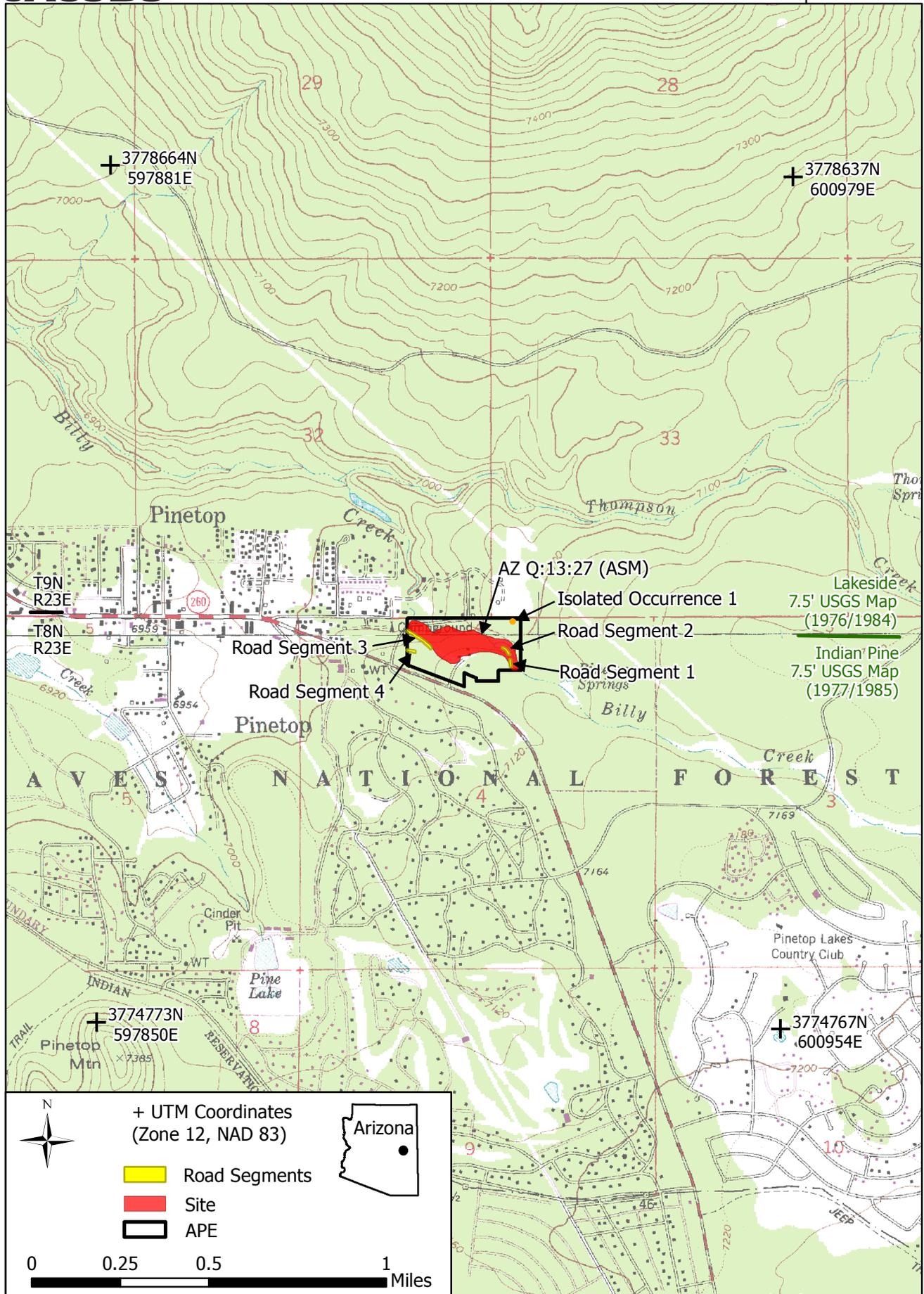


Figure 3. Location of cultural resources identified within the APE.

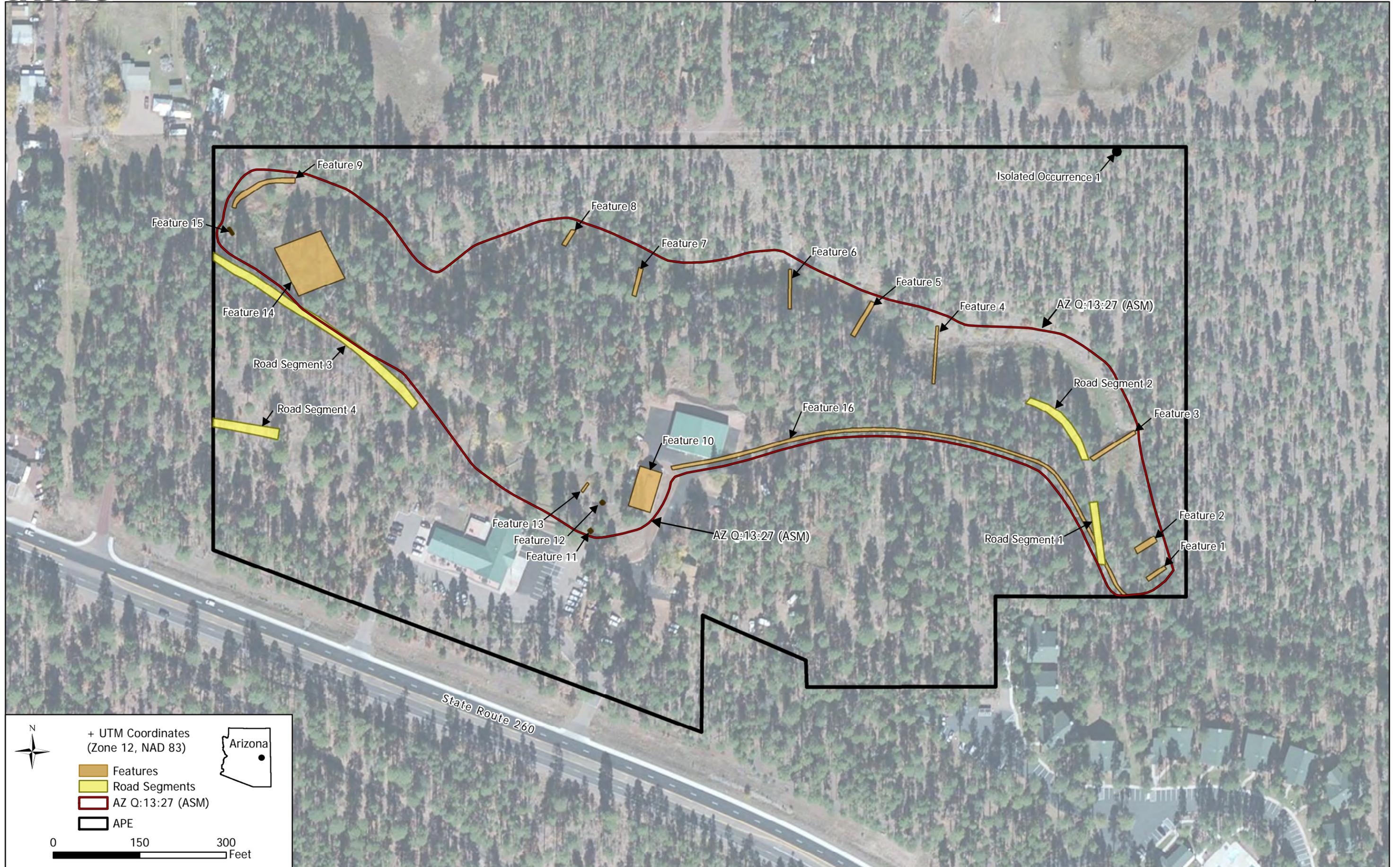


Figure 4. Aerial view of the APE and identified cultural resources.

and Historic Preservation: Secretary of the Interior's Standards and Guidelines (National Park Service 1983) and the *ASM Site Recording Manual* (1993), as amended (Fish 1995).

The survey was conducted under the direction of Mark Chenault (project manager) and Michael Stubing (project director). The survey was conducted by Michael Stubing on March 26 and 27, 2013; a total of 2 person field days were spent on the survey. One historic site, four road segments, and one isolated occurrence (IO) of cultural materials were identified as a result of a literature review of site records and a field survey of the APE.

Environmental Setting

The APE is located in east-central Arizona, in a hilly area along Billy Creek. It is situated approximately 1.5 miles (mi.) from the Mogollon Rim. Billy Creek flows seasonally in a northwesterly direction in the vicinity of the APE, and is part of the Little Colorado River watershed. The elevation of the APE varies from approximately 7,010 ft. above mean sea level (amsl) to 7,111 ft. amsl. The region is located in the Colorado Plateau physiographic province, which is characterized by sedimentary rock of the Paleozoic and Mesozoic eras (Chronic 1983). The APE is situated in a transitional region between the Rocky Mountain and Madrean Montane Conifer Forest biotic community, dominated by Ponderosa Pine, and the Plains and Great Basin Grassland community, characterized by Oak and various grasses (Brown 1994). Plant types from both communities are present in the APE.

