Arizona Water Protection Fund
FY 2009 Grant Application Review

Application # WPF0378 **Applicant:** NORTHERN ARIZONA UNIVERSITY

Title of Project: LAKE HAVASU WASH REDESIGN ASSESSMENT

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** APPLICATION
_____ **Other**

COPY

Arizona Water Protection Fund
Application Cover Page
FY 2009

WPF0378

Title of Project: Lake Havasu Wash Redesign Assessment

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

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

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

Applicant Information:
Name/Organization: Northern Arizona University
Ecological Monitoring & Assessment (EMA) Program
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: Patricia West
Title: Program Coordinator
Phone:
Fax:
e-mail:

Any Previous AWPF Grants:
☐Yes ☒No

If yes, please provide Grant #(s):

Arizona Water Protection Fund Grant Amount Requested:

$ 20,980

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	9088
2.	
3.	
	Total: 9088

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,
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

Lake Havasu Wash Redesign Assessment

Submitted to
The Arizona Water Protection Fund Commission
June 11, 2008

by the Ecological Monitoring & Assessment (EMA) Program at Northern Arizona University

ECOLOGICAL MONITORING & ASSESSMENT PROGRAM & FOUNDATION

NORTHERN ARIZONA UNIVERSITY

Executive Summary

Lake Havasu State Park is the most visited state park in Arizona. The riparian areas on the shores of the lake provide many benefits to humans and wildlife. The wash in the cactus garden on the shores of the lake has problems with drainage and erosion and needs to be re-constructed. The project area was once the site of illegal camping by transient people. There was a fire in the wash that charred most of the vegetation. The area was then converted to a botanical garden with native and xerophytes (cactus and other drought-tolerant plants). In meetings with park staff the need for the area to be redesigned was expressed to EMA staff. This project will allow a student intern with a faculty mentor to present options for the redesign of the wash. Engineering faculty have expressed interest in giving a student the opportunity to complete an assessment of redesign options for the park including hydrologic flow, innovative renewable energy solutions, and erosion control. The project deliverables would be a report to the park by the student that has been thoroughly reviewed by the faculty and/or professional advisor. This report will be presented to Lake Havasu State Park and the state office of Arizona State Parks in a combined meeting and in a written report. Information about the partnership involved in this project will be presented on the EMA website along with other riparian and Arizona State Parks projects. This project will lead to the enhancement, maintenance and restoration of a riparian wash which is habitat for wildlife in the area including beaver, osprey, many other bird species and other animals. This project will lead to Phase II which will be the reconstruction of the wash. That will enhance the riparian area by providing for more natural geomorphic conditions, restore the wash by restoring water flow to that area, and maintain the integrity of the wash by stopping erosion around the altered areas. We will be seeking funds for Phase II from the Water Protection Fund, Arizona State Parks (ASP), and other sources. We will work with ASP to develop Phase II from the resulting analysis and conceptual design from Phase I.

Project Overview

Background: The cactus garden has been created with much work by volunteers, but was not designed to take into account a wash that runs through it. This causes problems for the garden, means excessive maintenance after rain events and leads to the deposition of silt in the lake. The wash needs to be redesigned so that it can function as a conduit for water without creating an erosion problem in the garden. This proposal would fund Phase I of the project. Phase II would be the implementation of the redesign plan which would be done by Arizona State Parks.

Goals:

1. Perform an assessment for the redesign of the Cactus Garden Wash on the shores of Lake Havasu.
2. Present the assessment and one or more designs to Arizona State Parks for them to use in the reconstruction of the wash.
3. Present information regarding the project on the EMA website and at outreach events.

Objectives: The goals will be met by having the team take three trips to the site to document current conditions and establish redesign options to be proposed to Arizona State Parks. This will be done in consultation with the Arizona State Parks. In Phase I we will work with Arizona State Parks to develop procedures for Phase II design and implementation.

Statement of Problems/Causes: Lake Havasu State Park has established a cactus garden in a wash. The current design does not adequately address water flow and this led to silt being deposited in the garden and the interruption of the natural hydrologic flow of the wash. The May 2006 "Interpretive Plan for Lake Havasu State Park's Botanical Garden" by Mia LaBarbara states that "The botanical garden is located in a drainage area. During seasonal rains, flooding can occur damaging walkways and planting areas. Stabilizing the drainage system needs to be a top priority."

Statement of solutions- The solution will be to redesign the flow through the cactus garden so that the water can move more naturally and will minimize disruption to the garden, while re-establishing the natural flows to the riparian area beyond the garden.

Statement of project years of benefit- Phase I of the project will have a limited time of benefit, however Phase I is essential to completing Phase II (the re-construction of the wash) will have long-term benefits to the wash, wildlife and human visitors to Lake Havasu State Park. The work will also benefit managers that would like to do similar projects.

Project Location & Environmental Contaminant Information
FY 2009

Project Location Information

1. County: Mohave County	2. Section: 9	3. Township: 13N	4. Range: 20W

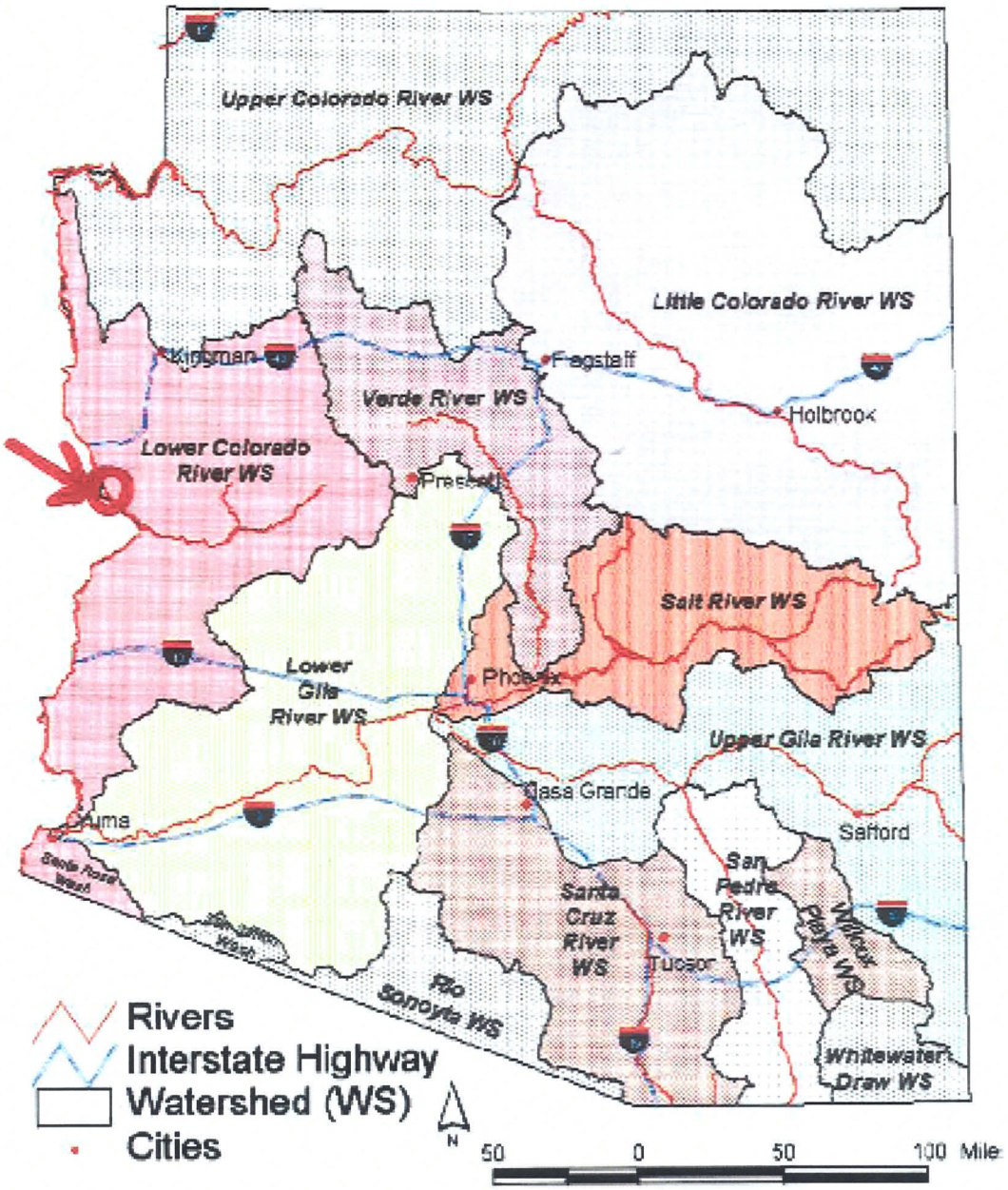
5. Watershed: Lower Colorado River
6. Name of USGS Topographic Map where project area is located: Lake Havasu City South
7. State Legislative District: 1
   (Information available at http://156.42.40.10/mapping/default2.asp?tname=Interim.2004.Legislative.Map)
8. Land ownership of project area: Arizona State Parks
9. Current land use of project area: Parkland/Cactus garden and natural wash
10. Size of project area (in acres): 1.2
11. Stream Name: No name
12. Length of stream through project area: 250 feet
13. Miles of stream benefited: 0.05 miles
14. Acres of riparian habitat: 1.2 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:
The park is located at 699 London Bridge Road off Highway 95 & Industrial Boulevard. Once you enter the park continue southwest on the main park road until you reach the sign for the xeriscape garden and bird care facility.

