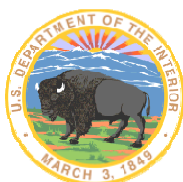




**DRAFT SCIENCE PLAN**  
FOR THE  
**AGUA FRIA NATIONAL MONUMENT**

JULY 2009



## TABLE OF CONTENTS

<b><i>Introduction.....</i></b>	<b><i>1</i></b>
<b><i>Scientific Mission of the Agua Fria National Monument .....</i></b>	<b><i>3</i></b>
<b><i>Scientific Needs .....</i></b>	<b><i>6</i></b>
<b><i>Strategy to Meet Scientific Mission .....</i></b>	<b><i>13</i></b>
Science Coordinator .....	13
Science Permitting Process .....	13
Science Providers, Partners, and Collaborators .....	14
Monitoring .....	15
Promoting Science .....	16
Connecting to Local, Regional and National Efforts .....	17
<b><i>Integrating Scientific Understanding into Management Decisions .....</i></b>	<b><i>17</i></b>
<b><i>Sharing Science: Outreach &amp; Education .....</i></b>	<b><i>18</i></b>
<b><i>Past, Present &amp; Ongoing Scientific Projects .....</i></b>	<b><i>19</i></b>
<b><i>Appendix A – Research Permit and Stipulations.....</i></b>	<b><i>24</i></b>
<b><i>Appendix B – Agua Fria National Monument Proclamation .....</i></b>	<b><i>27</i></b>
<b><i>Appendix C – List of Contributors .....</i></b>	<b><i>30</i></b>

## INTRODUCTION

The Agua Fria National Monument (AFNM) is part of the Bureau of Land Management's (BLM) National Landscape Conservation System (NLCS). The mission of the NLCS is to conserve, protect and restore nationally significant landscapes recognized for their outstanding cultural, ecological and scientific values.

The AFNM was established in 2000 by Presidential proclamation (Appendix B). The proclamation identified several unique and significant natural and cultural characteristics of notable scientific interest. Prior to and since its establishment as a National Monument, the land encompassed by the Monument boundaries has been host to several locally and nationally important scientific research projects that have sought to understand better how the monument's unique cultural and natural resources interact with a broader landscape, as well as provided insight to cultures and ecologies of the past.

The Monument, 40 miles north of metropolitan Phoenix, encompasses 70,900 acres of BLM managed land and 1,444 acres of scattered private parcels. It is entirely within Yavapai County, Arizona, to the east of Interstate 17, northeast of Black Canyon City, and southeast of Cordes Junction. Figure 1 depicts the monument location and boundary.

This plan has been developed in conjunction with Monument staff, other BLM staff, other agency staff, and Monument stakeholders throughout the scientific community. For a list of contributors, see Appendix C.

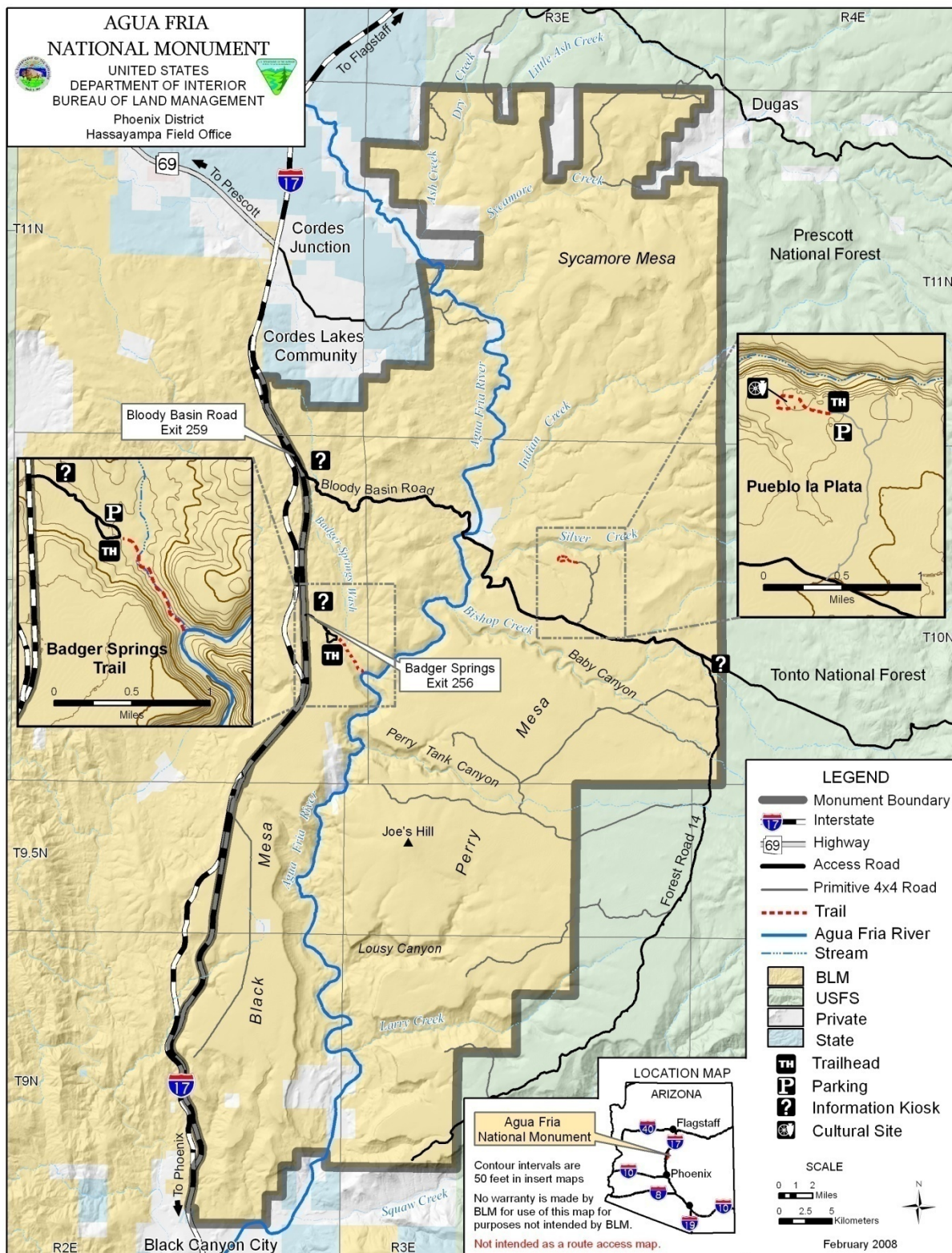


FIGURE 1: MAP OF AGUA FRIA NATIONAL MONUMENT

This science plan sets forth goals, requirements, and processes for continued scientific inquiry and research within the AFNM. Specific goals related to science for the Monument include:

- Establishing the AFNM as a world-class scientific research station, promoting science that both informs management decisions and explores general scientific inquiry
- Implementing a standard permitting process for research that encourages excellent research design, execution, and communication of scientific findings both internally and externally
- Promoting innovative approaches to collaboration with partners and stakeholders
- Establishing greater capacity to solicit investment in scientific research and communication

This plan was developed in accordance with the *National Landscape Conservation System Science Strategy*, *Bureau of Land Management Science Strategy* (2008) objectives, and prescriptions set forth in the *Proposed Agua Fria National Monument Resource Management Plan and Final Environmental Impact Statement* (AFNM PRMP/FEIS) (2008). Both the NLCS Science Strategy and the National Science Strategy define science broadly to include basic and applied research, along with inventory and monitoring initiatives. According to the national NLCS science strategy:

The natural resource and social issues within NLCS units are representative of those occurring throughout the BLM. Thus, understanding gained from science conducted on NLCS Units can be applied to other public lands, allowing the NLCS to function as an outdoor laboratory for science and base management practices across the BLM. Communicating findings from scientific investigations conducted within NLCS units to both a wider BLM audience and outside the agency will, therefore, maximize the overall utility of these findings across landscapes (*Bureau of Land Management National Landscape Conservation System Science Strategy*, 2007).

