# Arizona Water Protection Fund
# FY 2009 Grant Application Review

**Application #** WPF0375 **Applicant:** ABE SPRINGER / NORTHERN ARIZONA UNIVERSITY

**Title of Project:** ARIZONA WETLAND BIOLOGICAL ATLAS: RIPARIAN RESTORATION LINKAGES

**Additional materials were submitted with this application that could not be reproduced and distributed for review. These materials may be reviewed in person at the Arizona Water Protection Fund offices at (3550 N. Central Avenue, 4th Floor, Phoenix). The additional materials available are the following:**

_____ **Maps**
_____ **Photographs**
_✓_ **Disk**
_____ **Other**

COPY

# Arizona Water Protection Fund
## Application Cover Page
## FY 2009

WPF0375

**Title of Project:** Arizona Wetland Biological Atlas: Riparian Restoration Linkages

| **Type of Project:** | **Stream Type:** | **Your level of commitment to maintenance of project benefits and capital improvements:** |
|---|---|---|
| ☐ Capital or Other<br>☐ Water Conservation<br>☒ Research | ☒ Perennial<br>☒ Intermittent<br>☒ Ephemeral | ☐ < 5 years ☐ 5-10 years ☐ 11-15 years ☐ 16-20 years |

**Applicant Information:**
Name/Organization: Abe Springer/Northern Arizona University
Address 1:
Address 2:
City:
State:
ZIP Code:
Phone:
Fax:
Tax ID No.:

**Inside an AMA:** Yes ☒ No ☒

**If yes, which AMA:**
☒ Phoenix
☒ Tucson
☒ Prescott
☒ Pinal
☒ Santa Cruz

**Type of Application:**
☒ New
☐ Continuation

**Contact Person:**
Name: Wilma G. Ennenga
Title: Director, Office Grant and Contract Services
Phone:
Fax:
e-mail:

**Any Previous AWPF Grants:**
☒Yes ☐No

**If yes, please provide Grant #(s):**
04-120WPF, 95-006WPF,96-003WPF

**Arizona Water Protection Fund Grant Amount Requested:**

$61,703.00

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

**Matching Funds Obtained and Secured:**

| Applicant/Agency/Organization: | Amount ($): |
|---|---|
| 1. Applicant | |
| 2. | |
| 3. | |
| **Total:** | |

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

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

| Wilma G. Ennenga | Director, Office Grant and Contract Services |
|---|---|
| **Typed Name of Applicant or Applicant's Authorized Representative** | **Title and Telephone Number** |
| Wilma G. Ennenga | 9 June 2008 |
| **Signature** | **Date Signed** |

RECEIVED
JUN 11 2008
ARIZONA WATER PROTECTION FUND

# Executive Summary Page

To improve protection, restoration, and awareness of water quality and wetlands in Arizona, we propose to develop an annotated list of Arizona's diverse aquatic and wetland plants and its aquatic insects, and relate those species to water quality and habitat types. This proposal is submitted in parallel with a proposal to the Arizona Department of Environmental Quality, Water Quality Improvement Grant Program. Funding of this project will only be continued if the ADEQ proposal is also funded. Funding of the ADEQ proposal will be known prior to the conclusion of the AWPF project review process

We propose to

1) Compile existing water quality data for the 84 hydrologic subbasins (hydrologic units) of Arizona,
2) Catalog the data in a relational database,
3) Make the data accessible through a website,
4) Use multivariate statistical analyses to relate water quality to vegetation and aquatic invertebrates and determine what (if any) bioindicators exist,
5) Present all project materials in a final project report.

Improvement of riparian restoration projects will result from more complete knowledge of the plant and insect species that naturally occur in and around the state's waters. Such information will: 1) establish a baseline, 2) help inform habitat management and restoration planning and implementation; and 3) help develop and implement appropriate monitoring plans; and 4) help establish metrics of success for such projects. In addition, the information compiled and presented here will provide for much public outreach and education.