Environmental Contaminant Location Information

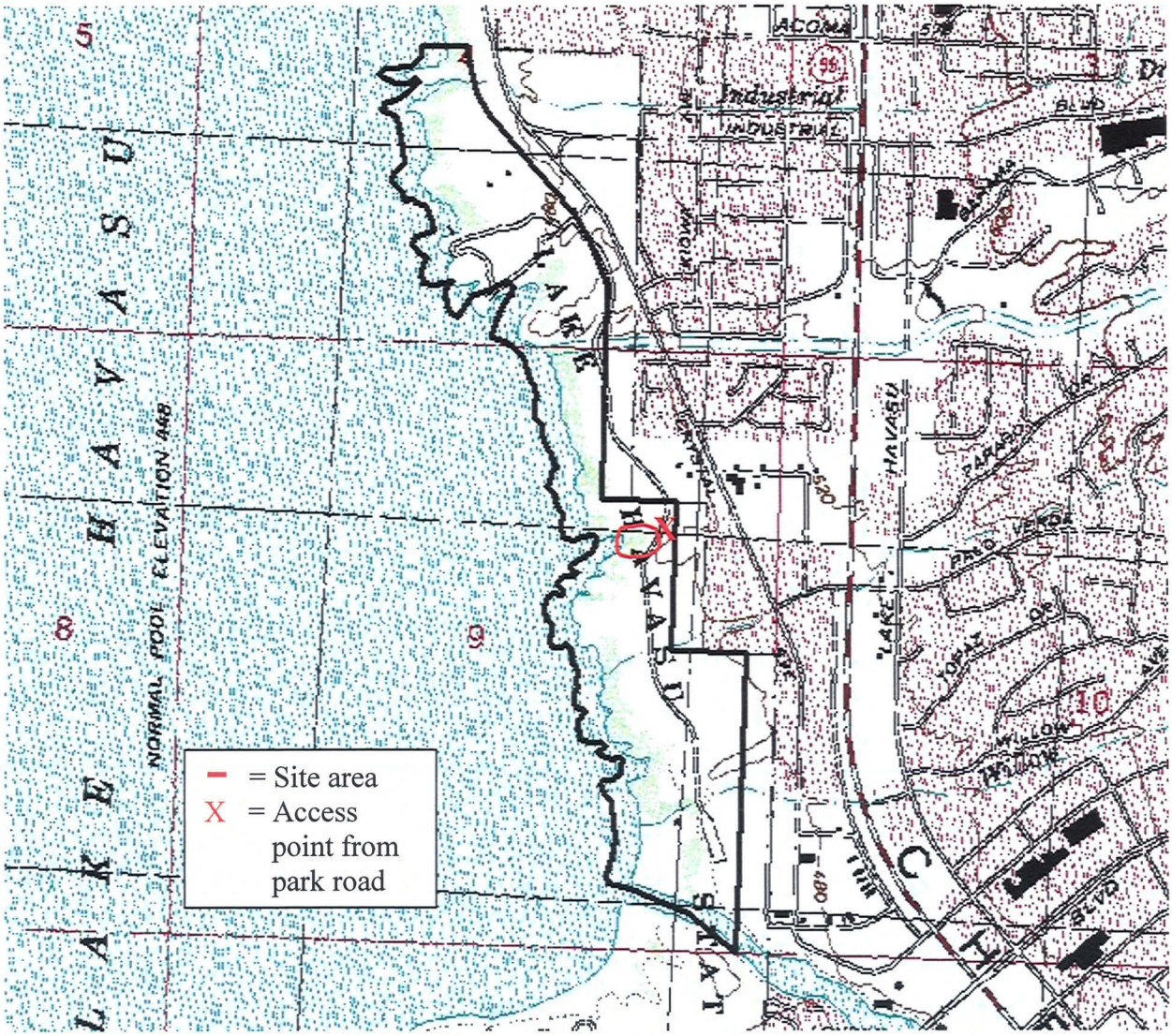
1. Does your project site contain known environmental contaminants? ☐ YES ☒ NO If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants:
   -
2. Are there known environmental contaminants in the project vicinity? ☐ YES ☒ NO If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants:
   -
3. Are you asking for Arizona Water Protection Fund monies to identify whether or not environmental contaminants are present? ☐ YES ☒ NO