## SCIENTIFIC MISSION OF THE AGUA FRIA NATIONAL MONUMENT

The AFNM exists for the purposes of protecting and understanding the unique objects and characteristics that comprise it. Some of its values are enumerated in the Monument Proclamation:

*The monument contains one of the most significant systems of late prehistoric sites in the American Southwest. Between A.D. 1250 and 1450, its pueblo communities were populated by up to several thousand people. During this time, many dwelling locations in the Southwest were abandoned and groups became aggregated in a relatively small number of densely populated areas. The monument encompasses one of the best*

*examples of these areas, containing important archeological evidence that is crucial to understanding the cultural, social, and economic processes that accompanied this period of significant change.*

*At least 450 prehistoric sites are known to exist within the monument and there are likely many more. There are at least four major settlements within the area, including Pueblo La Plata, Pueblo Pato, the Baby Canyon Ruin group, and the Lousy Canyon group. These consist of clusters of stone-masonry pueblos, some containing at least 100 rooms. These settlements are typically situated at the edges of steep canyons, and offer a panorama of ruins, distinctive rock art panels, and visually spectacular settings.*

*Many intact petroglyph sites within the monument contain rock art symbols pecked into the surfaces of boulders and cliff faces. The sites range from single designs on boulders to cliffs covered with hundreds of geometric and abstract symbols. Some of the most impressive sites are associated with major pueblos, such as Pueblo Pato.*

*The monument holds an extraordinary record of prehistoric agricultural features, including extensive terraces bounded by lines of rocks and other types of landscape modifications. The agricultural areas, as well as other sites, reflect the skills of ancient residents at producing and obtaining food supplies sufficient to sustain a population of several thousand people.*

*The monument also contains historic sites representing early Anglo-American history through the 19th century, including remnants of Basque sheep camps, historic mining features, and military activities.*

*In addition to its rich record of human history, the monument contains other objects of scientific interest.*

*This expansive mosaic of semi-desert grassland, cut by ribbons of valuable riparian forest, is an outstanding biological resource. The diversity of vegetative communities, topographical features, and relative availability of water provide habitat for a wide array of sensitive wildlife species, including the lowland leopard frog, the Mexican garter snake, the common black hawk, and the desert tortoise. Other wildlife is abundant and diverse, including pronghorn, mule deer, and white-tail deer. Javelina, mountain lions, small mammals, reptiles, amphibians, fish, and Neotropical migratory birds also inhabit the area. Elk and black bear are present, but less abundant. Four species of native fish, including the longfin dace, the Gila mountain sucker, the Gila chub, and the speckled dace, exist in the Agua Fria River and its tributaries.*

In addition to the characteristics outlined in the Monument Proclamation, the AFNM PRMP/FEIS discusses the baseline conditions of natural and cultural resources in the

Monument. These resources include riverine segments suitable for Wild and Scenic River designation; biological resources that include riparian areas, terrestrial and aquatic game species, endangered, threatened, proposed, and candidate species, other special status species, and invasive species; vast prehistoric and historic cultural resources; wilderness characteristics; and scenic qualities.

As enumerated by the AFNM PRMP/FEIS, the desired future conditions for the monument resources include protecting resources and objects; avoiding habitat fragmentation and restoring habitat to provide for natural pronghorn antelope fawning conditions; protecting the vast cultural resources while utilizing them for scientific understanding of previous societies and cultures; managing recreation to provide for public enjoyment while protecting resources; supporting and maintaining wilderness characteristics; minimizing visual impacts; and ensuring that watersheds and other ecological processes are functioning properly.

The AFNM/FEIS allows a wide variety of investigative techniques for scientific studies of cultural and natural resources. The following are an example of data collection techniques

- Detailed documentation through such techniques as mapping, photography, photogrammetry, and remote sensing
- Sample collections of artifacts
- Collections of samples for radiocarbon, archeomagnetic, pollen, and flotation analyses
- Controlled archeological excavations guided by research designs
- Periodic measurements of spring and stream flows
- Periodic measurements of water levels in selected wells
- Regular sampling and water quality analysis of surface water throughout the monument
- Collection of plant materials for scientific purposes

The body of scientific work conducted to date on the AFNM has the potential to provide useful information for developing effective management actions for natural and cultural resources, though efforts thus far have focused more on data collection and analysis than application. Protection and understanding of these unique natural and cultural resources provides both an opportunity and a responsibility for scientific research. Three key points shape the science mission of the AFNM.

1. Scientific inquiry should be encouraged on the Monument. This includes both science that increases knowledge about specific cultural or natural resources/processes and science that informs management actions.

2. It is important to ensure that Monument science is placed soundly within the context of the broader surrounding landscape. Political boundaries shared with other land management entities and private land holders should not inhibit regional and landscape-level analyses.
3. Given its assets, the AFNM is poised to serve as a world-class location for both long-term and short-term research, highlighting interdisciplinary studies and serving as a center for undergraduate and graduate education, field schools, and citizen participation in scientific projects.

## SCIENTIFIC NEEDS

Several specific science needs, opportunities, and questions have been identified by BLM staff and AFNM stakeholders, partners, and current/past scientific researchers. Table 1 lists those identified by BLM AFNM staff while Table 2 lists those identified by AFNM Partners and Stakeholders. These identified needs will help shape forthcoming research on the Monument but this list should be considered fluid and adaptable as changes in management needs and the general state of science will undoubtedly occur. These science needs inventories will be updated regularly by the Monument science coordinator, perhaps in conjunction with the annual science symposium, discussed later.