Compilation of the wetlands plant and aquatic insects will occur through the ADEQ project. Also, the ADEQ project will provide for the database and website design. This request to AWPF is only for specific tasks of the overall project which are listed above.

# Project Overview

## Background

To improve protection and awareness of water quality in Arizona, we propose to develop an annotated list of Arizona's diverse aquatic and wetland plants and its aquatic insects, and relate those species to water quality and habitat type. We will use those data in on-the-ground forums to educate primary and secondary school teachers, university faculty and staff, and state, federal, tribal, and other water resource managers about the state's aquatic biota, their relationships to water, habitat quality, and ecosystem restoration, and the extent to which those taxa can be used to identify nonpoint sources of water pollution. This project will place Arizona in the forefront of understanding their aquatic biodiversity and how it relates to water resource management and habitat restoration.

The water quality issues being addressed include data compilation of water quality among the state's 84 subbasins with available data, pollution status of those units, the distribution of aquatic and wetland plants and aquatic insects among those subbasins, relationships between water quality and aquatic biological indicators, and metrics of restoration success with regard to using the appropriate species for restoration of water and wetland habitat quality. Biotic indicators distribution data will be gathered from state and regionally important collections.

A recent AWPF project by Natural Channel Design assessed the success of AWPF projects. The Natural Channel Design project laid the foundation for this proposed project to incorporate biotic and water quality indicators to the channel design indicators of success of riparian restoration, creation, and enhancement projects.

## Goals

The goals of the project include

1) Improving protection and awareness of water quality in Arizona, and
2) Providing better metrics for assessing the success of riparian restoration.

## Objectives

We propose to

1) Compile existing water quality data for the 84 hydrologic subbasins (hydrologic units) of Arizona,
2) Catalog the data in a relational database,

3) Make the data accessible through an interactive website,
4) Use multivariate statistical analyses to relate water quality to vegetation and aquatic invertebrates and determine what (if any) bioindicators exist,
5) Present all project materials in a final project report.

**Statement of problem**

This project proposes to address the poor understanding by the public and water resource managers of the state's remarkably diverse aquatic and wetland flora and aquatic insects, the status and distribution of these species, and their utility as biological indicators.

**Statement of cause of the problem**

Arizona has never had a synopsis of the status, habitat relationships, and utility as biological indicators of Arizona's diverse aquatic and wetland plants and aquatic insects, among the state's 84 recognized subbasins, as well as a comprehensive compilation of water quality within those subbasins, and an extensive bibliography on these topics. This information will be provided through trainings and a widely available, user-friendly database, to all education levels, including primary and secondary teachers, university professors, and practicing water resource managers and habitat restoration experts. These data also will provide baseline information on species distributions, which are likely to change as water quality and global climate changes occur

**Statement of project-related remedies or solutions**

A never-before-achieved synopsis of the status, habitat relationships, and utility as biological indicators of Arizona's diverse aquatic and wetland plants and aquatic insects, among the state's 84 recognized subbasins, as well as a comprehensive compilation of water quality within those subbasins, and an extensive bibliography on these topics. This information will be provided through trainings and a widely available, user-friendly database, to all education levels, including primary and secondary teachers, university professors, and practicing water resource managers and habitat restoration experts. These data also will provide baseline information on species distributions, which are likely to change as water quality and global climate changes occur.

A better understanding by the public and water resource managers of the state's remarkably diverse aquatic and wetland flora and aquatic insects, the status and distribution of these species, and their utility as biological indicators. Education at all levels will help reinforce that understanding, and encourage state residents to recognize the importance of water resources

to our natural heritage and quality of life in Arizona. Such recognition will lead to more sustainable water resources in the future.

Improvement of on-the-ground water quality improvement projects will result from more complete knowledge of the plant and insect species that naturally occur in and around the state's waters. Such information will: 1) establish a baseline, 2) help inform habitat management and restoration planning and implementation; and 3) help develop and implement appropriate monitoring plans; and 4) help establish metrics of success for such projects. In addition, the information compiled and presented here will provide for much public outreach and education.