Arizona Watershed Map
FY 2009

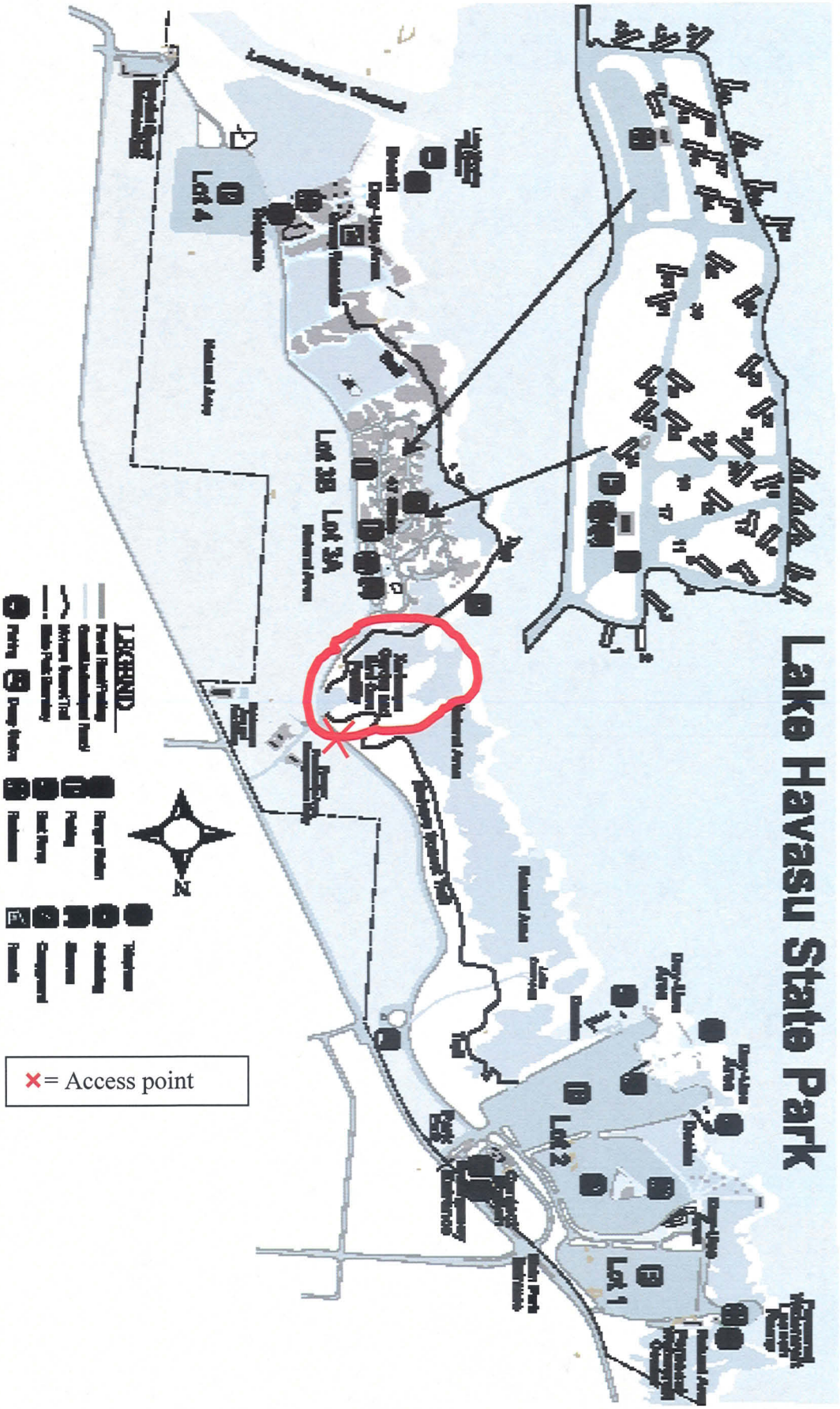


Title of Project: Lake Havasu Wash Redesign Assessment

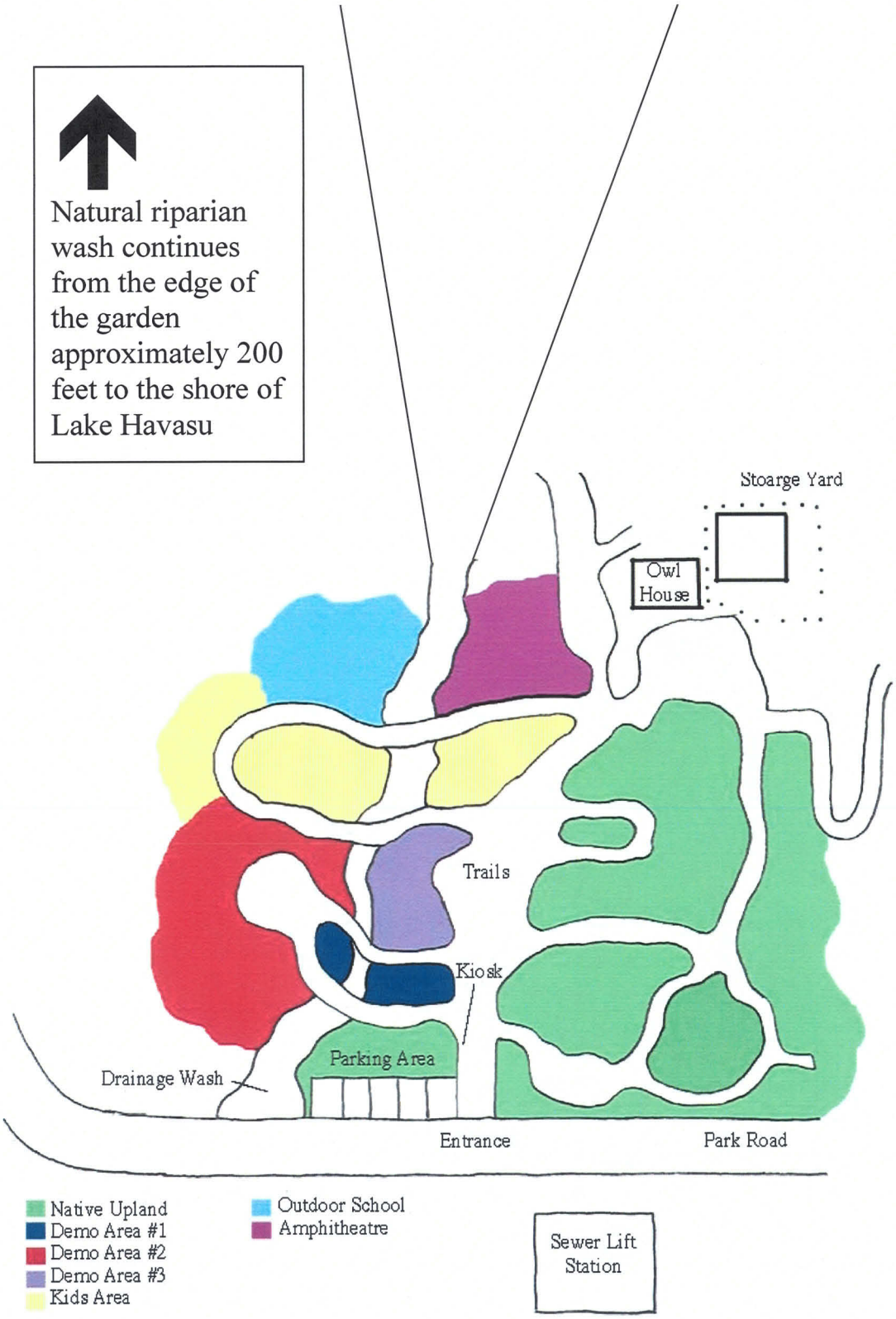
Location/Ownership Maps:



Map of Lake Havasu State Park and site of Wash Redesign Assessment


Lake Havasu State Park
LEGEND
N
× = Access point

Schematic of Garden and wash



Sources of water to be used in the project: NONE

Scope of Work:
Task #1: Permits, clearances, authorizations and agreements

Obtain and submit to the Project Manager all necessary permits, authorizations, clearances and agreements, and perform any consultations required to complete the tasks listed in the Scope of Work. The requirements will be met before any work in the project areas is performed and shall include, but not be limited to the following:

- Research permit for Arizona State Parks
- Any other permits, clearances, authorizations or agreements needed to complete this project.

Task purpose: To comply with all local, state, federal permit requirements, environmental laws, and obtain legal access to the project area.

Deliverable description: 1) Copies of research permit
2) Copies of pesticide application permits
3) Copies of any other permits, clearances, authorizations or agreements needed to complete this project.

Deliverable due date: Prior to implementation of tasks # 3-10

Reimbursable cost: $3152.94

Task #2: Develop a Research and Education and Outreach plans

- The Research Plan shall describe all activities to be performed for the duration of the Project to conduct research for the Project. The Research Plan shall include, but is not limited to:
  - Proposed activity objectives and descriptions
  - Proposed process for working with Arizona State Parks on Phase II of this project
- The Outreach and Education Plan shall describe all activities to be performed for the duration of the Project to inform and educate the public about the Project. The Outreach and Education Plan shall include, but is not limited to:
  - Proposed activity objectives and descriptions
  - Each activity's target audience
  - A description of each event and the informational material to be produced
  - Event schedule
  - Proposed website outreach and education

Task purpose: To develop detailed plans for the Research and the Education and Outreach components of this project.

Deliverable description:
1) Research Plan
2) Education and Outreach Plan

Deliverable due date:
1) May 31, 2009
2) July 31, 2009

Reimbursable cost: $4297.44

Task #3: Implementation of the Research Plan

We shall implement the research procedures as described in the approved Research Plan submitted for Task 2. Grantee shall prepare and submit one annual Research Report which shall include a brief narrative of work completed under this Task, description and analysis of all collected data, a map, photographs, and copies of receipts and invoices for materials, travel, labor and equipment. Final analysis and reporting of all research activities shall be included in the Final Report. Any changes or modifications made to the Research Plan shall be documented and submitted in writing to the Project Manager for approval prior to implementation.

Task purpose: To describe and document research activities.

Deliverable description:
(1) Initial assessment
(2)Annual Research Report
(3) Summary narrative and analysis of research activities in the Final Report.

Deliverable due date:
(1) August 31, 2009
(2) January 15, 2010
(3) May 31, 2010

Reimbursable cost: $7290.78

Task #4: Implementation of Outreach and Education Plan

Grantee shall implement the approved Outreach and Education Plan submitted as a component of Task 2. Grantee shall document each activity with a brief description of the activity, photographs, copies of meeting, conference, or field trip agendas, attendance lists, and any outreach materials produced in an Outreach and Education Report. Reimbursements pertaining to this task will be made

upon the submittal of approved copies of receipts and invoices for materials, travel, labor and equipment.