**TABLE 1: SCIENCE NEEDS & OPPORTUNITIES IDENTIFIED BY BLM**

Resource	Science Need or Opportunity	
<b>Cultural Resources</b>	<ul style="list-style-type: none"> <li>• Map and document the following priority sites: Pueblo la Plata, Fort Silver, Baby Canyon Pueblo, and Pueblo Pato; rock art sites on Black Mesa and along Baby Canyon and Perry Tank Canyon on Perry Mesa; the remnants of the historic Richinbar Mine water delivery system in the Agua Fria River Canyon; and the systems of small sites surrounding the larger prehistoric villages.</li> <li>• Conduct inventories of prehistoric and historic sites in the areas north of Perry Mesa.</li> <li>• Conduct controlled, limited excavations to obtain critical information on the prehistoric natural environment, human activities, architectural development, and chronology (time periods of occupation and use).</li> <li>• Continue cultural landscape studies, focused on prehistoric agricultural systems and the human effects of prehistoric and historic land use on the modern landscape.</li> <li>• Conduct archival studies and oral histories to examine research questions relating to the history of ranching, mining, and historic water use.</li> <li>• Study and inventory museum collections housed at the Arizona State Museum and Arizona State University.</li> <li>• Create a cultural resource geo-database.</li> <li>• Conduct ethno-historic study on tribal histories of land use and cultural traditions.</li> <li>• Incorporate ongoing scientific research into interpretation and public education.</li> <li>• Support the continuation of the Legacies on the Landscape project.</li> <li>• Pursue cooperative inventories and studies with the Tonto National Forest.</li> </ul>	
<b>Natural Resources</b>	<b>Fire</b>	<ul style="list-style-type: none"> <li>• Study historic fire use and fire ecology (e.g., changes in watershed drainage patterns after Cave Creek Complex fire).</li> </ul>
	<b>Hydrology</b>	<ul style="list-style-type: none"> <li>• Study the hydrology to analyze amount of water needed and available to sustain the values of the monument and the values for which the Agua Fria River was determined suitable for wild and scenic river designation.</li> <li>• Study hydrogeology at boundary between AFNM and Tonto National Forest.</li> </ul>
	<b>Vegetation</b>	<ul style="list-style-type: none"> <li>• Research invasive species distributions and management strategies.</li> <li>• Continue the ongoing vegetation inventories conducted by the Desert Botanical Garden.</li> <li>• Explore experimental studies of post-fire restoration methods.</li> <li>• Create and implement a vegetation monitoring plan.</li> </ul>

Resource	Science Need or Opportunity	
Natural Resources	Wildlife	<ul style="list-style-type: none"> <li>• Study Pronghorn Antelope corridors, placing emphasis on research that can inform management decisions for passage through the Interstate-17 corridor.</li> <li>• Conduct effectiveness monitoring for Gila Chub, Desert Pupfish, and Gila Topminnow recovery.</li> <li>• Study crayfish eradication.</li> <li>• Conduct Tamarisk/Bird study.</li> <li>• Support continued inventories to examine the distribution of bird species within the Agua Fria Important Bird Area.</li> </ul>

**TABLE 2: SCIENCE NEEDS & OPPORTUNITIES IDENTIFIED BY AFNM PARTNERS & STAKEHOLDERS**

Resource	Science Need or Opportunity
Cultural Resources	<ul style="list-style-type: none"> <li>• Conduct historic path/trail research, location, and field verification.</li> <li>• Complete mapping of ancient trade routes.</li> <li>• Study agave to determine its role/intensity as an ancient food source.</li> <li>• Conduct intensive archaeological survey and mapping of at least two of the larger pueblo sites (such as Pueblo Pato and Bull Tank), followed by multi-seasonal vegetation/biomass and soil data collection with lab analysis to replicate the efforts currently completed and underway at Pueblo La Plata.</li> <li>• Conduct Perry Mesa site settlement date studies.</li> <li>• Complete a full coverage, “landscape approach” survey of all of Perry Mesa. A great portion of the landscape surface of Perry Mesa was manipulated to produce an agricultural system that integrated some (and perhaps all) of the fourteenth century pueblos.</li> <li>• Complete a full-coverage survey of areas adjacent to Perry Mesa that are part of the Monument. Areas include hilltop sites south of Squaw Creek that have been identified but not verified in the field, along with sites north of Perry Mesa in the grasslands that date in the AD 1100-1275 period. From rock art in Arrastra Canyon we know there were Archaic foragers in this regions, and the recent excavations near Cordes Junction show that there later was a so-called Hohokam pithouse occupation in the region. Several sites on Perry Mesa from that era are also known (with red-on-buff pottery). How any of these sites go together to form larger settlement systems, however, is unknown – and an important research issue.</li> <li>• Complete professional mapping of the sites and agricultural landscapes. Already the coverage afforded by Google Earth is quite remarkable, and clearly other remote sensing recording methods would be highly desired.</li> </ul>

Resource	Science Need or Opportunity	
<b>Cultural Resources</b>		<p>They should be combined with ground truthing.</p> <ul style="list-style-type: none"> <li>• Conduct limited test excavations to recover artifact and ecofact samples from controlled contexts.</li> <li>• Enlarge existing cotton pollen study from Perry Mesa to 4 or 5 of the other pueblos</li> <li>• Map agave stands to discern between native and garden plot varieties.</li> <li>• Conduct a search for pre-1920 photographs taken within the Monument area and match theme to modern photographs to determine if differences exist in topographical and cultural features.</li> <li>• Conduct a study to discover correlating archaeoastronomy sites. Integrate findings into conservation and preservation plans. Cultural Astronomy (archaeoastronomy) as a science is of paramount importance for documentation on the Monument.</li> <li>• Expand cultural studies beyond political boundaries. For example, the multi-phase (Preclassic, Early Classic, Late Classic) settlements in the Rosalie and Brooklyn areas probably hold critical information for the Mesa as a whole, especially since sites with that sort of time depth are much less common on the BLM part.</li> </ul>
<b>Natural Resources</b>	<b>Soils</b>	<ul style="list-style-type: none"> <li>• Expand existing soil study sites for Legacies on Landscape to include sites managed by Tonto National Forest.</li> <li>• Research response of soil microbes and fungi to ancient farming techniques.</li> </ul>
	<b>Vegetation</b>	<ul style="list-style-type: none"> <li>• Conduct a complete inventory of biological resources.</li> <li>• Develop a comprehensive baseline for Monument plant communities (semidesert grassland, desert scrub, riparian, pinyon/juniper grasslands). Studies should include inventory methodologies. A diversity of vegetation attributes should be studied in order to comprehensively describe the baseline condition, including: plant composition, diversity, species richness, abundance, canopy cover, ground cover, vertical diversity, and horizontal diversity or patchiness. Inventory designs should include stratification by allotment and pasture boundaries to link to fine scale management units such as those for grazing.</li> <li>• Conduct a study to determine if tamarisk removal leads to long term changes in native vegetative cover.</li> <li>• Determine if the plants that were present on the Monument during prehistoric and early historic settlement differ from current plant communities.</li> <li>• Study vegetation movement in light of growing consensus that newly arrived “invasive” species do not pose the</li> </ul>