**Statement of project years of benefit (with justification)**

This project will serve to benefit all future AWPF projects. When incorporated with the channel design assessment of AWPF projects in a recent report by Natural Channel Design, knowledge of biotic and water quality indicators of will help guide the future success riparian creation, enhancement, and restoration projects.

## Project Maps and Schematic

**Arizona Watershed Map**

This project will evaluate all existing water quality data for the 84 subbasins of the state of Arizona.

**Project Location/Ownership Maps**

n/a

**Project Schematic**

n/a

# Project Location & Environmental Contaminant Information
# FY 2009

**Project Location Information**

| 1. County: All | 2. Section: _____ | 3. Township: _____ | 4. Range: _____ |
|---|---|---|---|

5. Watershed: Select One (reference watershed map)
6. Name of USGS Topographic Map where project area is located: all
7. State Legislative District: all

(Information available at http://156.42.40.10/mapping/default2.asp?tname=Interim.2004.Legislative.Map)

8. Land ownership of project area: n/a
9. Current land use of project area: n/a
10. Size of project area (in acres): n/a
11. Stream Name: all
12. Length of stream through project area: all
13. Miles of stream benefited: all miles
14. Acres of riparian habitat: all acres will be:

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

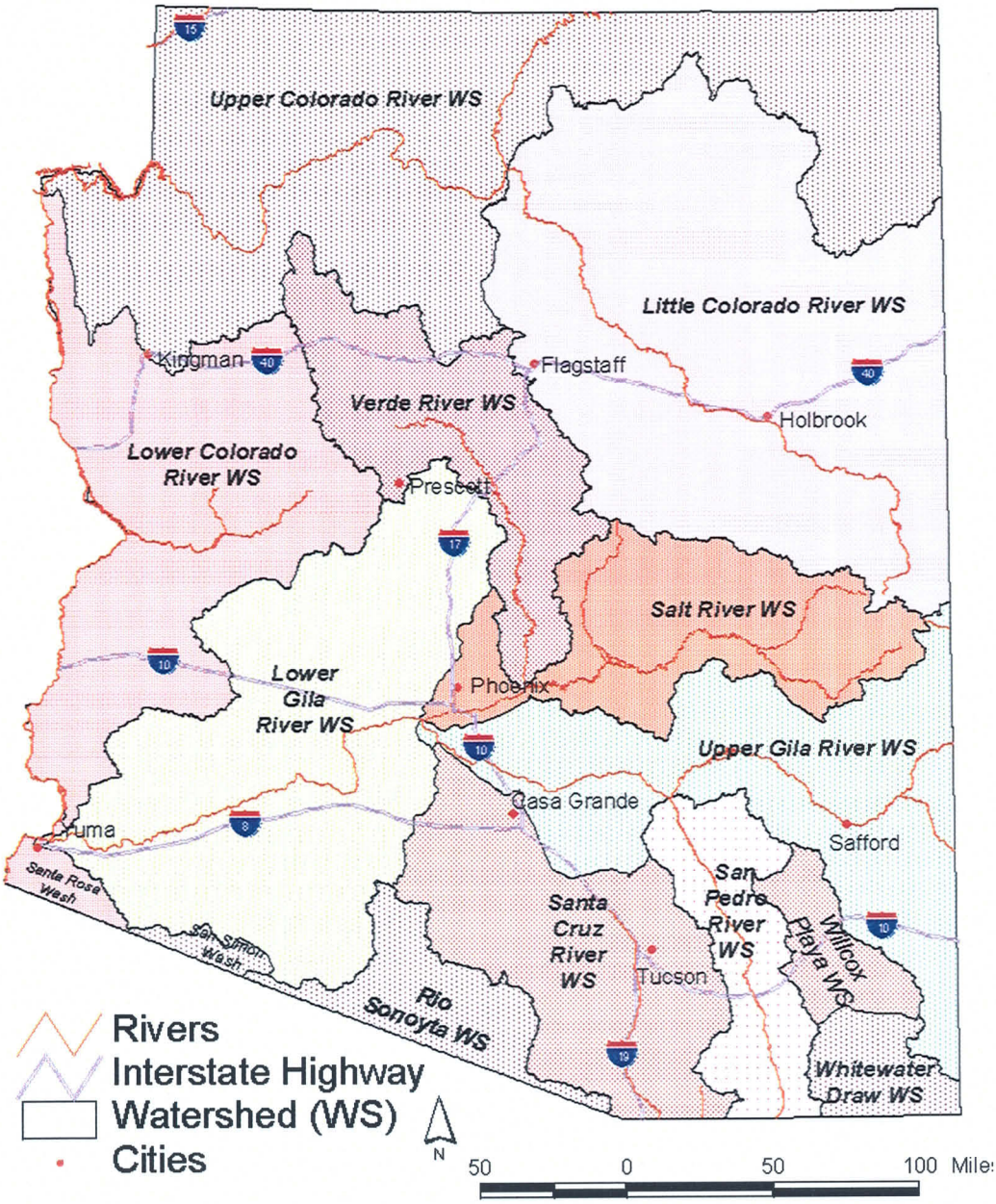
15. Provide directions to the project site from the nearest city or town. List any special access requirements:
This project is working in and benefiting all 84 hydrologic units of the state.