The APE consists of mostly hilly, undulating terrain, with some level areas present. Billy Creek extends from the southeast corner of the APE to the northwest corner, with slopes of varying steepness along both banks. The area included both undisturbed and disturbed portions. Disturbance consisting of historic and modern buildings, parking lots, storage areas, dams, and reservoirs was present throughout the parcel.

Cultural Context

This section presents a cultural history of the region encompassing the APE and vicinity. As noted by Upham (1988) "periodization schemes" often focus on readily visible archaeological remains. The less visible remains may contain cultural transitions that bridge what are now considered gaps in our knowledge of prehistory. The cultural progression of the Ancestral Puebloans in the vicinity of the APE does not match well with the traditional Pecos Classification cultural chronology (Kintigh 1996). However, the Basketmaker and Pueblo period and phase names are utilized here to offer some structure; note that the cultural markers in the vicinity of the APE sometimes occur at slightly different times from those more commonly associated with particular phases of the Pecos Classification.

Paleoindian Period (ca. 10,000–6500 B.C.)

Cultural resources dating to the Paleoindian period are represented in Arizona by isolated projectile points and scattered archaeological sites (Faught and Freeman 1998; Huckell 1982). Paleoindians are commonly thought to have been highly mobile, following big game, as indicated by large kill sites of late Pleistocene megafauna associated with Clovis and Folsom fluted projectile points. A recent study focusing on the Folsom tradition suggests that Paleoindians may have been less mobile than once thought, and that their choice of land use may have been in consideration of more predictable resources, such as water, wood, lithic materials, and the presence of smaller, less mobile game (Andrews et al. 2008). The Paleoindian period can be divided into Early (10,000–9000 B.C.), Middle (9000–8000 B.C.), and Late (8000–6500 B.C.) periods, which are distinguished primarily through their corresponding projectile point forms (i.e., Clovis, Folsom, and Eden/Cody-Belen complex), all of which are categorized as spear points (Tagg 1994).

Several isolated Clovis points have been found in east-central Arizona, and two have been found in sites with mixed contexts (Huckell 1982). Clovis points are relatively large and narrow; they have concave bases, and are fluted on both sides (Tagg 1994). A re-worked Clovis point found in the Chevelon Ruin area indicates that Paleoindian points may have been curated, re-worked, and re-used by later Ancestral Puebloan people (Hesse 1995).

East-central Arizona contains most of the known Folsom points in Arizona (Huckell 1982). Folsom points are smaller and thinner than Clovis points, with 'eared' concave bases and flutes that typically extend across the entire length of the point (Tagg 1994). It appears that east-central Arizona was heavily utilized by Folsom people, probably due to the abundance of grasslands that would have enticed fauna and, therefore, the humans who hunted them. In addition, there is a large quantity of naturally occurring chert and other high-quality lithic materials in the vicinity of the APE that would have been attractive for fashioning stone tools.

Eden/Cody-Belen projectile points of the late Paleoindian period are long and thin with no fluting, but with regular, parallel flaking along the length of the blade, and slight stems (Tagg 1994). A possible Belen point and a Cody-Belen projectile point base were recovered north of the APE (Brown and Courtright 2002; Neily 1988). Several projectile point bases attributed to the Eden complex have been recorded near St. Johns (Huckell 1977 in Tagg 1994:96).

Archaic Period (ca. 6500 B.C.–A.D. 300)

The Archaic period followed the Paleoindian and is marked by an increase in the number of cultural resource sites in Arizona. In east-central Arizona, the Archaic populations appear to have been mobile hunter-gatherers. Archaic habitations have been excavated from beneath deep floodplain deposits in southern Arizona and indicate that plant cultivation and permanent settlements existed during the Archaic period

(Gregory 1999, 2001; Mabry 1998; Mabry et al. 1997). These sites are characterized by ground stone tools used for processing wild seeds, slab-lined storage pits, and “sleeping circles” (Mabry and Faught 1998). Archaic projectile points consisted of dart points hafted to throwing spears and, like the preceding Paleoindian period, have been used as temporal markers to assign relative dates to sites for which no chronometric dating methods can be used.

The Early Archaic (6500–5000 B.C.) in east-central Arizona is recognized by the presence of Jay-type projectile points (Tagg 1994). Jay points are characterized by large points with stems that are slightly contracting and bases that are convex and often equal to or longer than the blade length (Tagg 1994:96). A Jay-type projectile point was collected from the surface of a possible Archaic site located north of the APE (Brown and Courtright 2002).

Middle Archaic (5000–1500 B.C.) projectile points in this region are known as Pinto points, which are sub-classified as belonging to the Bajada phase (4800–3200 B.C.) if they are not serrated or to the San Jose phase (3200–1800 B.C.) if they are serrated (Tagg 1994:98). Two Bajada-style projectile points were collected from the surface of sites located north of the APE (Brown and Courtright 2002).

Archaeological investigations sponsored by the Arizona Department of Transportation (ADOT) in the Lower Tonto Basin, west of the APE, found evidence of a late Middle Archaic occupation consisting of a buried artifact scatter/use area and three features: a rock-filled pit, a cluster of fire-cracked rocks, and a pile of unmodified river cobbles (Huckell 2004:234). A piece of charcoal recovered from the site yielded a date of approximately 4000 B.P. (Huckell 2004:237). Although not associated with absolute chronometric dates, several sites within the Tonto Basin southwest of the APE contained Archaic projectile points, and the flaked stone artifact assemblages at other sites exhibited traits that were interpreted as being possibly Archaic (Knoblock et al. 2003; Rapp et al. 1998). Some of these sites are thought to be short-term camps, others to be limited-use sites (Barz 1998:Table 15.3).

San Pedro points emerged in the Late Archaic (1500 B.C.–A.D. 300) (Tagg 1994). It is often difficult to distinguish Archaic San Pedro points from those of the next period, Basketmaker, as they share many of the same attributes, both being fairly large dart points with notches and flat to convex bases (Tagg 1994). A San Pedro point was collected from the surface of a site located north of the APE (Brown and Courtright 2002). ADOT-sponsored work by Desert Archaeology, Inc. west of the APE, has revealed the remains of two shallow pit structures that have been cross-dated with artifacts from between 800 B.C. and A.D. 500 (personal communication, S. Herr 2008). Recent research also suggests that agriculture was introduced to the greater Southwest region, and likely the project area, during the Late Archaic period (Herr 2009).

Basketmaker Period (A.D. 300–A.D. 800)

Agriculture -including the cultivation of corn and squash- and permanent habitations became more common in the Basketmaker period that followed the Archaic period. Evidence of nets and snares dating to this time have been recovered, and hunting was also aided by the use of the atlatl. Artifacts such as abalone and olivella shell beads indicate that trade occurred with inhabitants on the Pacific coast (Gumerman 1984:62). Settlements consisted of shallow pithouses, often with an associated storage pit for each house, that appear to have been accessed via a roof entry (Longacre 1964). Projectile points, though similar to the Late Archaic, are slightly thinner and were produced using more uniform flaking (Tagg 1994:101).

The Basketmaker III period (A.D. 500–800) saw larger settlements in east-central Arizona, with deeper and larger pithouses in small villages (Longacre 1964). Pottery production and larger two-hand manos and metates indicate that people were less nomadic (Gumerman 1984:65). Although settlements were larger, the population appears to have remained similar in size to that of the preceding phase (Longacre 1964). Both Mogollon and Ancestral Puebloan pottery are present in the vicinity of the APE by this time, with Alma Plain brownware attributed to the Mogollon and Lino Gray to the Ancestral Puebloan (Longacre 1964).

Puebloan Period (ca. A.D. 800–A.D. 1450)

The APE is within the northernmost portion of the Mogollon culture area and the southernmost limits of the Ancestral Puebloan area. Ceramics are the primary means of distinguishing the two groups; although ceramics were present during the preceding Basketmaker period, they became ubiquitous in the Ancestral Puebloan period, as populations became more settled.

The Pueblo I period (ca. A.D. 800–950) introduced Black-on-white ceramics, with the most commonly found types being White Mound, Kiatuthlanna, and Red Mesa (Longacre 1964:208). San Francisco Red, Lino Gray, and Alma Plain are also found during this time. Corrugated plainware with incised necks are present. Most of the corrugated vessels appear to be cooking pots and the incised decoration may have been functional, as well as visually appealing, by providing extra surface area that would conduct heat more effectively (Gumerman 1984:79–80). Maize agriculture increased in relation to other crop production, and small settlements containing up to 15 pithouses with associated storage pits and some coursed masonry were present (Longacre 1964). Some houses had lateral entrances (as opposed to top entry); there does not seem to have been a discernable planned pattern to the placement of houses (Longacre 1964). This type of pithouse village has characteristics similar to the Mogollon; sites such as the Bear Village in the Forestdale Valley, south of Show Low, have traits that can be attributed to both the Ancestral Puebloans and the Mogollon (Reid 1989). Burials exhibit differential cranial deformation, which could indicate that different cultures were within the same village (Reid 1989:73). In New Mexico, Chaco Canyon began its rise as the center of the Chacoan cultural system (Doyel 1992).