Resource	Science Need or Opportunity	
Natural Resources	Vegetation	<p>‘perceived’ threat that has been attributed to them. Local changes in plant communities documented through the Legacies on the Landscape Project present a local-scale model for long-term anthropogenic plant community dynamics, a process that continues today, but one which is in dire need of more study to devise realistic and ecologically sound management.</p>
	Wildlife	<ul style="list-style-type: none"> <li>• Complete a full inventory of biological resources.</li> <li>• Inventory AFNM wildlife resources and establish a current baseline for diversity, richness, abundance and distribution.</li> <li>• Complete small mammal studies.</li> <li>• Study pronghorn grassland habitat encroachment by woody plants such as cat-claw acacia, mesquite, mimosa, and one-seed juniper. Determine how to best alleviate these encroachments by employing the use of fire, the manipulation of cattle numbers, and brush removal.</li> <li>• Research and monitor the effects of grassland restoration activities such as juniper thinning, reseeding, or prescribed fire may have on habitat use and distribution by pronghorn and grassland dependant species.</li> <li>• Research and monitor the effects of OHV recreation, road densities and use levels, fence densities and designs on pronghorn habitat use and distribution.</li> <li>• Study the effects of OHV recreation, roads and grazing on riparian habitats and associated wildlife.</li> <li>• Inventory water availability and quality for wildlife.</li> <li>• Inventory, assess and map aquatic habitat resources (perennial, intermittent, ephemeral and springs) and quality (water quality, in-stream and riparian habitat quality) for native fish, as well as obligate amphibians and reptiles. Use data to develop species management strategies to maintain and enhance current distributions and support species recovery plans. Use data to develop habitat management and/or enhancement strategies and plans.</li> <li>• Determine if beaver were ever present in the Agua Fria watershed.</li> <li>• Determine if the presence of cattle is interfering with the self propagation of the Monument pronghorn herd.</li> <li>• Determine the role does the Monument plays in annual bird migration.</li> <li>• Determine if areas that excluded from grazing contain a</li> </ul>

Resource	Science Need or Opportunity	
<b>Natural Resources</b>	<b>Wildlife</b>	<p>different array of flora and fauna than areas that are grazed. What is the proper role and size for long-term cattle exclusion areas in conducting scientific inquiry on the Monument?</p> <ul style="list-style-type: none"> <li>• Investigate benign biological interventions that can be applied to control crawfish in the Agua Fria River and its tributaries.</li> <li>• Study the role that large predators play in shaping the appearance of the Monument.</li> <li>• Determine if pronghorn be taught to use new migration routes.</li> <li>• Study the various pastures within grazing allotments and attempt to determine which grazing management plans might be best for pronghorn. Variables to evaluate would be pasture size, fence type, amount of residual grass cover, "openness," forb composition, etc.</li> </ul>
<b>Other</b>	<ul style="list-style-type: none"> <li>• Coordinate research with other landscape legacy groups such as work at the Yucatan Peninsular Helen Moyer Biocultural Reserve, France, the Amazon.</li> <li>• Research how different management activities (such as grazing, prescribed fire, grassland restoration-juniper thinning/reseeding/shrub reduction, recreation) affect plant communities to evaluate effectiveness of management practices or develop adaptive management strategies and/or best management practices.</li> <li>• Develop a long-term monitoring strategy for plant communities and wildlife populations that incorporates results of inventory and research into an adaptive management process. Establish a monitoring strategy for each principal management focus such as: range management, recreation management, fire management or riparian habitat management.</li> <li>• Research and monitor the use of waters by wildlife (stock tanks, troughs, and wildlife waters) to determine which waters are most frequently used and which design components might inhibit wildlife use at those not being used. This information could be used to redesign waters and optimize overall water distribution and availability for wildlife.</li> <li>• Explore ways that BLM can facilitate observation and public appreciation of the fauna without affecting migration patterns. Is there a role for remote cameras or sensors?</li> <li>• Explore ways to influence destructive human behavior around archeological sites?</li> <li>• Insist that professional written reports result from any ARPA permits issued to researchers. If you are to put a scientific program in place, you</li> </ul>	

Resource	Science Need or Opportunity
<b>Other</b>	<p>need to have appropriate systems of review and oversight for all the work done, whoever is permitted to do it.</p> <ul style="list-style-type: none"> <li>• Insist that federal standards of curation be met for all collections made from the Monument, and that they are accessible for continuing scientific study.</li> <li>• Develop a web-based repository to disseminate completed and ongoing AFNM related inventory, research and monitoring information and publications.</li> </ul>

## STRATEGY TO MEET SCIENTIFIC MISSION

A strategy is needed in order to meet the scientific mission of the Monument. This strategy includes defining a central Monument science coordinator; establishing a comprehensive science permitting process; creating methods to promote science to potential providers, partners, and collaborators; establishing a monitoring plan; devising methods to link monument science to local, regional, and national efforts; and creating a plan for disseminating results of science studies to BLM staff, other researchers, the media, and the public.

### SCIENCE COORDINATOR

The Monument manager will serve as the science coordinator and main point of contact for scientific research. All scientific research proposals will be directed through the science coordinator or designee. The science coordinator will be responsible for the following:

- Maintaining a current inventory of science needs/opportunities
- Coordinating with other AFNM staff to evaluate and approve science proposals
- Coordinate annual science symposium

### SCIENCE PERMITTING PROCESS

Currently, there is no formal permitting process for all scientific research on the Monument, though archeological research requires issuance of a Cultural Resource Use Permit by the Arizona State Office of BLM. The following process has been adapted from other NLCS units and will be adopted by the AFNM. Coordination between the Monument Staff and the Arizona State office will ensure that the tenets of this process are integrated with the Cultural Resource Use Permitting process.

#### **1. Researcher submits a proposal**

Scientific research proposals will be submitted to the science coordinator and will include contact information for the principal researcher, summary of proposed research, timeline for field work, and outline of public outreach effort. All research will require at least one public outreach component, annual reporting, and close-out reporting.

#### **2. Proposal is considered by AFNM leadership team**

Determination is made as to whether or not proposal is 1) complete, 2) conforms to the AFNM Resource Management Plan, and 3) meets the AFNM science mission. If so, determination is made as to whether or not NEPA analysis is necessary. When possible, BLM staff will lead NEPA analysis. If this is not possible, the applicant will be required to lead/fund the required NEPA analysis.

### **3. Permit is granted to conduct research**

A permit is granted to the researcher. The permit includes several stipulations, such as time limits, annual reporting requirements, close-out reporting requirements, and public outreach effort. See Appendix A for a sample permit and associated stipulations.

### **4. Law Enforcement and Monument Staff are made aware of the permit**

AFNM Staff and Law Enforcement representatives are given a copy of the permit so that they are aware of potential interactions with researchers on Monument. Additionally, key volunteers and partners – such as the Site Steward Regional Coordinator – will also be made aware of research, especially their operations may be affected.

### **5. Research is initiated**

Research must be conducted according to the stipulations outlined in the permit (Appendix A). Annual progress reports are filed with the science coordinator if the research will require more than one year to complete. Progress reports should include status of research and preliminary findings.

### **6. Research is completed**

Upon conclusion of study, researcher will file a final report with BLM. This report should include research background, findings, a summary of public outreach effort, and citations if the research is published.