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

## Arizona Watershed Map

**FY 2009**




**Title of Project:** Arizona Wetlands Biological Atlas: Riparian Restoration Linkages: Note project includes watershed in the entire state (all 84 subbasins)

# Scope of Work

**Task : Permits, Authorizations, Clearances and Agreements**

N/A. No permits, authorizations, clearances, or agreements are necessary to complete the proposed research project.

**Deliverable Description**: n/a
**Deliverable Due Date**: n/a
**AWPF Reimbursable Cost**: $00.00

## Task 1: Prepare and Submit Research Plans

A research plan will be created and provided to AWPF staff for review before beginning tasks 2-6. The research plan will include details for tasks 2-5. The sources of water quality data will be identified and described and quality of the data assessed. The statistical methods of analysis will be defined and described. The website host for the database will be determined. The specific linkages of the analyses to riparian restoration will be defined based on an assessment of the quality of the data and a review of the AWPF assessment project by Natural Channel Design.

**Deliverable Description**: Research plan describing sources of data and methods of analysis for project and host for website.
**Deliverable Due Date**: May 15, 2009
**AWPF Reimbursable Cost**: $1803.00

## Task 2: Compile subbasin water quality information (USGS Cataloging Units)

Step 1: Determine water quality parameters: A list of water quality parameters will be developed that are known to be involved in impairment of Arizona water bodies. This will be based on the latest assessment data for the State of Arizona. As less than 2% of river and stream miles and less than 7% of lake and pond acreage have been assessed, and some of the identified impaired water bodies have unknown cause(s) of impairment, the list of water quality parameters will be expanded based on likely sources of impairment and on availability of data.

**Deliverable Description**: Parameters established that correlate aquatic insects and aquatic and wetland plants with water quality.

Step 2: Compile Arizona subbasin information: A list of Arizona subbasins (USGS Cataloging Units) will be developed with identified water bodies and current state of assessment (good, impaired, threatened). The source of the water for each water body (groundwater, surface water, or waste water) will be determined. Water quality parameters likely associated with impaired or threatened water bodies will be identified along with likely sources of impairment(s). Water quality parameters associated with an assessment of good will also be identified, but will likely be defaulted to those parameters available for these water bodies. These will include, at a minimum, major ions, dissolved oxygen, TDS, and TSS (or turbidity). This list will be reviewed for completeness by water quality experts.