Task purpose: To describe outreach and education activities.

Deliverable description: (1) Outreach and Education Report
(2) Summary of outreach and education activities in the Final Report

Deliverable due date: (1) January 31, 2010
(2) May 31, 2010

Reimbursable cost: $3715.74

Task #5: Final Report

A comprehensive Final Report shall be prepared and submitted in accordance with the Arizona Water Protection Fund Final Report Guidelines. The Final Report shall include a summary of all methodologies used, outcomes of the Tasks, an analysis of all Project data, suggestions for any changes or future actions, and an evaluation of the effectiveness of meeting Project objectives.

Task purpose: To describe the goals and accomplishments of the project.

Deliverable description: Final report

Deliverable due date: May 31, 2010

Fixed cost: $2523.32

Detailed Budget Breakdown:

DETAILED BUDGET INFORMATION- Lake Havasu Wash Redesign Assessment

TASK	UNIT COST	# OF UNITS	UNIT	TOTAL COST	TOTAL PER TASK
1 Permits, Authorizations, Agreements					
Faculty Advisor	64.08	10	hours	$641	
Project Coordinator	30.32	40	hours	$1,213	
Student Intern	10.82	60	hours	$649	
Travel					
Travel to Phoenix for permitting with ASP	200.00	1	per trip	$200	
Travel to Lake Havasu for permitting (1X)	300.00	1	per trip	$300	
subtotal					$3,002.80
Admin costs (5%)					$150.14
TOTAL for task					$3,152.94
2 Develop Plans: Research and Outreach and Education					
Faculty Advisor	64.08	20	hours	$1,282	
Program Coordinator	30.32	40	hours	$1,213	
Student Intern	10.82	120	hours	$1,298	
Travel					
Travel to Lake Havasu for permitting (1X)	300.00	1	per trip	$300	
					$4,092.80
Admin costs (5%)					$204.64
TOTAL for task					$4,297.44

3 Implementation fo the Research Plan

Faculty Advisor	64.08	20		$1,282	
Program Coordinator	30.32	50		$1,516	
Student Intern	10.82	300		$3,246	
Travel					
Travel to Lake Havasu for permitting	300.00	3	per trip	$900	
					$6,943.60
Admin costs (5%)					$347.18
TOTAL for task					$7,290.78

4 Implementation of the Outreach and Education Plan

Faculty Advisor	64.08	10		$641	
Program Coordinator	30.32	50		$1,516	
Student Intern	10.82	100		$1,082	
Materials and equipment					
Deliverables:					
Travel					
Travel to Lake Havasu for permitting (1X)	300.00	1	per trip	$300	
					$3,538.80
Admin costs (5%)					$176.94
TOTAL for task					$3,715.74

5 Final Report

Faculty Advisor	64.08	12		$769	
Program Coordinator	30.32	40		$1,213	
Student Assistant	10.82	20		$216	
Deliverables:					
Copies	0.15	1000		$150	
Cds for Photos	0.50	10		$5	
Binders for report	5.00	10		$50	
					$2,403.16
Admin costs (5%)					$120.16
TOTAL for task					$2,523.32

TOTAL PROJECT BUDGET $20,980.22

Detailed In-Kind Breakdown:

Detailed In-Kind Contributions: Lake Havasu Wash Redesign Assessment

TASK	UNIT COST	# OF UNITS	UNIT	TOTAL COST	TOTAL PER TASK
1 Permits, Authorizations, Agreements					
	total for task	48%	5%	total foregone	
Forgone indirect costs (total task cost* .48) - (total task cost*.05)= forgone indirects	$3,002.80	1441	150	$1,291	
					$1,291.20

2 Develop Plans: Research and Outreach and Education

	total for task	48%	5%	total foregone	
Forgone indirect costs (total task cost* .48) - (total task cost*.05)= forgone indirects	4,092.80	1965	205	$1,760	
					$1,759.90

3 Implementation of Research Plan

	total for task	48%	5%	total foregone	
Forgone indirect costs (total task cost* .48) - (total task cost*.05)= forgone indirects	6,943.60	3333	347	$2,986	
					$2,985.75

4 Implementation of the Outreach and Education Plan

Web design	35.40	14	hrs	$496	
	total for task	48%	5%	total foregone	
Forgone indirect costs (total task cost* .48) - (total task cost*.05)= forgone indirects	3,538.80	1699	177	$1,522	
					$2,017.28

5 Final Report

	total for task	48%	5%	total foregone	
Forgone indirect costs (total task cost* .48) - (total task cost*.05)= forgone indirects	2,403.16	1154	120	$1,033	
					$1,033.36
				TOTAL Matching BUDGET	$9,087.50

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 Commission

2. Project Title: Lake Havasu Wash Redesign Assessment

3. Applicant Name and Address: Ecological Monitoring & Assessment (EMA) Program

4. Current Land Owner/Manager(s): Arizona State Parks

5. Project Location, including Township, Range, Section: Township: 13N Range: 20W Section: 9

6. Total Project Area in Acres (or total miles if trail): 1.2

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: Because this is an assessment of the area that does not involve any surface disturbance there are no surface or subsurface impacts expected

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: _____

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

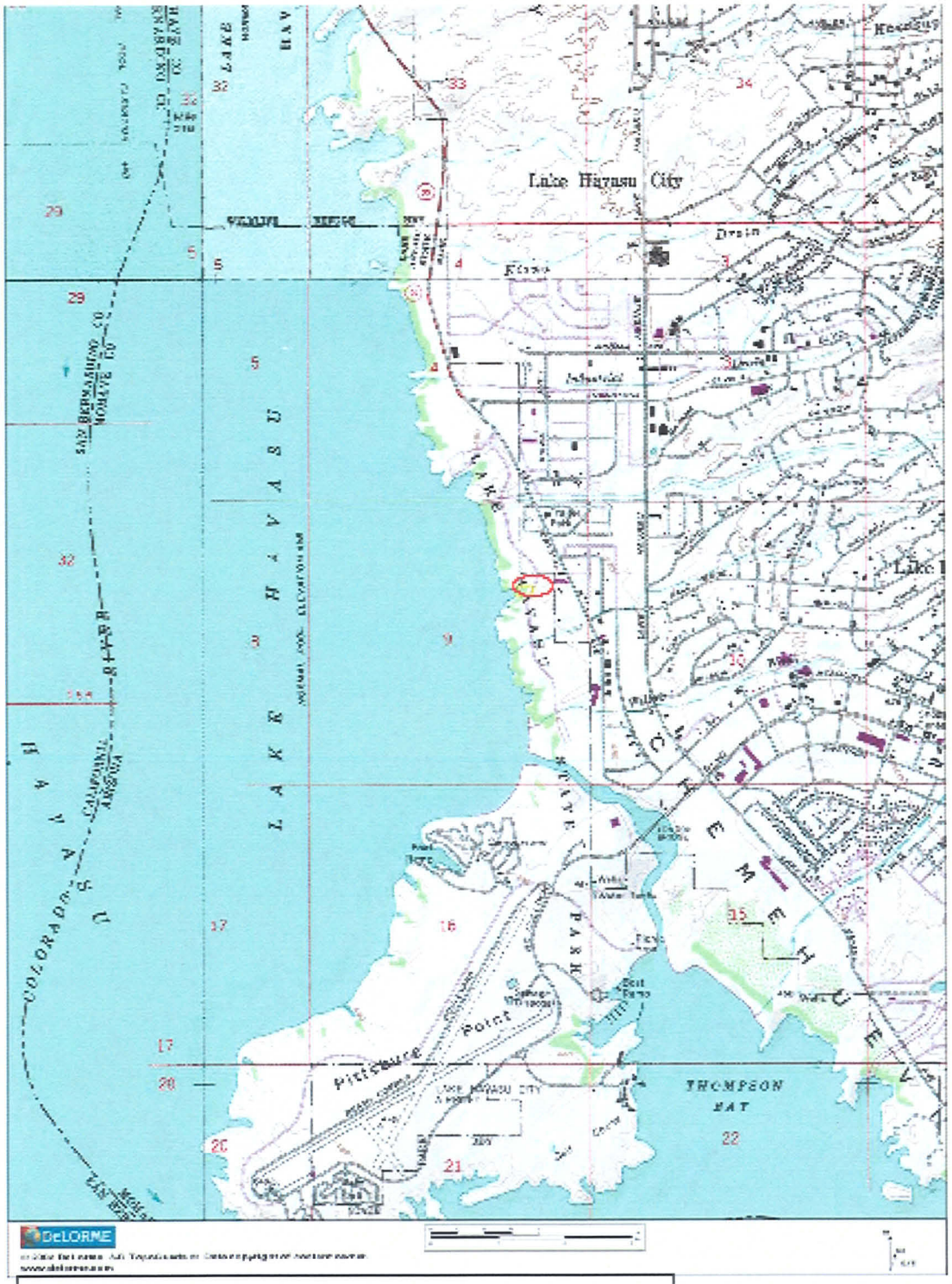
    If YES, name of the district:

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

Wilma G Ennenga 9 June 08 Wilma G. Ennenga

Applicant Signature /Date Applicant Printed Name

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



Map of Lake Havasu Wash Redesign Assessment Site

Arizona State Parks

"Managing and conserving natural, cultural, and recreational resources"

SHPO- 2006-0009 (26759)

December 27, 2005

RECEIVED

DEC 27 2005

ARIZONA STATE PARKS B.P.D

Mr. James Garrison
State Historic Preservation Officer
State Historic Preservation Office
1300 West Washington
Phoenix, Arizona 85007

Dear Mr. Garrison:

In compliance with A.R.S. 41-861 through 41-864, enclosed please find a Request for Determination of Effect (RDE) for a trail project at Lake Havasu State Park. There is currently an existing biking trail (Mohave Sunset Trail) through the west side of the park. It runs roughly from the boat launch parking lot near the park entrance on the north and dead-ends at the day-use group ramadas area near the south end of the park.

The park would like to create a loop trail so that hikers do not have to return to their point of origin the same exact way they just came. This would be done by creating a new section of trail continuing on from the day-use group ramadas where the trail currently ends, south of the London Bridge Channel, east to the park boundary, and then north back to the boat launching parking lot.

This section of the project area has already been highly disturbed by road, sewer, and waterline construction, dredging of the London Bridge Channel and the dumping the dredged sand onto State Park property, construction of brick retaining walls along the eastside property line of the state park, maintenance vehicles driving over the terrain, washes, and erosion. This section of trail will be placed atop the sand dredged from the channel, on top of a currently existing water line, and on top of a currently existing sewer line that follows the berm of the main paved park road.

Ground visibility was excellent as brush was light. No historic or prehistoric cultural remains were found.

A short section of new trail will be constructed through a dense grove of brush/tamarisk near the Xeriscape Garden and Bird Care Facility. At the time of survey, the brush/trees had already been cut and trampled down by small construction equipment which made ground visibility non-existent. Consequently, no historic or prehistoric cultural remains were found.

A short section of new trail will also be constructed along the shoreline of Lake Havasu just north of the day-use group ramada area. The new section of trail will follow the high waterline edge of the lake. Ground surface was lake stones/cobbles and the area was disturbed by water activity/erosion. No historic or prehistoric cultural remains were found.

All new trail construction will be done with earthmoving equipment to even out the terrain and hand tools. Project area is approximately 2.77 miles long and 10 feet wide.

In 1995, the whole park was surveyed for an ADOT road project by Archaeological Consulting Services, Ltd. Eight sites (sparse lithic scatters) were found. Current project work will avoid all of these sites.

Since all known sites will be avoided and no new sites were found in the project area, a determination of "No Effect" is recommended for this project. If there are any questions, please feel free to contact me at 602-542-6951.

Sincerely,

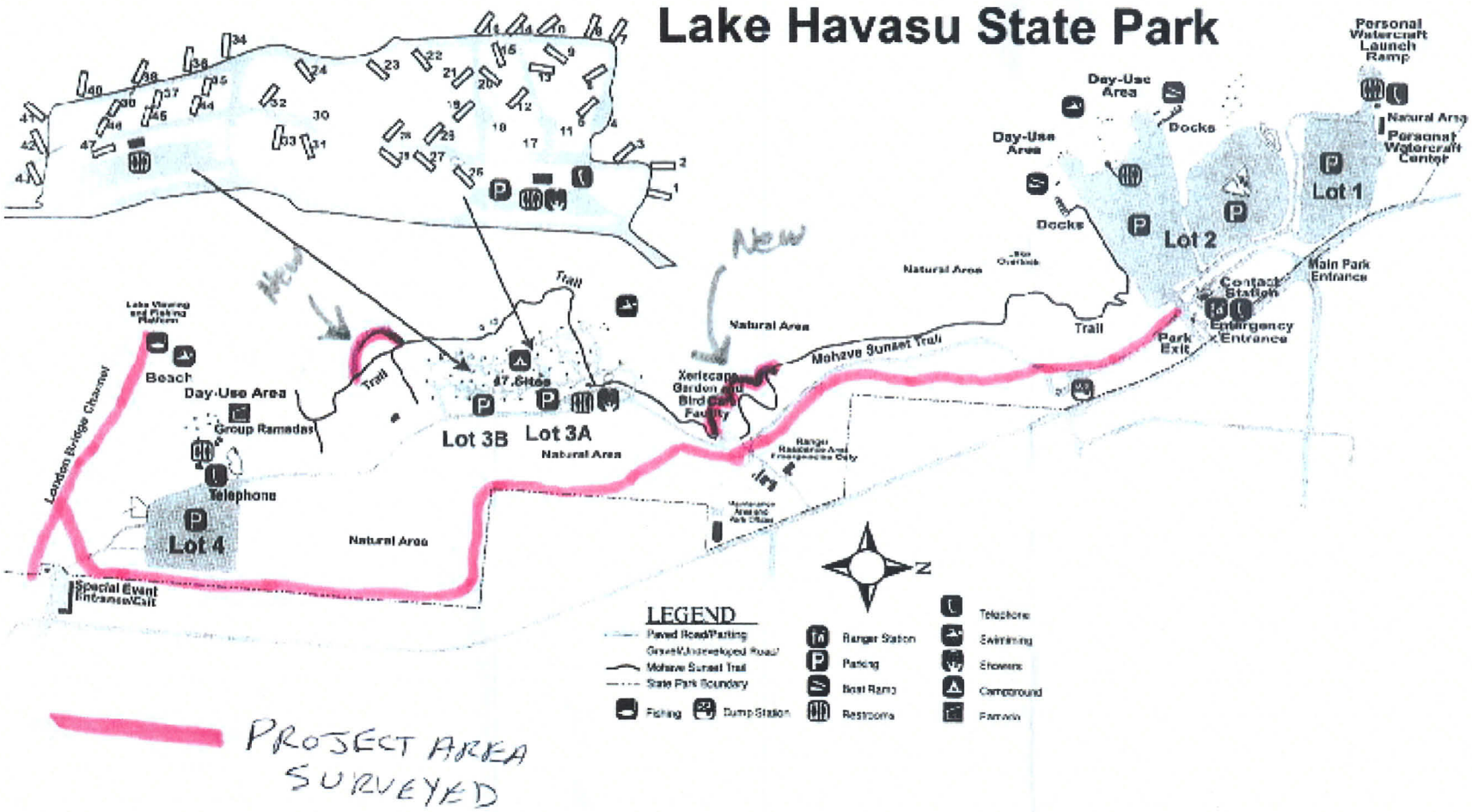
Marilyn Miazovsky
Cultural Resources Manager
Arizona State Parks
1300 West Washington
Phoenix, Arizona 85007

attachments

No Historic Properties Affected

for Arizona State Historic Preservation Officer
Arizona State Parks Board

June 14, 2006


Lake Havasu State Park
Personal Watercraft Launch Ramp
Natural Area
Personal Watercraft Center
Day-Use Area
Docks
Day-Use Area
Docks
Lot 1
Lot 2
Main Park Entrance
Contact Station
Emergency Entrance
Park Exit
Trail
Natural Area
Mohave Sunset Trail
Natural Area
Trail
Lake Viewing and Fishing Platform
Beach
Day-Use Area
Group Ramadas
Trail
Lot 3B
Lot 3A
Natural Area
Telephone
Lot 4
Natural Area
London Bridge Channel
Special Event Entrance/Exit
New
New
LEGEND
Paved Road/Parking
Gravel/Undeveloped Road
Mohave Sunset Trail
State Park Boundary
Fishing
Dump Station
Ranger Station
Parking
Boat Ramp
Restrooms
Telephone
Swimming
Showers
Campground
Fairway
N
PROJECT AREA SURVEYED