## **SCIENCE PROVIDERS, PARTNERS, AND COLLABORATORS**

The Monument has hosted several individuals and institutions for scientific research. Effort will be made to maintain these valuable relationships while fostering relationships with new institutions and individual researchers. Scientific partners and collaborators include:

- Arcosanti
- Arizona Antelope Foundation
- Arizona Archaeological Society – Desert Foothills Chapter
- Arizona Archaeological Society – Verde Valley Chapter
- Arizona Riparian Council
- Arizona State University, Deer Valley Rock Art Center
- Arizona State University, School of Human Evolution and Social Change
- Arizona State University, School of Life Sciences
- Audubon Society, Arizona Chapter
- Desert Botanical Garden
- Deer Valley Rock Art Center



- Friends of the Agua Fria National Monument
- Museum of Northern Arizona
- Natural Resource Conservation Service
- Northern Arizona University
- Pueblo Grande Museum and Archaeological Park
- Sonoran Audubon Society
- The Nature Conservancy
- University of Arizona Cooperative Extension, Yavapai County
- USDA Agricultural Research Service
- Yavapai County Public Works

## MONITORING

Monitoring provides essential feedback to resource managers to determine if goals and objectives are actually being met. Generally, the goals and objectives of programs and projects can be monitored at three different levels. Ranging from simple to complex, these are implementation monitoring, effectiveness monitoring, and validation monitoring (program validation).

**Implementation Monitoring:** Implementation monitoring, the most simple and straightforward type of monitoring, answers the question: “Were the prescribed activities for an objective implemented correctly on the ground?” Implementation monitoring ensures that work is being conducted as designed. With respect to science on the Monument, this may entail determining that permitted work and adherence to stipulations is actually occurring. Means of assessing this include field inspections, progress reports, and close-out reports from researchers.

*Example: an objective is to keep stream temperatures below 20° C following streamside timber harvest. The prescription is to leave a 100 ft buffer. Following the harvest, buffers are measured to ensure that 100 feet was actually retained.*

**Effectiveness Monitoring:** Effectiveness monitoring assesses the effectiveness of management prescriptions. The purpose of effectiveness monitoring is to determine if an objective was actually achieved by the activities undertaken.

*Example: using the above scenario, effectiveness monitoring answers the question “Did stream temperatures actually stay at or below 20° C following harvest?” If the answer is “yes,” then we might assume the prescription was effective. If the answer is “no,” then the practice must be re-examined.*

**Validation Monitoring:** The purpose of validation monitoring is to test the basic assumptions and relationships our monitoring efforts are designed to evaluate.

*Example: in the example above, validation work would be needed if stream temperatures following harvest stayed below the 20° C but we could not be sure that the temperature control was due to the buffer strip or some other factor (such as hidden springs) that would keep stream temperatures cool even in the absence of a buffer.*

A broader monitoring plan, extending beyond scientific research, should be developed by the AFNM in conjunction with its new Resource Management Plan. Most of the monitoring that can be effectively conducted directly by BLM is implementation monitoring, and, to a lesser extent, effectiveness monitoring. Validation monitoring is rigorous and requires extensive amounts of time and resources not available to field staff. However, validation monitoring of resource protection programs is extremely important and field staff can assist in the completion of these studies by providing data and funding assistance to researchers carrying out validation studies.

## PROMOTING SCIENCE

It is important to maintain and expand the network of scientific researchers who work in the Monument and promote science among a wide array of individuals and institutions. One way to promote science within the AFNM is to establish and maintain affiliations with preeminent scientific research organizations and societies. Participation in conferences, regular meetings, and special events supported by these organizations will allow Monument specialists to share the science that is occurring on the monument, determine synergies with other scientific pursuits, discuss management actions influenced by scientific findings, and promote the characteristics of the Monument that are of notable scientific interest. Doing so may garner interest in potential scientific research opportunities within the monument. Some of these professional organizations and societies include:

- American Indian Science and Engineering Society
- American Rock Art Association
- American Society of Mammalogists
- American Society of Ichthyologists and Herpetologists
- Arizona Archaeological Council
- Arizona Archaeological Society
- Arizona Riparian Council
- Native Plant Society
- Society for Rangeland Management
- Society for American Archaeology

- Wilderness Society
- Wildlife Society

In addition to promoting science within the networks afforded by professional scientific organizations, science can be promoted locally. The AFNM will hold an annual science symposium for BLM staff, stakeholders, and other interested members of the public, in which scientific research of the past year will be discussed. Researchers will be encouraged to participate in this meeting and present their research and findings.

## CONNECTING TO LOCAL, REGIONAL AND NATIONAL EFFORTS

The Monument belongs to the Arizona New Mexico Plateau Ecoregion (as defined by the Environmental Protection Agency) and the Apache Highlands Ecoregion (as defined by the Nature Conservancy). Contextualizing the Monument within its broader eco-region is imperative. Rather than solely promoting/conducting science that terminates at the Monument's political boundary, connections across landscapes will be encouraged. Some local, regional, and national efforts include:

- **Central Arizona Weed Management Area**, which intends to protect the health of central Arizona lands, waters, and people from plants which threaten the environment and economy
- **West Yavapai County Weed Management Area**, which coordinates weed management efforts in western Yavapai County and provides information and technical assistance related to noxious/invasive weed identification, locations, biology, and treatment options
- **Maricopa County Dust Abatement** regulations, programs, and best practices
- Monitoring and evaluation associated with the **Arizona OHV Decal** program
- **Arizona Game and Fish** wildlife research
- **BLM Healthy Landscapes Initiative**
- **BLM Assessment, Inventory, and Monitoring Program**

In addition to the projects noted above, effort will be made to seek out partnership opportunities with entities that promote local, regional, and national efforts that contribute to the scientific body of knowledge.

## INTEGRATING SCIENTIFIC UNDERSTANDING INTO MANAGEMENT DECISIONS

As scientific knowledge is obtained, integrating that knowledge into BLM management decisions is imperative. Doing so will ensure that appropriate management actions are taken,

given the best available scientific information. By establishing a formal reporting mechanism from researcher to BLM, this plan ensures that valuable information transfer will occur. Researchers will be required to submit progress reports while research is ongoing and close-out reports upon completion of their study. The BLM will host an annual science symposium with Monument staff and other stakeholders to discuss scientific findings, pose new questions, and discuss how the science informs management questions and concerns. The results from these annual meetings can be incorporated into the Annual Work Plan to ensure that all pertinent knowledge can be incorporated into management actions.

## SHARING SCIENCE: OUTREACH & EDUCATION

In addition to contributing to scientific knowledge and informing management decisions, findings of scientific research conducted on the Monument should be shared broadly with other agencies. Monument staff will formally inform other agencies/offices of science and science-informed decisions. Several forums currently exist and include the following:

- Regular **Agua Fria Grasslands Meeting** with Tonto and Prescott National Forests and Arizona Game and Fish
- Annual **Coordination Meeting** with Arizona Game and Fish
- Annual **NLCS Managers Meeting** with other Arizona NLCS Unit Managers

As part of the scientific permitting process, scientists will be required to include at least one public outreach effort while conducting research on the monument. In addition to the outreach requirement, BLM will work to maintain existing and create new outreach opportunities. Outreach to members of the public may include the following actions:

- Identify and create interpretive trails and signage to educate public about the interactions between cultures and natural resources on within the Monument
- Identify interpretive opportunities related to science, specify and post/advertise opportunities for educational institutions
- Encourage public presentations
- Encourage/lead tours of monument, highlighting science research and findings
- Participate in museum exhibits, such as *Art and Archaeology of Perry Mesa, Central Arizona*, at Pueblo Grande Museum
- Work closely with the Friends of the Agua Fria