**Deliverable Description**: Arizona subbasin list compiled, to include water quality parameters

Step 3: Compile water quality data: A compilation of sources of water quality data, prioritized according to data reliability, which will be ascertained by 1) existence of QA/QC standards with the dataset (e.g. data from EPA Storet Database, data from EPA or state regulated sources); 2) data from peer-reviewed sources; 3) data from published but not peer reviewed sources, e.g. reports, theses, etc.; 4) other sources, reliability to be determined by this project's researchers or interviews with those who generated data.

**Deliverable Description**: A Microsoft Excel File containing the above information.

Step 4: Compile data from above steps focusing on water quality parameters. Additional information will include, but not necessarily be limited to, date(s) of collection, latitude and longitude of collection site, reliability assessment, Arizona subbasin (USGS Cataloging Unit), identification of water body, and data source. This will be submitted for review by water quality experts.

**Deliverable Description**: Water quality data compiled in Microsoft Excel format.
**Deliverable Due Date**: May 15, 2009
**AWPF Reimbursable Cost**: $3,971.00

## Task 3 - Relational database design and data entry

Step 1: A Microsoft Access relational database is being designed for the project being conducted in parallel with this project. We will work with the database designer to develop appropriate tables for entry into the database and will coordinate database construction with the Arizona Hydrological Information System (AHIS) for compatibility. Draft tables will be sent to experts

for review and refined based on their feedback. Arrangements will be made with the host of the website for hosting it in Task 4. The host for the website will be determined in Task 1.

**Deliverable Description**: Draft Microsoft Access database design and criteria complete and sent to experts for review.

Step 2: Import/enter water quality data into the database and refine queries and reports. Data will be collected from multiple sources in different formats, requiring various import methods.

**Deliverable Description**: Species spatial range and water quality data entered, queries and reports refined based on feedback.
**Deliverable Due Date**: August 15, 2009
**AWPF Reimbursable Cost**: $22,230.00

## Task 4 – Import Access database to website

Coordinate and work with database expert to export the completed Access database to SQL and imported to the SQL Server website. We will refine the website design and make it available for expert review. Coordination of the website and database with existing architecture of ADEQ, ADWR, and AHIS will be conducted. Finalize and launch website. Based on feedback we will make any necessary changes or corrections to the website and make it available to the public. The host for the website will be determined in Task 1.

**Deliverable Description**: Completed database imported to website; website finalized and launched.
**Deliverable Due Date**: May 15, 2010
**AWPF Reimbursable Cost**: $7,021.00

## Task 5 – Analyses of wetland plant and aquatic insect relationships to water quality

Step 1 – Utilize database to conduct multivariate analyses. Convert database and conduct multivariate analyses to relate presence-absence biota data across elevation within subbasins, with covarying water quality and flow. These analyses will describe plant and insect assemblages in relation to subbasin water quality.

**Deliverable Description**: Completion of statistical analysis of plant and insect data in relation to subbasin water quality.

Step 2 – Prepare a report relating water quality, wetland plants, and aquatic insects to subbasin water quality and flow, and describing species rarity and utility as bioindicators.

**Deliverable Description**: Report on plant and insect data in relation to subbasin water quality complete and distributed for review.
**Deliverable Due Date**: May 15, 2010
**AWPF Reimbursable Cost**: $4,816.00

## Task 6: Final Report

We will prepare and submit a comprehensive final report consistent with the Final Report Guidelines in AWPF Policies and Application Guidelines Manual, including a summary of all methodologies used, outcome of all tasks, analysis of all project and monitoring data, suggestions for any further changes needed in the project, and an evaluation of the projects success measured against the objectives.