Key Personnel:

The key personnel for this project will be William Auberle, Patty West, and a student to be identified as an intern for the project. William Auberle is a Professor of Civil & Environmental Engineering at Northern Arizona University (NAU) in Flagstaff. His research interests focus on environmental policy, sustainable development, air quality management, and environmental protection on tribal lands. His most recent efforts also include Research Director for the Ecological Monitoring & Assessment (EMA) Program." He is a licensed professional engineer, a Diplomat of the American Academy of Environmental Engineers, a Qualified Environmental Professional (QEP) and a Fellow Member of the Air & Waste Management Association. He is active in several professional societies associated with environmental engineering, management and education. He also serves as a member of EPA's Clean Air Act Advisory Committee and the National Steering Committee, Advanced Coal Technology Workgroup (ACT), Aboriginal Human Resource Development Council of Canada (AHRDCC) and the Canadian Council for Human Resources in the Environment Industry (CCHREI). Patty West has been working in the fields of botany, ecology and ethnobotany in Arizona, Nevada, and Mexico for the past 12 years and is currently a program coordinator for the EMA Program.

William M. Auberle, P.E.

659 Amberwood Street
Flagstaff, AZ 86004

(928) 526-9216
wauberle@msn.com

Northern Arizona University
College of Engineering & Natural Sciences
P.O. Box I5600
Flagstaff, AZ 860II-1560
Phone (928) 523-5845
FAX (928) 523-2300
william.auberle@nau.edu

Education:

Graduate Studies
Columbia University, New York
University of Missouri, Columbia, Missouri

M.S.E., Environmental Engineering
West Virginia University
Morgantown, West Virginia, I967

B.S.I.E. West Virginia University, I966

Professional Experience

William Auberle is a Professor of Civil and Environmental Engineering in the College of Engineering and Natural Sciences at Northern Arizona University. He also serves as Research Director of the Ecological Monitoring and Assessment Program. He teaches courses in environmental engineering, air quality management, and environmental laws and regulations. He continuously guides graduate and undergraduate research projects. Concurrently, Professor Auberle is active in the NAU/EPA American Indian Air Quality Training Program and the Institute for Tribal Environmental Professionals.

From 1980 through 1990 Professor Auberle was a practicing consulting engineer and manager. His professional expertise and experience include environmental management, air pollution control, and environmental risk analysis. Professor Auberle was President of the national environmental consulting firm of Yates & Auberle, Ltd. In this capacity he directed professionals in the disciplines of environmental engineering, industrial hygiene, hydrogeology, and environmental monitoring and analysis.

Prior to entering business and education, Professor Auberle served governmental agencies as an author and administrator of environmental laws and regulations. His responsibilities have included the direction of programs in air quality management, water pollution control, radiation protection, noise control and solid/hazardous waste management. In I978 and I979, Professor Auberle managed all environmental protection programs for the State of Colorado.

Registration and Certification:

Licensed Professional Engineer
Qualified Environmental Professional

Professional Societies:

Member, National Steering Committee, Building Environmental Aboriginal Human Resources, Canada
Board Certified & Past Trustee, American Academy of Environmental Engineers
Member, National Society of Professional Engineers
Member, Arizona and Louisiana Societies of Professional Engineers

Fellow Member & Past Vice-President, Air & Waste Management Association (A&WMA)
Member, Grand Canyon Section, A&WMA
Member, U.S. Environmental Protection Agency's Clean Air Act Advisory Committee
Member, U.S. Environmental Protection Agency's Advanced Coal Technology Working Group.
Past Chairman, A&WMA Committees on Risk Assessment/Management, Regulations and Standards, Student Affairs, and Strategic Planning
Past Trustee, Institute of Professional Environmental Practice
Member, Tau Beta Pi
Member, American Society for Engineering Education

Community Service:

Member, Advisory Board, Watershed Research and Education Program

Member, Steering Committee, Sustainable Economic Development in Northern Arizona

Publications:

Acker, T. L., W. M. Auberle, J. D. Eastwood, D. R. LaRoche, A. S. Ormond, R. P. Slack and D. H. Smith, Recommendations for reducing Energy Consumption and Improving Air Quality Through Energy Efficiency on Native-American Lands, Energy Sources, Part B, 1:223-234, 2006.

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Auberle, W.M. and Barber, W.C., "Knowing the Pros: New Certification Offered for Environmental Experts", Engineering News Record, Environmental Engineering, 1993.

Strategic Plan for the Year 2000, Air & Waste Management Assoc., 1992, by AWMA Strategic Planning Committee - W. M. Auberle, Chairman.

Auberle, W.M., Foreword to Managing Environmental Risks, APCA, I988.

Reeser, W.K., Auberle, W.M., Mulford, E., Siek, R.D., Inventory of Hazardous Waste Generators and Sites on Selected Indian Reservations, Council of Energy Resource Tribes, I985

Stewart, A.M., MacNamara, C., Auberle, W.M., Report to the Public - 1977, Colorado Department of Health, 1978.

Michaelson, D., Auberle, W.M., Buffington, P.D., Air Quality Report, Regional Air Pollution Control Agency, 1975.

Auberle, W.M. and Hutchinson, D., Air Quality Report, Regional Air Pollution Control Agency, 1972

Auberle, W. M., Burkhart, W.T., Peden, D.B., Air Quality Report, Montgomery County (Ohio) Department of Health, 1970.

Auberle, W.M., Linsky, B., Effects of Air Pollution on Property Values, Air Pollution Control Association Annual Meeting, 1968.

Selected Presentations:

Professor Auberle has developed more than 350 technical policy addresses as a public official, technical consultant and educator. He has been a frequent television and radio guest and participated in a weekly radio program for four years regarding Ohio environmental affairs.

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Education

Northern Arizona University, BS. - December 1996
University of Arizona, MS. Renewable Natural Resources- May 2002

Professional Experience

Twelve years of professional experience as a botanist, with ten years as an ethnobotanist:
Senior Research Specialist, Center for Sustainable Environments
Botanist, Inventory and Monitoring Program
Research Assistant and Program Coordinator, Arizona-Sonora Desert Museum
Research Associate, San Diego Natural History Museum
Field Research Assistant, Northern Arizona University
Assistant Research Botanist, Arboretum at Flagstaff
Botanist, NAU, Forestry Department, Ecology Lab (now ERI)

Honors and Awards

National Council of State Garden Clubs Scholarship, 1994, 1995, 1996, 1999, 2000, 2001; Pacific Region of the Federation of Garden Clubs Scholarship, 2000; Federation of AZ Garden Clubs Scholarship, 1993 Botany Academic Achievement Award, 1996; Deans Honor List, 1992-1996; Member of Phi Kappa Phi Honor Society, 1995-present; Arizona Nursery Association Stipend-Propagation, 1994; Federation of AZ Garden Clubs Scholarship, 1993

Publications

Hansen, M., P. West, and K. Thomas. 2002. Plants of Petrified Forest National Park. United States Geological Survey- Biological Research Division. Flagstaff, Arizona.

Nabhan, G.P., P. West, and R. Pirog. 2005. Linking Arizona's Sense of Place to a Sense of Taste: Marketing the Heritage Value of Arizona's Place-based Foods. Center for Sustainable Environments, Northern Arizona Univeristy, Flagstaff, Arizona.

Nabhan, G. P., P. A. West, R. S. Felger, M. O'Brien, J. O'Brien, T. Van Devender, A. L. Reina G., S. McLaughlin, P. Jenkins, J. Stromberg. 2002. Exotic Plants in the Sonoran Desert Region: Plants *in* B. Tellman (ed). Invasive Exotic Species in the Sonoran Region. Univ of AZ Press, Tucson, AZ.