The Pueblo II period (A.D. 950–1100) saw the construction of planned towns in the vicinity of the APE, with villages of several surface rooms at first, then rectangular above-ground blocks of rooms (Longacre 1964). Settlements are larger and more numerous than in the preceding phase. Population is presumed to have increased at this point. However, some studies suggest that the population remained the same, but that the overall number of non-village sites decreased, as people who still were practicing a predominately hunter-gatherer lifestyle joined with the more sedentary agriculturalists (Upham 1988). Chaco Canyon flourished during this period (Doyel 1992) and kivas appear in the vicinity of the APE with “Great Kivas” found in larger settlements that may have been central villages surrounded by smaller villages with small or no kivas (Longacre 1964). This formation suggests that the Great Kivas were communally used by inhabitants of the surrounding villages. This patterning of villages (smaller villages surrounding a larger village with a Great Kiva) may indicate a hierarchical political system based on redistribution of goods or a central storage place where local goods were kept for trade (Upham et al. 1981).

Approximately twenty miles north of the APE, the Carter Ranch Pueblo was excavated by the Chicago Natural History Museum in 1961 and 1962 (Martin et al. 1964). With approximately 39 rooms, the Carter Ranch Pueblo contained a kiva, plaza, and a Great Kiva (Rinaldo 1964). The occupation of Carter Ranch Pueblo spanned from A.D. 950 in the Pueblo II period to around A.D. 1150 or 1200 in the Pueblo III period (Martin 1964:226). LeBlanc (1989:349) notes that while the Great Kiva at Carter Ranch appears to “mimic” a Chacoan outlier, the site is missing the traits that are typically attributed to Chacoan outliers: the walls are not core and veneer, the pueblo does not have extra-large rooms, and there is not an “orderly, rapid building plan.” Further, although Great Kiva-sized structures have been documented along the Silver Creek drainages, these structures apparently had no roofs or raised roofs, neither of which are associated with Chacoan outliers (Herr 2001). Cordell (1996:229) indicates that there are no Chacoan outliers within the Silver Creek drainage.

In the Pueblo III period (A.D. 1100–1300), sites were larger but fewer in number as the population aggregated into masonry pueblos situated near major drainages (Longacre 1964). There is well-documented evidence of severe drought between A.D. 1130–1180 and whereas the Chacoan system appears to have crumbled in A.D. 1150, and many areas in northeastern Arizona saw large-scale abandonment, populations within the vicinity of the APE appear to have changed more gradually (Cordell 1996). Broken K Pueblo, located approximately 27 miles north of the APE, dates from between A.D. 1150 and A.D. 1280; it contained 95 rooms in four large roomblocks surrounding a plaza (Hill 1970). This population aggregation may have been a response to the extended drought or other factors, as population aggregation is “...socially difficult and economically inefficient” (Cordell 1996:230). Excavations at Broken K Pueblo indicate that at the end of its occupation there was less reliance on cultivated crops, and more emphasis on wild plants (Hill 1970). There was also a much higher ratio of storage rooms to habitation

rooms in the later occupation. A second severe drought in A.D. 1276–1299 (Reid 1989) may have contributed to further aggregation in the Pueblo IV period.

Aggregation may have been, in part, a response to warfare (LeBlanc 1999). Sites may have been larger as a defensive measure, in addition to a response to the changing environment. Haas and Creamer (1996:205) indicate that warfare activities may have been limited to “wife-stealing,” destruction of others’ resources, and raiding of supplies, but not necessarily hand-to-hand combat.

The Pueblo IV period (A.D. 1300–1450) saw the population in the general region concentrated in the Silver Creek Valley and the Little Colorado Valley (Longacre 1964:210). Other sites were abandoned as the population settled in large pueblos containing several kivas and a large plaza area (Longacre 1964). Great Kivas were no longer being constructed, and the area was completely abandoned by A.D. 1450.

The reasons for abandonment of the area have been debated for years, and are not explored fully here. Environmental pressures, such as drought and decrease in temperature, landscape degradation, overpopulation, and warfare have all been postulated as contributing factors. The common consensus is that the Ancestral Puebloans migrated from the area to form the present-day puebloan people, such as the Hopi and Zuni (Adams 1981; Anyon 1992; Ferguson 1981; Kintigh 1985).

Protohistoric Period (A.D. 1450–1700)

The date range for the protohistoric period is much debated in the Southwest (Gilpin and Phillips 1998; Ravesloot and Whittlesey 1987; Wells 2006; Woodson 2002). Consequently, a definitive timeline for the period has yet to be established. Some reasons for this are that there are few recognized protohistoric sites in the archaeological record, and the Spanish occupation of the area (which traditionally marks the beginning of the historic period) began at various times in different portions of the Southwest. However, it is generally accepted that the Ancestral Puebloan cultural occupations do not appear in the archaeological record of this area after A.D. 1450, and that the Spanish presence was established in Arizona by A.D. 1700.

When and where the Navajos first settled in the Southwest is still under debate; a general consensus has yet to be established (Brugge 1983). However, the Navajos themselves, and some ethnologists and archaeologists, attribute an entrance at around the twelfth or thirteenth century (Iverson 2002). The Navajo word *‘Anaasázi* can be translated as “those non-Navajos who lived beside the Navajos but not among them many generations ago,” thus indicating that the Navajos may have been in the Southwest during the Ancestral Puebloan occupation (Walters and Rogers 2001:324). However, archaeological evidence of such a co-existence has not been reported.

In A.D. 1539, the Spanish explorer Fray Marcos de Niza and Estevan the Moor entered northern Arizona and encountered the Zuni; Estevan was subsequently killed (Gilpin and

Phillips 1998). A year later the Francisco Vásquez de Coronado expedition traveled to Zuni, and sent armed troops to Hopi (Gilpin and Phillips 1998). The Spanish attempted to convert the Puebloan people to Christianity, sending several padres to Hopi and Zuni, beginning in A.D. 1629 (Gilpin and Phillips 1998). The Pueblo Revolt of A.D. 1680 sent a clear message that the Pueblos preferred their own religion. However, the Spanish obtained a somewhat successful reinstatement of some of their missions in A.D. 1692 (Gilpin and Phillips 1998).

Spanish explorers noted that the Navajo were the only “Apaches” (the general Spanish term for those of assumed Athapaskan affiliation) to practice full-scale agriculture (Brugge 1983). Although practicing agriculture, the Navajos were still very mobile, traveling to hunt and gather other resources (Brugge 1983:491), and it is likely that they ventured into the vicinity of the APE. The Navajos aided the Pueblos during the 1680 revolt and were often at war with the Spanish (Brugge 1983).

It appears that the Western Apache were settled in Arizona by the 1600s (Basso 1983); in 1598, Oñate reported that Apaches were at Acoma in New Mexico (Gilpin and Phillips 1998). Most likely, they lived within the vicinity of the APE at that point, but Euroamericans had not yet settled the area, and little archaeology has been conducted on early Apache sites that would yield further information.

Historic Period (A.D. 1700–Present)

Ethnohistorical accounts indicate that the Apache cultivated maize, beans, and squash, but like the Navajo, also placed a heavy reliance on hunting and gathering (Basso 1983:465). The introduction of agriculture caused the originally nomadic Apache to establish more sedentary residences, necessary to tend crops. The Apache incorporated the horse (introduced by the Spanish) as a major part of their subsistence, and used it for carrying both people and goods, and as food. The horse enabled the Apache to increase their range, and thus increase the resources available to them. By the mid 1700s, the Apache boasted a trade and raiding system that spanned from northern Arizona into Mexico (Basso 1983:465).

As Spanish settlements grew, they began to encroach upon Apache territories. This caused an increase in Apache raiding and warfare against the Spanish. According to Basso (1983:466), raiding provided a means for the Apaches to obtain livestock and foodstuffs; in contrast, warfare was usually a vengeance act, retaliation for Spanish attempts at controlling the Apache. Due to the increasing frequency of violent interactions with the Apache, Viceroy Bernardo de Gálvez instituted a policy in 1786 for “controlling” the Apache. This policy was effective in subduing the Apache for a short time; however, after 1821 (when Mexico attained independence from Spain), the supplies given to the Apaches could no longer be afforded. Most Apaches left the presidios and returned to their original homelands (Basso 1983:466-467).