**Deliverable description**: Final project report will summarize all methodologies used, outcome of all tasks, summarize and analyze project data & monitoring data, suggest any further changes needed in the project and evaluate project success measured against the objective.
**Deliverable due date**: August 15, 2010
**AWPF Fixed Cost**: $21,861.00

| Arizona Wetland Biological Atlas | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Task 1 | | Task 2 | | Task 3 | | Task 4 | | Task 5 | | Task 6 | | |
| | | | | Research Plan | | Compile data | | Database | | Website | | Analyses | | Report | | |
| Due Date | | | | Due | 15-May-09 | Due | 15-May-09 | Due | 15-Aug-09 | Due | 15-May-09 | Due | 15-May-09 | Due | 15-Aug-10 | |
| **Direct Labor Costs** | | | | | | | | | | | | | | | | |
| Salary | | | | | | | | | | | | | | | | |
| | Project Manager | 48 | per hour | | | | | 160 hours | $7,680 | | | | | 160 hours | 7,680 | 15,360 |
| | Co-manager | 72 | per hour | | | | | 80 hours | $5,760 | | | | | 80 hours | 5,760 | 11,520 |
| | Grad student | 17 | per hour | 100 hours | 1700 | 130 hours | $2,210 | 274 hours | $4,658 | 206 hours | 3,502 | 206 hours | 3,502 | 280 hours | 4,750 | 20,322 |
| | | | | | | | | | | | | | | | | |
| Fringe | | | | | | | | | | | | | | | | |
| | Project Manager | 0.16 | | | | | | | $1,229 | | | | | | 1,229 | 2,458 |
| | Co-manager | 0.16 | | | | | | | $922 | | | | | | 922 | 1,843 |
| | GRA fringe | 1 % AY, 8 % SU | | | 17 | | $22 | | $373 | | 35 | | 35 | | 380 | 862 |
| | GRA Tuition remission | | | | | | $1,500 | | | | 1,000 | | 1,000 | | | 3,500 |
| | GRA health insurance | | | | | | | | | | 800 | | | | | 800 |
| **Total Direct labor Costs** | | | | | $1,717 | | $3,732 | | $20,621 | | 5,337 | | 4,537 | | 20,720 | 56,665 |
| | | | | | | | | | | | | | | | | |
| **Outside Services** | | | | | 0 | | $0 | | $0 | | 0 | | 0 | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| **Other Direct Costs** | | | | | | | | | | | | | | | | |
| | Materials and supplies | | | | 0 | | $50 | | $50 | | 50 | | 50 | | 100 | 300 |
| | Student travel to regional presentation | | | | 0 | | $0 | | $0 | | 800 | | 0 | | 0 | 800 |
| | Software licenses | | | | 0 | | $0 | | $500 | | 500 | | 0 | | 0 | 1,000 |
| **Total Other direct costs** | | | | | $0 | | $50 | | $550 | | 1,350 | | 50 | | 100 | 2,100 |
| | | | | | | | | | | | | | | | | |
| **Capital Outlay and Equipment Costs** | | | | | 0 | | $0 | | $0 | | 0 | | 0 | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| **Total Direct Cost** | | | | | $1,717 | | $3,782 | | $21,171 | | 6,687 | | 4,587 | | 20,820 | 58,765 |
| **Administrative Costs** | | 5% | | | $86 | | $189 | | $1,059 | | 334 | | 229 | | 1,041 | 2,938 |
| | | | | | | | | | | | | | | | | |
| **Total Task cost** | | | | | $1,803 | | $3,971 | | $22,230 | | 7,021 | | 4,816 | | 21,861 | **61,703** |

# STATE HISTORIC PRESERVATION OFFICE
## Review Form

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

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

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

**Please answer the following questions:**

1. Grant Program: Arizona Water Protection Fund

2. Project Title: Arizona Wetlands Biological Atlas: Riparian Restoration Linkages

3. Applicant Name and Address: Abe Springer, Department of Geology, Northern Arizona University, Box 4099, Flagstaff, AZ 86011

4. Current Land Owner/Manager(s): n/a

5. Project Location, including Township, Range, Section: n/a

6. Total Project Area in Acres (or total miles if trail): n/a

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: To improve protection, restoration, and awareness of water quality and wetlands in Arizona, we propose to develop an annotated list of Arizona's diverse aquatic and wetland plants and its aquatic insects, and relate those species to water quality and habitat types. There are no surface or subsurface impacts that are expected from this project.