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West, P. A., J. Rebman, G. A. Polis, and H. D. Humphrey. 2002. Appendix 4.4: Plants of some smaller islands in Case, T. J. and M. L. Cody. Island Biogeography in the Sea of Cortéz, second edition. University of California Press. Los Angeles, CA.

Project Site Photos:

Figure 1: Above cactus garden wash, below park road

Figure 2: Wash going through cactus garden

Figure 3: Another section of wash through cactus garden

Figure 4: Beaver sign in the cactus garden

Figure 5: Garden and riparian wash to west of garden

Figure 6: Riparian are between the garden and Lake Havasu

Description of the Research Plan:
The Research Plan will be developed with the input of the Project Manager and will include a description of the proposed activities to conduct the necessary research for this Project. The plan will include descriptions of activities and each activity. The plan will also include descriptions of necessary collaborations with Arizona State Parks. The plan will specify who is involved in each activity and where that will take place.

Description of the Outreach and Education Plan:

The Outreach and Education Plan shall describe all activities to be performed for the duration of the Project to inform and educate the public about the Project. The Outreach and Education Plan shall include a list of proposed activities and the target audience for each, a description of the materials to be used, and an event schedule. The plan will also include proposed web outreach and education.

Description of revegetation/restoration plans or research design: Phase I will determine these plans for Phase II. Arizona State Parks will be planning more plantings in the area to stabilize the wash. Revegetation will also be considered in the assessment.

Description of existing plans: The May 2006 "Interpretive Plan for Lake Havasu State Park's Botanical Garden" by Mia LaBarbara states that "The botanical garden is located in a drainage area. During seasonal rains, flooding can occur damaging walkways and planting areas. Stabilizing the drainage system needs to be a top priority."

Interpretive Plan
for
Lake Havasu State Park's
Botanical Garden

Written By:
Mia LaBarbara

March 2006

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A. Project Background: Note to NAI Reviwers

Several years ago, a botanical garden was installed at Lake Havasu State Park to provide recreation and education opportunities for visitors. Over the years flooding, natural die off, vandalism, and staff turn-over have resulted in a need for the botanical garden to have "an extreme make-over." The majority of the park's interpretive programs take place within or end at the garden, so the development of an interpretive plan was in much need to help focus the "make-over." The following plan was developed by park and regional interpretive staff with consul advice from the Lake Havasu Master Gardeners and Nautilius Elementary staff. My role in the process has been that of meeting leader and plan writer.

B. Project Goals:

Create a safe and inspiring environment for recreation and education opportunities for our diverse visitors and users.

To create a botanical garden that follows the principles of water conservation, low maintenance, erosion resistance, and high accessibility.

C. Project Objectives:

Project Objective 1: Increase the number of school groups visits by 10% annually.

Project Objective 2: Decrease water consumption within the park per visitor user by 10% over the next five years.

D. Management Description:

Arizona State Parks' Mission:
"Managing and conserving Arizona's natural, cultural, and recreational resources for the benefit of the people, both in our Parks and through out Partners."

Lake Havasu State Park is located on the shores of Lake Havasu, one of several man-made lakes along the Colorado River. The park supports the main interest in the area, which is boating recreation. Facilities include: three launching ramps (one exclusively for personal watercraft), 45 primitive campsites (plus 2 host sites), day-use picnic and swim area, concession store with personal watercraft rental, group use ramada, hiking trail and botanical garden. See Appendix A for park map. The park is run by 12 permanent rangers and 2 seasonal rangers.

Current descriptions of botanical garden:
This interpretive area showcases the diverse life that exists within the park and this area of the desert. Birds, lizards, and cotton-tails are common sights. Located within is a raptor house whose current resident is a non-releasable Great Horned Owl. There are also interpretive panels describing aspects of the Sonoran and Mohave Deserts. The botanical garden offers recreational and educational opportunities, such as hiking, wildlife viewing, and self guided and guided tours.

E. Key Issues:

Flooding – The botanical garden is located in a drainage area. During seasonal rains, flooding can occur damaging walkways and planting areas. Stabilizing the drainage system needs to be a top priority.
Water System – Weathering, vandalism, and lack of documentation on line locations have made the current water system ineffective and should be completely replaced.
Electric – Currently there is no electricity within the botanical garden, except for two solar panels that are used to light entry lamps.
Parking – The botanical garden is located in the middle of the park. For those that do not want or are unable to hike into the garden, parking is limited.
Vandalism – Past vandalism include the break of waterlines, scratching of interpretive signs, broken fencing, and intended physical harm to resident Great Horn Owl.
Nuisance Wildlife – Any Cottonwood plantings should have trunk sleeves to prevent beaver damage. Design of any human interactive element (amphitheatre, benches, self-guided stations, etc.) should include insect deterrent measures, such as, smooth surfaces to discourage nesting and make washing or wiping down easy.
Staffing-
Design and Installation:
Design for all aspects of the botanical garden shall be a team effort with final approval of element design going to the appropriate level of expertise. Examples – any large scale structures will have to be approved through the Development Section, small scale structures or changes to park staff, and any interpretive element to the regional interpretive planner.
Installation for any and all changes will be the responsibility of the park staff or contracted crew. Regional interpretive staff will be able to assist when appropriate.
Maintenance:
Park staff will be required to perform all maintenance, including but not limited to, tree trimming, landscaping, waterline repair, trail clearing, etc.
Programming:
The Northwestern Region Interpretive Education Planner and Coordinator will be responsible for the development of all interpretive programs, both self-guided and led. This includes: writing, layout and production of any signs or interactive stations, establishing necessary team(s) for curricula development, writing and development of presentations, and leading or coordinating with park staff or guest speakers for guided experiences.
Funding:
Funding for all improvements (including maintenance) to the botanical garden will come from the annual interpretive regional budget and agency interpretive program budget. An appropriate timeline will be developed so that funding can occur over multiple fiscal years.

F. Markets: current and potential users of the botanical garden

School groups – educational K-12
Lake Havasu Unified School District consists of 6 elementary schools, 2 secondary schools, and 1 High School. There are also two charter schools, various pre-schools and group daycare centers. Currently, most of our school visits come from one of the six elementary schools. It is an informal program where a teacher will call up and ask us to provide a hike or talk usually on the plants and animals of our area.

Mohave Community College (MCC)
MCC serves the people of Mohave County and surrounding communities through four campuses - Bullhead City, Kingman, Lake Havasu City and North Mohave.
Core academic courses are offered on each of the four campuses and certain career/technical programs are specific to one or more of the campuses.
This is a potential group to tap into for expertise, potential research possibilities, and guest speakers for interpretive programs.

Campers
Campers at Lake Havasu State Park tend to fall into one of three categories: snowbirds (winter campers, typically retirees, seeking warm climates while their home states are snowbound.), springbreakers (college students), and summer boaters (mostly families from southern California). Out of these three groups the "snowbirds" use the garden the most.

Local Hikers/Runners
This group usually discovers the garden accidentally, as it is located about midpoint along the trail route. These are a small percentage of the annual visitors to Lake Havasu State Park.

G. Messages:

Message Background Information
Historically and today the Colorado River has been a vital source of water for people and wildlife. The river starts high in the Rocky Mountains and winds roughly 1400 miles through multiple states to its end at the of Gulf of California. Before the development of modern water diversions, the river was used primarily as a transportation route. Early Spanish explorers navigated the river on small barge like vessels and eventually in the mid 1800's steamboats were carrying supplies up and down the river to various settlements and forts. By the turn of the century, as more and more people migrated into the west, the focus of the Colorado River started to shift from an important transportation route to that of a commodity. If the river could be "controlled", then it could used to irrigate dry areas and bring water to communities that were outgrowing their own local water supplies. The first water diversion along the Colorado River was completed in 1909 in Yuma. Its main purpose was for irrigation and consisted of a non-traditional dam (weir) and canal system. Its success would lead to several more diversions including Glens Canyon Dam, Hoover Dam, and Parker Dam, which created Lake Havasu. Today, water from the Colorado River "provides irrigation water for more than 3.7 million acres of farmland and delivers water to 30 million people in the United States and Mexico." (1.) The "control" of the Colorado River has created an illusion that there is an endless supply of water to be tapped into, but there isn't. The communities that rely on Colorado River water and most of the river its-self are in arid-desert environments where water is a very limited resource. Mark Twain once commented, "Out West, God made plenty of whiskey to drink, but only enough water to fight over." He was right. By the 1930's the demand for Colorado River water exceeded the river's supply. This lead to what is probably the most disputed, fought-over, and complicated water rights issues and compacts in the country. As communities continue to grow it is imperative that people take responsibility for choosing to live in desert environments by participating in and supporting community water conservations measures.
(1.) *Lost, A Desert River and Its Native Fishes: A Historical Perspective of the Lower Colorado River*, Gordon A. Mueller and Paul C. Marsh, 2002.