The Western Apache resumed their raiding in 1831, prompting the Mexican government to endeavor to exterminate all Apache. This action spurred Apache warfare, and large portions of the Mexican population subsequently declined (Basso 1983:466-467). After the Gadsden Purchase (signed in 1853, ratified in 1854 [Walker and Bufkin 1986]), Euroamerican settlers and prospectors entered and encroached upon Apache territory. The United States government, like the Mexican government, vowed to eradicate the Apache (Basso 1983:480).

The Navajos embraced the introduction of sheep and horses, brought over by the Spanish (Iverson 2002). As the United States government pushed westward, the Navajos were often accused of livestock stealing and other crimes. In 1861, a treaty negotiated by Major Edward R.S. Canby was enacted, which acknowledged that the Navajos had been subjected to constant slave raids by New Mexicans, and that they were entitled to rations (Roessel 1983). Despite this and other treaties, the Navajos were still subjected to slave raids and hostile treatment. In 1860, the Navajos attacked the Army's Fort Defiance. In 1863, the United States Army forced more than 9,000 Navajos on "the Long Walk" from their homeland to Fort Sumner, in New Mexico. At least ten percent of the Navajos died along the journey (Roessel 1983). In 1868, after much public outcry, the Navajos were permitted to return to their homeland.

In 1876, the Church of Latter Day Saints directed 200 people to establish settlements along the Little Colorado River and surrounding areas (Levine 1977). Navajo County was formed in 1895, and ranching and cattle raising became primary economic activities in the region. The Pinetop-Lakeside region was settled in the last quarter of the 19th century, with logging also playing a vital role in its growth.

Previous Research

Prior to conducting the survey, Jacobs conducted a background literature review to identify previously recorded cultural resource sites and historic properties, historic resources (homesteads, buildings, roads, etc.), and previous archaeological investigations within the APE and a surrounding one-mile radius.

Research was conducted at the following agencies:

- ASM (AZSITE)
- Arizona State Historic Preservation Office (SHPO)
- Bureau of Land Management Phoenix Public Records Office (for General Land Office plat maps and notes, and Master Title Plat information)
- Arizona Department of Water Resources (ADWR)
- United States Army Corps of Engineers National Inventory of Dams
- Navajo County Assessor's Office
- AGFD internal documents

In addition, discussions were conducted with several current and former employees of the AGFD Pinetop Region Headquarters with knowledge of the area.

Results

Background research identified 10 previously conducted archaeological investigations (Table 1) within the search area; no previously recorded cultural resource sites were shown within the search radius. Four previous surveys encompassed portions of the APE. Locations of previously conducted archaeological investigations and cultural resource sites are shown on Figure 2.

The GLO notes and plat map of T8N, R23E, GSRB and M (Plat No. 00296, surveyed in 1906 and 1908, filed in 1910) were examined for evidence of historical resources. A road oriented northwest-southeast extends through the western portion of the APE, continuing to Snowflake to the northwest and Springerville to the southeast. A saw mill with the accompanying notation of H.J. Hanson is shown in the vicinity of the extreme northwest corner of the APE. Due to the scale and lack of detail, it could not be determined if the saw mill was located within the APE or not.

Table 1. Previously Conducted Cultural Resource Investigations Within a One-Mile Radius of the APE.

Reference	Location/Proximity to the APE	Type of Investigation	Results of Investigation Within a One-Mile Radius of the APE
Adams 1997	Within APE	Survey	Nothing encountered
Breternitz et al. 2007a	0.36 mi. southeast	Survey	Nothing encountered
Breternitz et al. 2007b	0.51 mi. southeast	Survey	Nothing encountered
Breternitz et al. 2007c	Within APE	Survey	Nothing encountered
Gilbert 2011	Within APE	Survey	14 water catchment or control structures
Hagopian 2006	0.89 mi. southwest	Survey	Nothing encountered
Jolly 2002	0.28 mi. west	Survey	Nothing encountered
Kaldahl and Dart 2001	Within APE	Survey	Nothing encountered
Wheeler 2000	0.55 mi. west	Survey	Nothing encountered
1980-231	0.95 mi. west	Survey	Nothing encountered

Field Methods and Results

The survey was completed by systematically examining the APE using north-south oriented pedestrian transects spaced 20 m (66 ft.) apart. These methods provided

complete (100 percent) coverage of the APE. Notes regarding the APE were recorded on standardized forms; the APE was also documented with digital photographs. A Garmin Etrex global positioning system unit was used to obtain the Universal Transverse Mercator (UTM) location of the APE boundaries and feature locations. Ground visibility ranged from fair to poor, with approximately fifty percent of the surface open to observation and the rest covered with pine needles. One historic site, four road segments, and one isolated occurrence of cultural materials were identified as a result of the literature review and field survey of the APE. These are described individually below.

Results

The site, road segments, and IO found within the APE are described separately below.

AZ Q:13:27 (ASM) (Previously designated AZ Q:13:7 [NRCS])

Land Jurisdiction: State of Arizona, administered by the Arizona Game and Fish Commission

Legal Description: In the north half of the north half of Section 4, T8N, R23E, GSRB and M

Site Type: Complex of dams, water control features, and other features related to the Pinetop Fish Hatchery

Cultural Affiliation/Age: Historic/modern

Elevation: 7,010-7,096 ft. amsl

Maximum Dimensions: 1,750 ft. northwest-southeast x 500 ft. northeast-southwest

NRHP Status: Recommended eligible under criteria A, C, and D

Description: AZ Q:13:27 (ASM) consists of a complex of features related to the Pinetop Fish Hatchery that are located throughout the AGFD Pinetop Region Headquarters property, including along the section of Billy Creek that flows through the property (Figure 5). The features consist of three concrete dams, five rock dams/water control features, and one rock and earth diversion dam that are along Billy Creek, and the fish hatchery building, two water junction boxes, a portion of the base of a holding basin, a fish raceway, a concrete wall, and a metal waterline that are situated throughout the APE (Table 2). Overall AZ Q:13:27 (ASM) is in fair condition. Individual features vary in their states of preservation from good to poor, and have been disturbed by flooding, erosion, and vandalism.

Extensive research of archival records was conducted as part of the survey, including ADWR dam records, USACE National Inventory of Dams, GLO plat maps and field notes, Master Title Plat information at BLM, and the Navajo County Assessor's Office. With the exception of the fishery building, archival research did not produce any significant information regarding the features or when they were constructed. No physical evidence was found on any of the features to establish absolute dates, other than general attributes of workmanship and construction. Discussions with AGFD personnel