- Continue partnership with ASU Legacies on the Landscape Program and other higher educational institutions to promote undergraduate and graduate education, theses, field schools, etc
- Promote the distribution of science information to the BLM websites, and Friends group websites
- Propose specific outreach to local communities and broader audiences
- Suggest making research available to public via tours, website information, copies of final reports, and local seminars
- Seek and promote educational partnerships for youth via local elementary and secondary schools
- Through partnerships, work with established youth groups
- Adopt lessons learned from other NLCS unit outreach strategies
- Consider implementation of distance educational programs similar to the Anza Borrego Foundation's Parks Online Research for Teachers and Students (PORTS) program
- Work closely with the BLM National Training Center
- Encourage formal educational coursework at local colleges/universities. One example is "Field Geology of the Southwest" using the Monument as a case study, or Use field geology to promote dynamic, interactive learning experience to broadcast science info to the students

## PAST, PRESENT & ONGOING SCIENTIFIC PROJECTS

The following lists past, present, and ongoing scientific research within the AFNM.

### **Agua Fria National Monument Flora Project**

#### *Desert Botanical Garden*

The Desert Botanical Garden (DBG) has been conducting floristic inventories of the Monument's vegetation since 2003. The project includes the collection, identification, and curation of flora on the Monument. In addition, DBG is using the data to study desert grassland ecology from the pre-Columbian era to the present. DBG is also assisting Arizona State University in the identification of agave species and prehistoric agave fields. These studies are providing baseline data for supporting decisions that will foster productive ecosystem management and the protection of Monument landscapes, consistent with the Monument proclamation.

### **Archaeological Survey**

#### *Arizona Public Service*

The entire length of a twin 500kV power line right-of-way that traverses the Monument was surveyed for archaeological resources in 2008 by Arizona Public Service (APS). The detailed survey is the most thorough cultural survey conducted in the area. The survey was done to

identify and protect cultural resources that might be located within the right-of-way prior to vegetation clearing. As a result, the BLM will receive a huge database of archaeological information. BLM staff worked with APS for six months in 2008 to design the project.

### **Bird Species and Distribution Study**

#### *Sonoran Audubon Society*

Audubon Society volunteers conduct ongoing surveys and studies of bird species and habitats in the Monument. Audubon has gathered sufficient data to designate the riparian areas within the Monument as “Important Bird Areas,” which are part of a global network of places recognized for their outstanding value to bird conservation. Their efforts have focused on the riparian zones, and they are now directing their attention to the upland areas. Society volunteers have also contributed to public outreach efforts.

### **Ecological Site Inventory**

#### *Natural Resource Conservation Service*

This study includes recommended reference sites and ecological site guides.

### **Geological Studies**

#### *Dr. Robert Leighty*

While at Arizona State University, Dr. Leighty wrote his doctoral dissertation on the geology of the monument. He is now a professor at Mesa Community College and has begun follow-up studies in the Agua Fria region.

### **Hydrological Studies in the Agua Fria Watershed**

#### *U.S. Geological Survey*

#### *U.S. Army Corps of Engineers*

#### *AZ Dept. of Water Resources*

#### *University of Arizona*

#### *Upper Agua Fria Watershed Partnership*

In 2005, the USGS completed a report on the hydrology of the monument, based on reconnaissance surveys and analyses of existing data on hydrology, geology, and stream flows. The BLM is currently working with a number of partners, led by the U.S. Army Corps of Engineers, to conduct further studies of hydrology and water quality in the upper Agua Fria watershed.

### **Laser Scanning of Rock Art**

#### *Deer Valley Rock Art Center (Arizona State University)*

This project received Science Initiatives funding to study the utility, efficiency, and costs of three-dimensional laser scanning techniques for rock art recording. It was designed as a comparative study of alternative recording techniques at the Arrastre Creek and Badger Springs sites, which had already been recorded through string-grid drawing and digital photography. The technique may reveal differences in the age of individual designs. ASU subcontracted the work to Western Mapping Services, which is currently completing the final report.

## **Legacies on the Landscape Project**

### *Arizona State University*

Since 2003, this interdisciplinary project is an ongoing effort of the School of Life Sciences and the School of Human Evolution and Social Change. Ecologists and archaeologists are studying the effects of the natural environment on the prehistoric human populations, and the long-term effects of the prehistoric settlements on the modern environment. ASU has been awarded two grants from the National Science Foundation to continue the project.

ASU expanded this effort to include the Alliance Project, which focuses on the analysis of prehistoric pottery types and their geographic distributions within and beyond the Monument. Partners include the Tonto National Forest and the Arizona Archaeological Society.

In conjunction with the continuing Legacies on the Landscape research study, professors and students from Arizona State University (ASU) completed cultural surveys of more than 400 acres. These surveys discovered and mapped at least three extensive systems of prehistoric farming terraces on Perry Mesa. ASU also continued to map prehistoric features in the vicinity of the 100+ room Pueblo la Plata ruin. In addition to the Legacies project, ASU began the Alliance Project (“Alliance and Landscape: Perry Mesa, Arizona in the Fourteenth Century”), supported by two grants from the National Science Foundation. ASU collected samples of prehistoric ceramics from the surfaces of several Monument sites, to be used for examining pottery production, trade, and social relationships among villages and regions. ASU also continued to work with the Desert Botanical Garden to study prehistoric agave farming on the mesas. Volunteers affiliated with the Arizona Archaeological Society and Friends of the Agua Fria National Monument assisted with the ASU field surveys on Perry Mesa and recorded three petroglyph sites on Black Mesa.

## **Prehistoric Rock Art on Black Mesa**

### *Arizona Archaeological Society*

Over more than a decade, volunteers from the AAS have recorded at least 20 petroglyph sites on Black Mesa, including the extensive Arrastre Creek site. The Arrastre Creek project produced a published report. Two volunteers recently created an innovative database for rock art, utilizing information collected through digital photography, rather than traditional, labor-intensive drawing techniques. Participants in the AAS projects were instrumental in the creation of the Arizona Rock Art Coalition.

## **Prehistoric Rock Art on Perry Mesa**

### *Deer Valley Rock Art Center (Arizona State University)*

Since 2003, the Deer Valley Rock Art Center has completed detailed documentation of prehistoric petroglyph sites, focused on Baby Canyon. The signature effort took place, over several seasons, at the large site of Baby Canyon Pueblo. The extensive report for the project, along with a masters’ thesis, was completed in 2006. The emphasis is on a scientific approach

to rock art research within a cultural landscape, using experimental and innovative techniques while collecting and preserving critical data. In 2006, the DVRAC was nominated by the BLM and received the Governor's Award in Public Archaeology for its efforts in rock art research and public education.

### **Pronghorn Antelope Habitat Study**

*Arizona Game & Fish Department*

*Arizona State University*

Wildlife biologists have been conducting ongoing studies of pronghorn foraging behavior on Perry Mesa and Black Mesa. These studies complement the efforts by the AZ Game & Fish Dept. to conduct annual surveys of the numbers, distribution, migration routes, and fawning rates of pronghorn. This information will be an important component of efforts by government agencies to increase and sustain the pronghorn population.