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: n/a

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

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

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

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

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

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

**If YES, name of the district:**

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

Applicant Signature /Date 10/5/08 Applicant Printed Name Jordan Springer

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

# STATE OF ARIZONA
# HISTORIC PROPERTY INVENTORY FORM

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

**PROPERTY IDENTIFICATION**
*For properties identified through survey*: Site No. n/a Survey Area: n/a

Historic Names (*enter the name(s), if any that best reflect the property's historic importance*): n/a

Address: n/a

City or Town: n/a ☐ Vicinity County: n/a Tax Parcel No.: n/a

Township: n/a Range: n/a Section: n/a Quarters: n/a Acreage: n/a

Block: n/a Lot(s): n/a Plat (Addition): n/a Year of plat (addition): n/a

UTM Reference – Zone: n/a Easting: n/a Northing: n/a

USGS 7.5' quadrangle map: n/a

ARCHITECT: n/a ☐ not determined ☐ known Source: _____

BUILDER: n/a ☐ not determined ☐ known Source: _____

CONSTRUCTION DATE: n/a ☐ known ☐ estimated Source: _____

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

**USES/FUNCTIONS**
Describe how the property has been used over time, beginning with the original use: n/a

Sources: _____

**PHOTO INFORMATION**
Date of photo: _____
View Direction (looking towards): _____

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

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

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

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

C. ARCHITECTURE – Style: _____ ☐ no style

Stories: _____ ☐ Basement Roof Form: _____

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

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

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

**DESIGN**
Describe alterations from the original design, including dates: _____

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

Walls (structure): _____

Walls (sheathing): _____

Windows: _____

Roof: _____

Foundation: _____

**SETTING**
Describe the natural and/or built environment around the property: _____

How has the environment changed since the property was constructed? _____

**WORKMANSHIP**
Describe the distinctive elements, if any, of craftsmanship or method of construction: _____

**NATIONAL REGISTER STATUS (*if listed, check the appropriate box*)**
☐ Individually Listed; ☐ Contributor; ☐ Non-contributor to _____ Historic District

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

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

Property ☐ is ☐ is not eligible individually.

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

☐ More information needed to evaluate.

If not considered eligible, state reason: n/a

# Supplemental Information

## Key Personnel

Dr. Springer, Professor of Geology at NAU will serve as project manager and as the supervisor of the graduate student in Environmental Sciences and Policy at NAU who will conduct much of the work. Dr. Wilbert Odem, Professor of Civil and Environmental Engineering at NAU will serve as a thesis committee member for the graduate student and will participate in all aspects of the project. The graduate student will have a broad background in ecology and water quality to successfully complete the project. The parallel ADEQ proposal includes ecologist Dr. Larry Stevens, botanist Patty West, and database expert Jeri Ledbetter. Drs. Springer and Odem have led and completed various other research and capital AWPF proposals in the past and look forward to working with AWPF staff on this project.

### Site Photographs

n/a

### Description of Monitoring/Sampling Plans

n/a

### Description of Revegetation/Restoration Plans or Research Designs

A research design will be developed as part of Task 1 of the project. This will provide additional details than those provided in tasks 2-5.

### Description of Existing Plans

The proposal "Arizona Wetland Biological Atlas" to the Arizona Department of Environmental Quality Water Quality Improvement Grant Program was submitted in March 2009. The project will provide a tool that can be used 1) to identify plant and insect indicator species and assemblages useful as biocriteria to evaluate water quality, 2) to monitor changes in vegetation and insect distributions throughout Arizona as indicators of changes in water quality, climate, or other ecological or abiotic conditions; and 3) to assist restoration projects so that species used are native, and appropriate to sites, 4) to use plant species for bioremediation. The team will present workshops to potential user groups throughout the state to introduce the tool (the online database and corresponding CD) and relevant species identification techniques for common wetland species. The project has a heavy emphasis on education and outreach which be complimentary

to this AWPF proposal. This AWPF proposal addresses the water quality analyses which will be used in tandem with the biotic indicators in the ADEQ proposal.