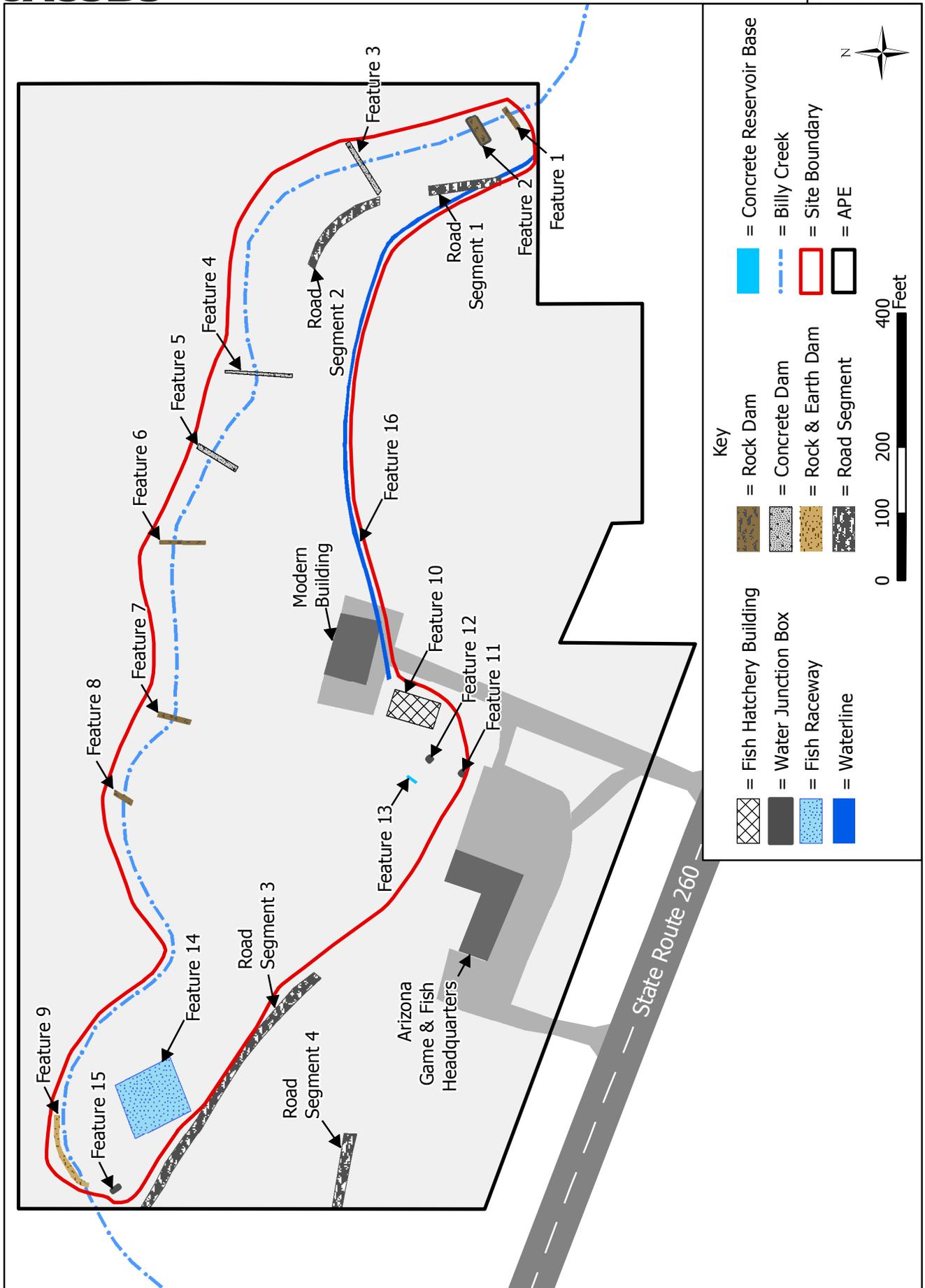


Figure 5. Site AZ Q:13:27 (ASM).

Table 2. Features Within AZ Q:13:27 (ASM).

Feature Number	Feature Type
1	Rock dam/water control feature
2	Rock dam/water control feature
3	Concrete buttress dam
4	Concrete buttress dam
5	Concrete and rock dam
6	Rock dam/water control feature
7	Rock dam/water control feature
8	Rock dam/water control feature
9	Rock and earth diversion dam
10	Fish hatchery building
11	Water junction box
12	Water junction box
13	Concrete reservoir base
14	Fish raceway
15	Concrete wall
16	Metal waterline

that worked at the Pinetop Region Headquarters and other local residents indicated that the features predated the employment of those working there, but no absolute or relative dates could be established.

Documents from AGFD indicate that the Pinetop Hatchery became a primary source of trout for stocking around the region from 1932 to 1954. In 1954 the water source for the hatchery, Pinetop Springs, experienced diminished flows due to drought, and the hatchery was closed. According to AGFD records, the hatchery property was converted to a Regional Wildlife Management Office for AGFD in the early 1960s. The hatchery was operated intermittently from the 1960s to the 1990s when the water flow was sufficient.

The sixteen features that make up AZ Q:13:27 (ASM) are described individually below. Those features along Billy Creek (Features 1-9) are described first; descriptions of Features 10-16, which are located on a ridge overlooking Billy Creek, along a slope above the creek, and on the bank adjacent to it, follow.

The five rock dams/water control features are similar in morphology and construction. They were made of dry-laid (no mortar or concrete), locally obtained, unaltered basalt rocks that vary in size from 0.2 to 2.5 ft. Construction appears to have consisted of rough-stacking the rocks on top of each other. The features are generally rectangular in plan view, the sides appear to have been roughly vertical when constructed, but are in various states of collapse currently. All are oriented perpendicular to Billy Creek which flows seasonally from the southeast to the northwest, and extend from bank to bank across the creek. The features vary in preservation, but all have at least some collapsed sections and all allow water to pass over and under with little to no impoundment upstream. They do not appear to have been maintained or repaired recently.

Two of the concrete dams (Features 3 and 4) are of a type designated buttress dams. These are so-called as they employ a sloping face on the upstream side, with buttresses on the opposite side that support the face. Pressure from impounded water pushes the buttresses downward, providing reinforcement for the structure. Buttress dams use significantly less material for construction than other types of dams. They became popular in the early 20th century, and continue to be a very popular dam type. They are often associated with the Ambursen Dam Company of New York and San Francisco, which held some of the original patents for buttress dams.

Features 3 and 4 are very similar in design and construction to a dam designed by the Ambursen Dam Company that was built in Papago Park in Phoenix. The Papago Park plans were drawn in 1932 for the Arizona Game and Fish Commission. It is unknown if Ambursen Dam Company designed additional dams for the Game and Fish Commission, including any within the APE.

Feature 1: Feature 1 is a rock dam/water control feature located in the extreme southeast portion of the APE (Figures 6-7). A metal sluice gate frame is present on the upstream (southeast) face of the feature; however, it is not functioning and is partially covered by collapsed rock. The feature is oriented northeast-southwest, and is 38 ft. long, 8-10 ft. wide, and 2-3 ft. high. It is in fair to poor condition, with most of the rocks in the center collapsed and the ends relatively intact.

Feature 2: Feature 2 is a rock dam/water control feature located approximately 55 ft. downstream (northwest) of Feature 1 (Figures 8-9). It is oriented northeast-southwest, and is 39 ft. long, 8.5-11 ft. wide, and 1.5-2.0 ft. high. It is in fair to poor condition, with most of the rocks in the center collapsed and the ends relatively intact.



Figure 6. AZ Q:13:27 (ASM), Feature 1, looking upstream (northwest).



Figure 7. AZ Q:13:27 (ASM), Feature 1, looking northeast.



Figure 8. AZ Q:13:27 (ASM), Feature 2, looking upstream (northwest).



Figure 9. AZ Q:13:27 (ASM), Feature 2, looking northeast.

Feature 3: Feature 3 is a poured concrete, buttress dam located near the eastern edge of the APE (Figure 10). Feature 3 is oriented northeast-southwest, perpendicular to Billy Creek, and extends from bank to bank across the creek although it does not impound water due to broken sections within the dam. It has a sloped face on the upstream (southeast) side (Figure 11), with triangular buttresses supporting the sloped face on the downstream (northwest) side (Figure 12). This creates an open or hollow area on the downstream portion of the dam (Figure 13). The dam has a narrow, level surface across the top. It is 103.5 ft. long, and varies in width from 5.0 ft. at the base to 2.0 ft. at the level top surface. The top of the dam is level; however, its height relative to the ground surface ranges from level with the modern ground surface at the southwest end to a maximum of 6.0 ft. above on the upstream side and 8.0 ft. above on the downstream side near the center of the creek channel.

An opening or gate is present in the center of the upstream dam face, but is broken and covered with vegetation. A metal sluice gate frame is also present near the center of the dam, but is also broken. A metal eyebolt is embedded in the top of the dam near the northeast end.

The feature was constructed of formed concrete. Metal rebar is exposed in a broken section near the center of the dam (Figure 14), and also protrudes in several places. Feature 3 is in poor condition, with the broken section near the center allowing water to flow through. Numerous pieces of broken concrete are present in the creek bed near the feature, and a modern railing with ten upright metal posts and a cable has been installed on top of the dam. Some graffiti is also present on the concrete surfaces.

Feature 4: Feature 4 is a poured concrete, buttress dam located near the east-central portion of the APE (Figures 15-16). The feature is oriented slightly east of north, perpendicular to Billy Creek, across which it extends from bank to bank. Water impounds upstream of the dam, and a small pond was present at the time of the survey. Feature 4 is similar in construction to Feature 3, with a sloped face on the upstream (southeast) side (Figure 17) and triangular buttresses supporting the sloped face on the downstream (northwest) side (Figure 18). Feature 4 also has open or hollow areas on the downstream portion of the dam. A narrow, level surface is located on top of the dam, capping the buttresses and sloping face. Feature 4 is 106 ft. long. It varies in width from 10.0 ft. at the base to 2 ft. 9 inches (in.) at the top. The top of the dam is level; however, its height relative to the ground surface ranges from level with the modern ground surface at the banks to a maximum of 10.0 ft. above on the downstream side near the center of the creek channel.

Two outlets or spillways are located on the dam (Figures 19-21). A box-like opening near the center of the upstream face and a partially broken concrete spillway on the opposite downstream side functioned as an outlet for water. Slots in the concrete indicate that a gate may have been present, although no other evidence of one was



Figure 10. AZ Q:13:27 (ASM), Feature 3, looking north at the upstream (southeast) face of the dam.



Figure 11. AZ Q:13:27 (ASM), Feature 3, looking west at the sloping upstream (southeast) face of the dam.



Figure 12. AZ Q:13:27 (ASM), Feature 3, looking southeast at the buttresses on the downstream (northwest) face of the dam.



Figure 13. AZ Q:13:27 (ASM), Feature 3, looking east at the downstream (northwest) face of the dam.



Figure 14. AZ Q:13:27 (ASM), Feature 3, looking south at the downstream (northwest) face of the dam and the broken section.



Figure 15. AZ Q:13:27 (ASM), Feature 4, looking northwest at the upstream (southeast) face of the dam.