### **Public Use Studies**

*Friends of the Agua Fria*

*Northern Arizona University*

*Arizona State University*

These ongoing studies include recreation analysis, visitor use, and photo inventories of impacts of recreation use.

### **Pueblo la Plata Project**

*Northern Arizona University*

*Museum of Northern Arizona*

*Verde Valley Archaeological Society*

*Arizona Site Stewards*

*Center for Desert Archaeology*

This partnership project produced aerial photos and a detailed map of Pueblo la Plata and its vicinity. A sample collection of painted pottery was analyzed and placed in permanent storage at the museum. The study team also analyzed existing information and museum collections from other sites, in order to pursue a landscape analysis of links among prehistoric settlements. NAU and MNA produced an on-line identification manual for prehistoric pottery types in the monument, which will be useful for future reference and research.

In July 2007, NAU published the final report, a book entitled "The Archaeology of Perry Mesa and Its World." NAU and MNA celebrated the publication at a special event at the museum. Challenge cost share funds supported the project.



### **Seeds of Success Collection**

#### *Desert Botanical Garden*

The Seeds of Success (SOS) program is part of the Federal interagency Native Plant Materials Development Program. It supports and coordinates seed collection of native plant populations in the United States to increase the number of species and the amount of native seed that is available for use to stabilize, rehabilitate, and restore lands in the United States by partnering with the seed producing industry.

### **Source Analysis of Obsidian Artifacts**

#### *Center for Desert Archaeology*

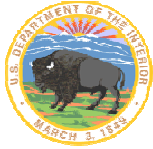
The Center donated a source analysis of obsidian artifacts from Perry Mesa sites, in conjunction with the Pueblo la Plata mapping project. The analysis, completed at the University of California at Berkeley, revealed that the majority of this raw material for stone tools came from sources in the Flagstaff area.

### **Vegetation and Post-Fire Restoration Studies**

#### *Desert Botanical Garden*

The principle purpose of these projects are to provide the opportunity to conduct basic and applied botanical research, support research efforts toward protection and restoration of desert landscapes affected by wild fires on semi-arid grasslands of the desert Southwest, on the ground application of knowledge gained through this research, environmental conservation, participation on the national seed bank program, partnership development, and to provide educational opportunities for students, volunteers, and the general public. The Garden is also assisting ASU in its studies of the prehistoric use and cultivation of agave species for the Legacies on the Landscape Project. This work includes DNA analysis of the various species of agave, including hybrids. This is a multi-year project expected to be completed in 2010.

## APPENDIX A – RESEARCH PERMIT AND STIPULATIONS



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### Scientific Research and Collection Permit

#### Agua Fria National Monument

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Applicant Name & Address:

Phone Number:

Email Address:

Date:

AFNM Number: \*

State Permit Number (if applicable): \*

Federal Permit Number (if applicable): \*

Is the research covered by an assistance agreement with this office and/or other BLM offices? \*

If so, briefly outline the nature of the agreement. Attach a copy of the assistance agreement.

Please attach a description of your proposed research and provisions for curation of collections.

For AFNM office use only below this line.

---

Specialist review complete	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Permit granted	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Complies w/plan	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Special stipulations	<input type="checkbox"/> Yes	<input type="checkbox"/> No
WSA status	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Curation agreement	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Science review complete	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Permit extension	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Date issued: \*

Expiration: \*

Area of activity: \*.

Collecting is authorized. Materials to be collected: \*. Authorization. Permission is hereby given to the above named individual to collect material(s) specified in the approved research proposal, within the guidelines of stipulations outlined below.

Approved By: \_\_\_\_\_  
Monument Manager Date

I have read and accept the stipulations in this permit:

\_\_\_\_\_  
Permit Holder Date

**STANDARD STIPULATIONS:**

1. This permit may not be assigned to any other institution, group, or individual. Any modifications to the permit must be requested in writing to the Monument Manager.
2. This permit is valid only for the period specified. The permit may be suspended or modified at the discretion of the Monument Manager. Fieldwork under this permit may be halted temporarily by either verbal or written notice from the Monument Manager or other Authorized Officer for violations of permit terms and conditions or for administrative purposes of the BLM.
3. All terms and conditions of this permit shall remain in effect, including reporting requirements, until all permit terms and conditions have been met, regardless of permit expiration date.
4. This permit shall not be exclusive in character, and the Bureau of Land Management reserves the right to authorize other uses of the land during the tenure of this permit. Fieldwork shall be carried out in such a manner as to not impede other legitimate uses of the Monument, except when a provision has been made by the Monument Manager or delegated representative.
5. The Department of Interior, including its bureaus and employees, shall be held blameless for any and all events, deeds, or mishaps, regardless of whether or not they arise from operations under this permit.
6. Unless otherwise agreed, all costs shall be borne by the permittee, including costs of curation.
7. The Monument Manager, and /or designated representatives shall have access to the study area during or after performance of fieldwork, and shall have the right to inspect all materials removed.
8. Collections, if authorized, of materials acquired from public lands under the provisions of this permit remain the property of the United States Government and may be recalled at any time for use by the BLM. In the case of this permit, a designated repository will not be required. It is understood that the samples will be used and destroyed in the analysis process.
9. Any stakes, flagging, or other temporary materials used to identify localities in the field shall be removed upon completion of field activity. No permanent survey monuments or markers shall be disturbed or removed during the course of fieldwork.
10. The Agua Fria National Monument, and the BLM, Arizona shall be cited in any report, publication, paper, news article, film, television program or other media, resulting from field work under this permit. Copies of such documents shall be provided to the Agua Fria National Monument Office in Phoenix. To assist in producing the best possible science, you are encouraged to forward manuscripts for review to the Agua Fria National Monument Science Coordinator prior to submitting them for publication.
11. Access to research site(s) is authorized only across BLM administered lands. Use of private lands or lands administered by another agency must be secured separately.

12. Field schedule must be coordinated with the Monument Manager or a designated representative in advance of fieldwork.
13. A report of all activities conducted under this permit shall be prepared by December 31 of each year during the tenure of the permit. This report will be submitted to the Monument Headquarters, in care of the Monument Science Coordinator. The report shall include a catalog of all specimens collected, if authorized, a description of work conducted, copies of datasets (with FGDC compliant metadata for final reports) and any recommendations for future research or management activities. Similarly, upon conclusion of research on the Monument, a final report will be submitted.
14. Pursuant to NAGPRA regulations set forth at 43 CFR 10.4(a-g), the permittee must immediately notify the Monument Manager immediately upon the discovery of prehistoric human remains, funerary objects, sacred objects or objects of cultural patrimony, with a written confirmation of the discovery. All work in the vicinity of the discovered remains must cease, and reasonable efforts made to protect the remains pending BLM action. Activities may resume within 30 days of receipt of the written confirmation of notification unless the situation is resolved sooner.
15. Within 180 days following collection, if authorized, provide Monument staff with a complete, annotated list of all specimens collected. Information required for each specimen includes: what was collected, collection number, collection location (legal, to nearest ¼ section; latitude / longitude; or UTM Zone 12), and final curation location of the specimen. If GPS units are used for generating location information, the datum should be NAD 83.
16. Researchers are required to provide an educational outreach component, sharing the research work they have done with the public. Outreach may include interpretive tours, informative materials such as signs and website information, and educational seminars for local/regional schools. This can be coordinated with the Monument Manager.
17. A copy of this permit must be carried by the individual in direct charge of fieldwork during the course of all work conducted under permit.

## APPENDIX B – AGUA FRIA NATIONAL MONUMENT PROCLAMATION

### **Proclamation 7263 of January 11, 2000 Establishment of the Agua Fria National Monument**

*By the President of the United States of America*

#### *A Proclamation*

The windswept, grassy mesas and formidable canyons of Agua Fria National Monument embrace an extraordinary array of scientific and historic resources. The ancient ruins within the monument, with their breathtaking vistas and spectacular petroglyphs, provide a link to the past, offering insights into the lives of the peoples who once inhabited this part of the

desert Southwest. The area's architectural features and artifacts are tangible objects that can help researchers reconstruct the human past. Such objects and, more importantly, the spatial relationships among them, provide outstanding opportunities for archeologists to study the way humans interacted with one another, neighboring groups, and with the environment that sustained them in prehistoric times.

The monument contains one of the most significant systems of late prehistoric sites in the American Southwest. Between A.D. 1250 and 1450, its pueblo communities were populated by up to several thousand people. During this time, many dwelling locations in the Southwest were abandoned and groups became aggregated in a relatively small number of densely populated areas. The monument encompasses one of the best examples of these areas, containing important archeological evidence that is crucial to understanding the cultural, social, and economic processes that accompanied this period of significant change.

At least 450 prehistoric sites are known to exist within the monument and there are likely many more. There are at least four major settlements within the area, including Pueblo La Plata, Pueblo Pato, the Baby Canyon Ruin group, and the Lousy Canyon group. These consist of clusters of stone-masonry pueblos, some containing at least 100 rooms. These settlements are typically situated at the edges of steep canyons, and offer a panorama of ruins, distinctive rock art panels, and visually spectacular settings.

Many intact petroglyph sites within the monument contain rock art symbols pecked into the surfaces of boulders and cliff faces. The sites range from single designs on boulders to cliffs covered with hundreds of geometric and abstract symbols. Some of the most impressive sites are associated with major pueblos, such as Pueblo Pato.

The monument holds an extraordinary record of prehistoric agricultural features, including extensive terraces bounded by lines of rocks and other types of landscape modifications. The agricultural areas, as well as other sites, reflect the skills of ancient residents at producing and obtaining food supplies sufficient to sustain a population of several thousand people.

The monument also contains historic sites representing early Anglo-American history through the 19th century, including remnants of Basque sheep camps, historic mining features, and military activities.

In addition to its rich record of human history, the monument contains other objects of scientific interest. This expansive mosaic of semi-desert grassland, cut by ribbons of valuable riparian forest, is an outstanding biological resource. The diversity of vegetative communities, topographical features, and relative availability of water provide habitat for a wide array of sensitive wildlife species, including the lowland leopard frog, the Mexican garter snake, the common black hawk, and the desert tortoise. Other wildlife is abundant and diverse, including pronghorn, mule deer, and white-tail deer. Javelina, mountain

lions, small mammals, reptiles, amphibians, fish, and neotropical migratory birds also inhabit the area. Elk and black bear are present, but less abundant. Four species of native fish, including the longfin dace, the Gila mountain sucker, the Gila chub, and the speckled dace, exist in the Agua Fria River and its tributaries.

Section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431) authorizes the President, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and to reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected.

WHEREAS it appears that it would be in the public interest to reserve such lands as a national monument to be known as the Agua Fria National Monument:

NOW, THEREFORE, I, WILLIAM J. CLINTON, President of the United States of America, by the authority vested in me by section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431), do proclaim that there are hereby set apart and reserved as the Agua Fria National Monument, for the purpose of protecting the objects identified above, all lands and interests in lands owned or controlled by the United States within the boundaries of the area described on the map entitled “Agua Fria National Monument” attached to and forming a part of this proclamation. The Federal land and interests in land reserved consist of approximately 71,100 acres, which is the smallest area compatible with the proper care and management of the objects to be protected.

For the purpose of protecting the objects identified above, all motorized and mechanized vehicle use off road will be prohibited, except for emergency or authorized administrative purposes.

Nothing in this proclamation shall be deemed to enlarge or diminish the jurisdiction of the State of Arizona with respect to fish and wildlife management.

The establishment of this monument is subject to valid existing rights.

All Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from all forms of entry, location, selection, sale, leasing, or other disposition under the public land laws, including but not limited to withdrawal from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the monument. Lands and interests in lands within the proposed monument not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States.

There is hereby reserved, as of the date of this proclamation and subject to valid existing rights, a quantity of water sufficient to fulfill the purposes for which this monument is established. Nothing in this reservation shall be construed as a relinquishment or reduction of any water use or rights reserved or appropriated by the United States on or before the date of this proclamation.

The Secretary of the Interior shall manage the monument through the Bureau of Land Management, pursuant to applicable legal authorities, to implement the purposes of this proclamation.

Laws, regulations, and policies followed by the Bureau of Land Management in issuing and administering grazing leases on all lands under its jurisdiction shall continue to apply with regard to the lands in the monument.

Nothing in this proclamation shall be deemed to revoke any existing withdrawal, reservation, or appropriation; however, the national monument shall be the dominant reservation.

Warning is hereby given to all unauthorized persons not to appropriate, injure, destroy, or remove any feature of this monument and not to locate or settle upon any of the lands thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this eleventh day of January, in the year of our Lord two thousand, and of the Independence of the United States of America the two hundred and twenty-fourth.

WILLIAM J. CLINTON

## APPENDIX C – LIST OF CONTRIBUTORS

Leah Baker	Bureau of Land Management
Peggy Biegler	Friends of the Agua Fria National Monument
Todd Botswick	Pueblo Grande Museum
David Brown	Friends of the Agua Fria National Monument
Steve Cohn	Bureau of Land Management
Brian Culpepper	Bureau of Land Management
Tim Flood	Friends of the Agua Fria National Monument
Sharon Hall	Arizona State University
Rem Hawes	Bureau of Land Management
Amanda James	Bureau of Land Management
Melissa Kruse-Peeples	Arizona State University
Robert Leighty	Mesa Community College
Ken Mahoney	Bureau of Land Management
Trudy Mertens	Friends of the Agua Fria National Monument
Shelley Rasmussen	Friends of the Agua Fria National Monument
Andrew Salywon	Desert Botanical Garden
Hoski Schaafsma	Arizona State University
Carolyn Shelton	Bureau of Land Management
Nancy Stallard	Bureau of Land Management



## APPENDIX C – LIST OF CONTRIBUTORS, CONTINUED

Connie Stone	Bureau of Land Management
J.A. Vacca	Bureau of Land Management
Dana Warnecke	Arizona Department of Game and Fish
David Wilcox	Museum of Northern Arizona
Scott Wood	Tonto National Forest
Mark Ziem	Yavapai County Public Works