Figure 16. AZ Q:13:27 (ASM), Feature 4, looking west at the upstream (southeast) face of the dam.



Figure 17. AZ Q:13:27 (ASM), Feature 4, looking north at the sloping upstream (southeast) face of the dam.



Figure 18. AZ Q:13:27 (ASM), Feature 4, looking southeast at the buttresses on the downstream (northwest) face of the dam.



Figure 19. AZ Q:13:27 (ASM), Feature 4, looking downward at the outlet on the upstream (southeast) face of the dam.



Figure 20. AZ Q:13:27 (ASM), Feature 4, looking southeast at the spillway near the center of the downstream (northwest) face of the dam.



Figure 21. AZ Q:13:27 (ASM), Feature 4, looking south at the spillway near the northeast end of the dam.

observed. The opening is rectangular and is 4 ft. 11 in. parallel to the long axis of the dam, 3 ft. 1.5 in. perpendicular to the long axis, and 3 ft. 7 in. high.

A second spillway consisting of a wing-wall and two openings is located on the northeast end of the dam. The wing-wall extends 13 ft. 8 in. downstream of the dam, is 8.5 in. wide, and varies from 2 ft. 8 in. to 4 ft. 3 in. high. The two openings are 4 ft. 6 in. long and 2 ft. 3 in. high.

Several curving, concrete sluice channels are located at the base of the downstream side of the dam, along with two low, 1.5 to 2.0 ft. high walls made of rocks cemented together with unsmoothed concrete.

The dam was constructed of formed concrete; portions of the wood forms are still present on some sections of the downstream side of the sloped dam face. Metal rebar is exposed in several sections and protrudes from the dam in other areas. A metal eyebolt is located on the top of the dam at the southwest end.

Feature 4 is in fair condition. Water flows through the bottom, but appears to do so in openings intended for that purpose and water does impound upstream of the dam. Some sections of the dam are broken, including the spillways and sluice channels. Modern, upright poles have been installed on the top of the dam, although no cable is present between them. Modern graffiti is also present on the downstream side of the feature.

Feature 5: Feature 5 is a poured concrete and rock dam located in the east-central portion of the APE (Figure 22). Feature 3 is oriented northeast-southwest, perpendicular to Billy Creek, and extends from bank to bank across the creek. Water does impound upstream of this dam, and a pond was present at the time of the survey. Feature 5 has a presumably vertical concrete face on the upstream (southeast) side, and a sloping surface on the downstream (northwest) face, although water and vegetation prevented full observation of the base of the dam (Figures 23-24). The top of the feature is narrow and level. Feature 5 is 55 ft. long, and varies in width from an estimated 2 to 3 ft. at the base to 1 ft. 3 in. along the top. The top of the dam is level; however, its height relative to the ground surface ranges from level with the modern ground surface at both ends to a maximum of 4 ft. above the center of the creek channel.

A rectangular, box-like opening is located near the center of the dam and currently allows water to flow through a broken section (Figure 25). Slots in the concrete along the opening suggest that it may have been used as a gate for regulating the flow of water through the dam, although no other evidence of a gate was observed. The opening measures 3 ft. 1 in. parallel to the dam and 2 ft. 8 in. perpendicular to it. A spillway is located near the northeast end of the dam, and measures 6 ft. 6 in. parallel to the dam and 4 ft. 8 in. perpendicular to it.



Figure 22. AZ Q:13:27 (ASM), Feature 5, looking northwest at the upstream (southeast) face of the dam.



Figure 23. AZ Q:13:27 (ASM), Feature 4, looking west showing the vertical upstream face, the center outlet, and the northeast spillway.



Figure 24. AZ Q:13:27 (ASM), Feature 5, looking east at the downstream (northwest) face of the dam.



Figure 25. AZ Q:13:27 (ASM), Feature 5, looking northeast at the center outlet.

Feature 5 appears to have been constructed by cementing local rocks into place with concrete. The surfaces on the upstream and top of the dam have been smoothed or were possibly constructed with forms; the downstream surface is rough with exposed rock present. Overall, the construction is more rough-hewn than the Features 3 and 4, the other two concrete dams within AZ Q:13:27 (ASM). Feature 5 is in fair condition. It is mostly intact, although sections at the center outlet and northeast spillway are broken and allow water to flow through.

Feature 6: Feature 6 is a rock dam/water control feature located in the east-central portion of the APE (Figures 26-27). It was constructed of two parallel walls of stacked rock, separated by a distance of 2 to 2.5 ft. The feature is oriented northeast-southwest, and is 70 ft. long. Each wall is approximately 3.0 ft. wide; the total width of both walls and the area separating them is 10-11 ft. The top of the feature slopes downward from the ends to the center, parallel to the existing ground surface. The walls vary in height, from 0.5 ft. at each end to a maximum height of 4.0 ft. near the center of the feature. Feature 6 is in fair to poor condition, with most of the rocks in the center collapsed and the ends relatively intact.

Feature 7: Feature 7 is a rock dam/water control feature located in the north-central portion of the APE (Figures 28-29). It was constructed of two parallel walls of stacked rock, separated by a distance of 2 to 2.5 ft. The feature is oriented northeast-southwest, and is 49.0 ft. long. Each wall is approximately 3.0 ft. wide; the total width of the feature is approximately 9.0 ft. The top of the feature slopes downward from the ends to the center, parallel to the existing ground surface. The walls vary in height from 3.0-5.0 ft. throughout their length. Feature 7 is in fair to poor condition, with most of the rocks in the center collapsed and the ends relatively intact (Figure 30).

Feature 8: Feature 8 is a rock dam/water control feature located in the northwest portion of the APE (Figures 31-32). It was constructed of two parallel walls of stacked rock, separated by a distance of 2 to 2.5 ft. Only the walls north of the creek are present; no evidence of the dam was found south of the drainage. The feature is oriented northeast-southwest, and is 30.0 ft. long. Each wall is approximately 3.0 ft. wide; the total width of both walls and the area separating them is 10-11 ft. The top of the feature slopes downward from the ends to the center, parallel to the existing ground surface. The walls vary from 1.0-4.0 ft. in height. Feature 8 is in poor condition; most of the north wall is collapsed although the south wall is relatively intact.

Feature 9: Feature 9 is a diversion dam made of rock and earth that is located in the northwest corner of the APE (Figures 33-35). The feature is curvilinear, arcing from southwest to northeast, with the concave portion to the southeast. Feature 9 is located in the general drainage of Billy Creek; however, the creek flows around the southwest end of the feature. It is 127.0 ft. long, 12-14 ft. wide at the base, and 3.0-4.0 ft. wide along the slightly rounded but generally level top. Feature 9 varies from 3.0-4.0 ft. high, with sloping sides.



Figure 26. AZ Q:13:27 (ASM), Feature 6, looking at the upstream (southeast) face of the dam.



Figure 27. AZ Q:13:27 (ASM), Feature 6, looking southwest.



Figure 28. AZ Q:13:27 (ASM), Feature 7, looking northwest at the upstream (southeast) face of the dam.



Figure 29. AZ Q:13:27 (ASM), Feature 7, looking southwest.



Figure 30. AZ Q:13:27 (ASM), Feature 7, looking southeast at a well-preserved section of feature.



Figure 31. AZ Q:13:27 (ASM), Feature 8, looking north.



Figure 32. AZ Q:13:27 (ASM), Feature 8, looking west at parallel walls.



Figure 33. AZ Q:13:27 (ASM), Feature 9, looking north.



Figure 34. AZ Q:13:27 (ASM), Feature 9, looking west.



Figure 35. AZ Q:13:27 (ASM), Feature 9, looking north.

Several pieces of broken concrete are present near the southwest end of the feature and may have been the remains of an opening, although no other evidence of such was found. A flat, level slab of concrete is located southwest of the southwest end of Feature 9. The slab has a functioning metal gate. It could not be determined if slab and gate were associated with Feature 9, or represent a separate feature.

Feature 9 was constructed using dry-laid, unaltered, stacked rock, with soil placed over and within the feature. Feature 9 is in fair condition. The majority of the rock and earth berm is intact; however, there is broken concrete associated with it and some damage from erosion is present.

Information from the Show Low/Pinetop-Woodland Irrigation Company, Incorporated in Show Low indicates that Feature 9 is a diversion dam constructed to channel water into three nearby culverts to protect a road that is immediately northwest of the feature. No information on when the dam was constructed was available, but the company indicated that has been maintained and repaired and is currently in use.

Feature 10: Feature 10 is the historic Pinetop Fish Hatchery building that is located near the center of the APE (Figures 36-39). The building is rectangular in plan view, oriented northeast-southwest, with a sloping roof capped with a clerestory. It is constructed of brick on a concrete slab; the lower four feet of the walls are concrete, with brick above. The roof is sloping, capped with a clerestory, and covered with asphalt shingles. Windows are present on all sides of the building; with doors on the north and south sides. Feature 10 is 70.0 ft. long, 40.0 ft. wide, and is an estimated 25.0 ft. high.

The building is in relatively good condition. Some holes in the brick and other areas were observed. The building has been continuously maintained and repaired, and is currently used for research and storage purposes.

Documents from AGFD and a plaque that was removed from the building indicate that construction began in 1930 and was completed in 1932; however, the building became operational in 1931. The plaque indicates that the structure was designed by the architectural firm of Lescher and Mahoney.

Feature 11: Feature 11 is a concrete water junction box that is located approximately 75 ft. southwest of Feature 10 (Figures 40-41). The feature is square, open on top, with inlets/outlets on all four sides and in three corners. It is constructed of formed concrete, and is 3 ft. 4 in. on each side. The exterior height is 2 ft. 4 in.; the interior measures 3 ft. 3 in. high. According to AGFD personnel, it was used to control the flow of water from the hatchery building into nearby basins. Feature 11 is in fair condition, with some broken concrete and weathered sections.



Figure 36. AZ Q:13:27 (ASM), Feature 10, looking northeast at the hatchery building.



Figure 37. AZ Q:13:27 (ASM), Feature 10, looking southeast at the hatchery building.



Figure 38. AZ Q:13:27 (ASM), Feature 10, looking west at the hatchery building.



Figure 39. AZ Q:13:27 (ASM), Feature 10, looking northwest at the hatchery building.



Figure 40. AZ Q:13:27 (ASM), Feature 11, looking east.



Figure 41. AZ Q:13:27 (ASM), Feature 11, looking downward into the junction box.

Feature 12: Feature 12 is a concrete water junction box, very similar to Feature 11, that is located approximately 40 ft. west of Feature 10 (Figures 42-43). The feature is square, open on top, with inlets/outlets on all four sides and in three corners. It is constructed of formed concrete, and is 3 ft. 4 in. on each side. The exterior height is 2 ft., 4 in. and the interior is 3 ft. 7 in. As with Feature 11, Feature 12 was apparently used to control the flow of water from the hatchery building into nearby basins. Feature 12 is in fair condition, with some broken concrete and weathered sections.

Feature 13: Feature 13 is a small section of an exposed concrete basin that is located 80 ft. west of Feature 10 (Figures 44-45). According to AGFD personnel, the feature is the remnant of a basin used to store fish from the hatchery; the remainder of the basin has been removed. The exposed concrete consists of several separate pieces in a roughly linear alignment. The exposed surface is very rough and uneven, possibly from modern construction and the removal of the rest of the basin. The total area of exposed concrete is 18.0 ft. northwest-southwest by 3.0 ft. northwest-southeast. Feature 13 is in poor condition, and has been almost entirely destroyed.

Feature 14: Feature 14 consists of an elaborate, concrete raceway for holding fish, several earthen berms, and the area enclosed by the berms (Figures 46-51). The raceway is located on a slope on the south bank of Billy Creek; the berms and enclosed area are on a level area at the base of the slope. The feature is located in the northwest corner of the APE. The raceway used gravity-fed water to flow into the top of the raceway, through a series of interconnected troughs, into the enclosed area, and then into the adjacent berm. Water for the raceway came through a channel along a natural drainage at the top of the slope.

The raceway consists of eight separate troughs that are parallel with each other, and with each successive trough positioned lower on the slope than the previous one. Water flowed into the uppermost trough at its northeast end, flowed the length of the trough to the southwest end, then entered the next lower trough through a connecting channel. After flowing to the northeast end of that channel, the water was conducted to the next successive trough, and continued in a similar fashion to the bottom of the raceway. Constrictions, known as raceway bulkheads, are present in the center of each trough, and were constructed to create shorter sections in the raceway channels, establish and maintain desired water levels, and aerate the water (National Resources Conservation Service 2009). Concrete pipes extend from the end of each trough, and metal frames are present on the inside of the troughs to control flow into these pipes.

The raceway is 92.0 ft. from the top to the bottom (northwest-southeast) and 86.0 ft. wide (northeast-southwest). The troughs are also 86.0 ft. long, 5.5 ft. wide, and have an average depth of 2 ft. 4 in., although debris in the bottom prevented consistent measurements. The raceway is constructed of poured and framed concrete. It is in fairly good condition and is mostly intact, although there are numerous broken sections



Figure 42. AZ Q:13:27 (ASM), Feature 12, looking southeast.



Figure 43. AZ Q:13:27 (ASM), Feature 12, looking downward into the junction box.



Figure 44. AZ Q:13:27 (ASM), Feature 13, looking northwest.



Figure 45. AZ Q:13:27 (ASM), Feature 13, looking north.



Figure 46. AZ Q:13:27 (ASM), Feature 14, looking southeast at the raceway.



Figure 47. AZ Q:13:27 (ASM), Feature 14, looking southeast at the raceway.



Figure 48. AZ Q:13:27 (ASM), Feature 14, looking south at the raceway.



Figure 49. AZ Q:13:27 (ASM), Feature 14, looking northwest at the raceway.



Figure 50. AZ Q:13:27 (ASM), Feature 14, looking west at the raceway.



Figure 51. AZ Q:13:27 (ASM), Feature 14, looking west at a typical constriction.

and holes throughout and sediment and debris in the troughs. Ponderosa pine trees up to two ft. in diameter are located within the raceway.

Three connected berms at the base of the raceway form an enclosed area that measures 86.0 ft. northeast-southwest by 48.0 ft. northwest-southeast. An adjacent berm extends from the enclosed area to the southwest; it is 78.0 ft. long. The berms vary from 13.0-16.0 ft. wide at their base, 4.0-6.0 ft. wide at the top, and are 3.0-5.0 ft. high. The berms appear to be made from soil piled over rocks, based on several exposed sections. They are in fair condition, mostly intact with some eroded areas.

Feature 14 was apparently used to hold fish in running water conditions. The raceway allowed maximum use of the available space and water, channeling water from the hatchery above into the troughs which held fish, before returning the water to Billy Creek below. No date could be established for the construction and use of Feature 14 through archival sources or physical evidence at the feature; however, the presence of large ponderosa pines within the feature suggests that it is more than 40 years old, and likely was contemporaneous with the use of the hatchery building.

Feature 15: Feature 15 is a concrete wall and adjacent level area that is located in the northwest corner of the APE, approximately 70 ft. northwest of Feature 14 (Figures 52-53). The wall is oriented northwest-southeast, and is 11 ft. 9 in. long, 1 ft. 5 in. wide, and 2 ft. 2 in. high. The north face of the wall extends above the ground surface, however, the south edge of the wall is flush with the ground surface which has been leveled. The level area extends approximately 11.0 ft. south of the wall. The wall is constructed of poured and framed concrete; the level area is earthen with no other formal preparation observed. Several large pieces of broken concrete are present at the base of the wall; it is unknown if they are associated with it.

No date could be established for Feature 15. Based on the level area and short vertical wall, it may have functioned as a loading platform. The proximity of Feature 14 suggests that they may be associated, although this could not be determined with certainty.

Feature 16: Feature 16 is a waterline that extends from Feature 10 to the southeast corner of the APE, in the east half of the APE (Figures 54-55). A boundary plat map of the APE prepared in 1988 indicates that the waterline extends southeast of the APE approximately 400 ft. to Pinetop Springs. Water from this spring, conveyed by gravity-feed, supplied the hatchery operation within the APE. Based on the plat map, the water line extends northeast of Feature 10, curves to the east, then extends southeast to Pinetop Springs.

The pipe is located beneath the ground, and could not be observed with the exception of two areas in the southeast portion of the APE at which modern excavations had been done to expose and repair the pipe. The two areas are approximately 50 ft. apart, and



Figure 52. AZ Q:13:27 (ASM), Feature 15, looking south at the wall.



Figure 53. AZ Q:13:27 (ASM), Feature 15, looking southeast at the wall.



Figure 54. AZ Q:13:27 (ASM), Feature 16, looking southeast at the exposed waterline.



Figure 55. AZ Q:13:27 (ASM), Feature 16, looking southeast at the exposed waterline.

expose 3.0-5.0 ft. of pipe in each location. Based on these areas, the water line consists of a 1.0 ft. diameter metal pipe that is buried approximately 0.5-1.0 ft. below the modern ground surface. It is in poor condition, very rusted with numerous holes and patched sections observed. The age of the water line could not be determined; however, the condition of the pipe and discussions with AGFD personnel suggest that this may be the original line to supply the hatchery.

Road Segments

Four separate road segments were found within the APE (Figures 4 and 5). The segments are similar in construction, consisting of alignments that have been cleared of rocks, trees, and other obstructions. The surface of all the segments is earthen, with no formal covering or pavement. No edge markings or other features were observed in association with any of the segments. They are described individually below.

Road Segment 1: Road Segment 1 is located in the southeastern portion of the APE and was constructed into the slope along the southeast bank of Billy Creek (Figures 56-57). It is relatively straight and is oriented northwest-southeast. Road Segment 1 is 125.0 ft. long and varies from 12.0-14.0 ft. wide.

Road Segment 2: Road Segment 2 is located in the east-central portion of the APE, along the southeast bank of Billy Creek and approximately 80 ft. northwest of Road Segment 1 (Figures 58-59). It is possible that the two segments were originally connected and formed a continuous road. Road Segment 2 curves slightly from southeast to northwest. It is 140.0 ft. long and varies from 12.0 to 14.0 ft. wide.

Road Segment 3: Road Segment 3 is located in the northwest corner of the APE, and is located along a slope above Feature 14 of AZ Q:13:27 (ASM) (Figures 60-61). The northwest end of the segment terminates at a modern road beyond the APE; the southeast end is located at an area of modern construction. Road Segment 3 curves gradually from southeast to northwest. It is 440.0 ft. long, and 10.0-14.0 ft. wide.

Road Segment 4: Road Segment 4 is located on a slope near the west boundary of the APE; the northwest end of the road terminates at a modern road immediately west of the APE (Figures 62-63). The road is relatively straight, oriented northwest-southeast, and is 110.0 long and 10.0-12.0 ft. wide. Two ponderosa pine trees, 1.5 ft. in diameter, are located within the roadbed near the southeast end.

Isolated Occurrence

One isolated occurrence (IO 1), was found in the northeast corner of the APE (Figures 64-65). IO 1 is located along the fence on the northern boundary of the APE; approximately half of it is within the APE, and the other half is located beyond the APE. IO 1 consists of an estimated 50-75 metal cans and 10-20 glass fragments, and is considered a waste pile as defined by the SHPO context statement on historical-period



Figure 56. Road Segment 1, looking northwest.



Figure 57. Road Segment 1, looking northwest.



Figure 58. Road Segment 2, looking southeast.



Figure 59. Road Segment 2, looking northwest.



Figure 60. Road Segment 3, looking southeast.



Figure 61. Road Segment 3, looking northwest.



Figure 62. Road Segment 4, looking northwest.



Figure 63. Road Segment 4, looking southeast.



Figure 64. Isolated Occurrence 1, looking northwest.



Figure 65. Isolated Occurrence 1, metal beer can.

waste deposits (Sullivan and Griffin 2005). The waste pile is approximately 20.0 ft. east-west by 6.0 ft. north-south.

The cans are in various states of preservation, from whole cans to fragments. They include church-key opened, rolled seam beer cans; a blue, white, and red label was partially visible on two cans. The label was faded, but appeared to include the words/letters "Dog"; "...RA"; "MALT LIQUOR"; and "EXTRA MELLOW." These cans were 4 ¾ in. tall by 2 ¾ in. in diameter. Also found were hole in top fruit and meat cans with rolled seams.

The glass consisted of clear soda bottle fragments, including one with a "Barq's label, blue, wide-mouth screw top pieces, and a clear, probable liquor bottle top. Various clear pieces were also present.

Based on the artifacts present it appears that IO 1 likely dates from the 1940s to the 1960s (Rock 1987; Toulouse 1971). The presence of the beer cans suggests that IO 1 postdates 1947, as cans were not widely used for packaging beer prior to then (Martells 1976; Rock 1987:29). It is possible that IO 1 was associated with construction of a power transmission line that is in the immediate vicinity.

Summary and Recommendations

Jacobs completed a Class III archaeological survey of 35.4 acres encompassing the AGFD Pinetop Region Headquarters property in Pinetop-Lakeside. The survey was conducted to locate and evaluate cultural resources prior to a proposed pond refurbishment and wetland creation project at the AGFD Pinetop Region headquarters. The survey also provides a cultural resources inventory of the AGFD Pinetop Region headquarters property for any future projects. One historic site, four road segments, and one IO of cultural materials were identified as a result of the survey. Recommendations for the individual cultural resources for the National Register of Historic Places (NRHP) and treatment recommendations are presented below.

NRHP Recommendations

The NRHP criteria for evaluation state that historic properties should:

- A. Be associated with events that have made a significant contribution to the broad patterns of our history; or
- B. Be associated with the lives of persons significant in our past; or
- C. Embody the distinct characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. Yield, or be likely to yield, information important in prehistory or history.

Further, a property must be evaluated by its association with an important historic context and retain integrity of those features necessary to convey its significance (National Park Service 1991). Using the above criteria, all cultural resources observed during the survey were evaluated for eligibility for inclusion in the NRHP.

AZ Q:13:27 (ASM)

AZ Q:13:27 (ASM) consists of a complex of features related to the Pinetop Fish Hatchery that are located throughout the AGFD Pinetop Region Headquarters property, including along the section of Billy Creek that flows through the property. Overall AZ Q:13:27 (ASM) is in fair condition. Individual features vary in their states of preservation from good to poor, and have been disturbed by flooding, erosion, and vandalism.

AZ Q:13:27 (ASM) is recommended as eligible for the NRHP under criteria A, C, and D. The complex is one of the better examples of historic fish hatcheries in Arizona, and as such is considered eligible for the NRHP under criterion A for its association with the context of historical fish-raising in the state. The hatchery building, designated Feature 10, retains integrity of design, setting, location, and workmanship, and is recommended as eligible for the NRHP under criterion C as an example of the public works projects of the well-known architectural firm of Lescher and Mahoney. In addition, AZ Q:13:27 (ASM) is considered register-eligible under criterion D for its potential to yield information important in history.

Road Segments

Four road segments in various locations are situated throughout the APE. Segments 1 and 2 are located near each other, and may be separate remnants of a single road. The dates and purpose of the roads was not determined. A road is shown and noted in the GLO plat and field notes of a survey conducted in 1906 and 1908 that is located in the northwest portion of the APE. It could not be determined if this road corresponds with either of the two road segments that were found in the general area. As none of the road segments appear to meet any of the criteria for the NRHP, they are recommended as not eligible for the NRHP and no further work is recommended for them.

Isolated Occurrence

Isolated occurrence 1 consists of a waste pile of metal cans and glass fragments that is located within and beyond the APE. Arizona SHPO guidance for evaluating historic waste piles for the NRHP (Sullivan and Griffith 2005:32) stipulates that a primary consideration is the association of the waste pile with its source. In the case of IO 1, it was previously noted in this document that a power transmission line is located in the immediate vicinity of the waste pile. However, a definitive association with the transmission line, or any other source, could not be established. Additionally, IO 1 appears to be largely confined to the surface with little potential for buried deposits, and its information potential has been realized through field recordation. Therefore, it is recommended as not eligible for the NRHP, and no further work is recommended for it.

Assessment of Project Effect and Treatment Recommendations

Most of the proposed pond refurbishment and wetland creation project will avoid the features within AZ Q:13:27 (ASM). The project will result in the following impacts to the site:

- The proposed wetland will cover Feature 13 (a portion of a concrete reservoir base),
- Construction of a water junction box within an existing junction box adjacent to Feature 10 (fish hatchery building), and
- Repair leaks to Feature 16 (water pipeline).

In addition, construction of Dam 1 will cover a portion of Road Segment 3.

Although Feature 13 will be covered by the proposed wetland, it will not be destroyed and will be preserved by the wetland. As such, this is not considered an adverse effect to AZ Q:13:27 (ASM). The existing water junction box adjacent to Feature 10 was constructed at a later date than the original building, and is not considered a contributing feature to the hatchery building. As such, construction of a water junction box within the existing box is not considered an adverse effect to the hatchery building or to the site. Repair and maintenance of existing waterlines are considered permissible activities under SHPO guidelines; therefore work on Feature 16 should be allowed to proceed.

Road Segment 3 will be covered by a portion of a proposed dam. However, this road segment is recommended as not eligible for the NRHP, and no further work is recommended for it.

Based on the above assessment, the proposed pond refurbishment and wetland creation project will result in either no adverse effects to AZ Q:13:27 (ASM) or will utilize permissible activities within the site, and will not affect any other NRHP-recommended properties in the APE. Therefore, no further work is recommended for the APE for this project. If the scope of work for the project changes, the impact to those changes to AZ Q:13:27 (ASM) should be assessed before they are implemented.

General Treatment Recommendations

Avoidance is recommended for any future projects that will impact AZ Q:13:27 (ASM). If avoidance is not possible, mitigation plans and memorandums of agreement among the consulting parties should be developed and implemented. It is recommended that a qualified architectural historian document any features of the site that may be affected by future projects.

The four road segments and IO 1 are considered not eligible for the NRHP. Therefore, no further work is recommended for these properties.

If any previously unidentified cultural resources are encountered during ground-disturbing activities at this location, all activities should cease in the immediate area of the discovery and a qualified archaeologist should be contacted immediately. Ground disturbing activities should not resume until a qualified archaeologist has evaluated the discovery.

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