Theme:
Even though we live next to a large source of water (Lake Havasu and the Lower Colorado River) giving us a visual illusion of abundance, the reality is that we live in a desert environment where water is a very limited resource.

Message Goal:
Through education, raise awareness of the limited amount of water available in our desert to encourage our visitors to participate in water conservation programs within our park, their homes and our community.

Message Objective 1: Visitors will be able to define and describe the major components of the Mojave Desert and Sonoran Desert ecosystems.

Stories:

Defining our desert

- The Mojave Deserts major components
  - Boundaries
  - Amount of annual rainfall
  - Temperatures
  - Indicator species
- The Sonoran Desert's major components
  - Boundaries
  - Amount of annual rainfall
  - Temperatures
  - Indicator species
- Transition Zones

Message Objective 2: Visitors will be able to list two ways that plants conserve water and two ways that animals conserve water.

Stories:

How plants conserve water

- Small, reduced leaves
- Light colored leaves
- Nursery species, growing in the shade of another
- Creosote's natural sunscreen

How animals conserve water

- Getting water from food
- Altering active time (nocturnal, etc.)
- Coloring
- Other physiological adaptations

Message Objective 3: Visitors will be able to describe four ways to conserve water in their yards, homes and communities.

Stories:

How people can conserve water

- Understanding water management along the Lower Colorado River
  - Physical description of the river

- List of dams and impoundments
- Who is using the water
- Positive water choices
  - Landscaping
    - Xeriscapes
    - Native and desert species
  - Household
    - Low flow toilets, showers
    - Proper Dishwashing
    - Reduced Carwashing
  - In our communities
    - Public education
    - Sponsoring of water conservation measures
    - Supporting companies and businesses that implement water conservation measures

H. Mechanics:

Site considerations:

Non-movable item:

Raptor House – This structure consists of a cement floor with deep footings and block supports. The labor and cost of dismantling it, re-pouring the floor and footers, and stress to the resident owl make moving this structure impractical.

Environmentally sound material choices:

Construction materials for all structures and interpretive media should not only be eco-friendly, but also eco-smart. Temperatures in Lake Havasu can often exceed 120 degrees F during the summer and high winds and severe thunderstorms occur annually. Designs and colors should blend in with the landscape so as to appear part of the environment.

Existing vegetation:

While we want to keep or re-use as much of the existing vegetation as possible, the design of the vegetative areas should not be constrained due to any particular plant's current location. Re-location or transplanting will occur where feasible.

Space allocation:

The botanical garden is located within a small wash. The space is delineated on three sides by the lake on the west, small hill on the north, the paved park road on the east. The south side has room for small expansion between the existing edge and the campground.

I. Media:

Proposed Changes/Additions:

Facilities-

Amphitheatre

Target Audience: Winter campers

Type of Programs: Evening lecture/presentations using various electronic medium (powerpoint, slides, video) and physical props.

Presenters: Interpretive staff, park staff and guest speakers.

Components:

- Projection Screen
- Sound system
- Electrical outlets for electronic devices (ie computer, projector, etc.)
- Seating
- Fire ring
- Lighting
  - Along the trail from entrance to amphitheatre
  - Within amphitheatre area

Physical Description: The amphitheatre will be an attractive and welcoming facility consisting of a cement stage with a backdrop wall capable of screen projection. The wall should be oriented to act as a wind break and so the backside is parallel to the trail so a program information box can be available to all that use the trail. Permanent speakers should be mounted within the wall, as well as, lighting fixtures and electrical outlets. A projection table, also with electrical outlets, should be located an appropriate distance in front of the stage. Rows of bench seats will provide visitors a comfortable way to view and participate in presentations. Since most of the programs will take place during the winter, a fire ring will add comfort and a welcoming focus point.

Location: See Appendix B

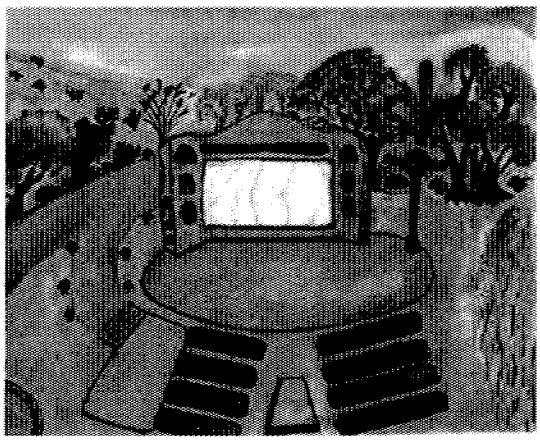


Illustration by:
Elizabeth Enriquez, Arizona State Parks, Northwestern Region, Interpretive Education Coordinator

Outdoor School
Target Audience: Schools groups
Type of Programs: Grade specific field trip curricula with activities developed to complement Arizona Academic Standards.
Components to develop:
4 sided, two full walls, roofed 30 foot by 30 foot ramada
Cement floor which extends beyond the ramada
Two permanent counters with sink along full walls
Electrical outlets
Physical Description:
The Outdoor School will provide a semi-controlled setting for school groups to participate in directed activities. The open ramada will provided shade and potential wind protection for the presenter, participates, and activity while still having an outdoor feel. By having the counters and sink be the only permanent items in the ramada, we hope to reduce the attraction for theft or vandalism. Tables, chairs, and activity props can be set-up before activity and removed when completed. The two walls will give hanging points for props or projection screen. Cement floor provides a stable level, cleanable surface.
Location: See Appendix B

Kid Friendly Area
Target Audience: Pre-K through 5 school groups and family visitors.
Type of Programs: Self-guided exploration stations with touchable, colorful, interactive media.
Interactive interpretive stations
High percentage of thornless vegetation
Physical Description:
The Kid Friendly Area will be a place for self-guided exploration. Interactive stations, with engaging games or mechanisms will be flanked by colorful, desert adapted, thornless plants species. Interactive stations should be simple in design and durable.
Location: See Appendix B

Vegetative Areas-
Target Audience: All.
Type of Programs – Self-guided and interpreter led tours
Native Upland Vegetation
Mojave species to choose from – narrow down by elevation, soil and temperature requirements
*Beavertail Cactus (Opuntia basilaris)
Mojave Yucca (Yucca schidigera)
Parry Saltbush (Atriplex parryi)
Mojave Sage (Salvia mohavensis)
*Creosote Bush (Larrea tridentate)
Big Sagebrush (Artemisia tridentate)
** Shadescale (Atriplex confertifolia)
** Blackbush (Coleogyne ramosissima)
Hopsage (Atriplex spinosa)
*Desert Holly (Atriplex hymenelytra)
Cattle Spinach (Atriplex polcarpa)
*White Bur Sage (Ambrosia dunosa)
*Brittlebush (Encelia farinosa)
Ratany (Krameria parvifolia)

Barrel Cactus (Ferocactus acanthodes)
Catcalw (Acacia gregii)
Honey Mesquite (Prosopis glandulosa)
Screwbean Mesquite (Prosopis pubescens)
Arrow Weed (Pluchea sericea)
Four-wing Saltbush (Atriplex canescens)
*Ironwood (Olneya tesota)

Sonoran species to choose from -- narrow down by elevation, soil and temperature requirements
Saguaro (Cereus giganteus)
Bur Sage (Ambrosia deltoidea)
Big Galleta (Hilaria rigida)
Indigo Bush (Psorothamnus schottii)
Mormon Tea (Ephedra sp.)
Pencil Cholla (Opunita ramosissima)
Velvet Mesquite (Prosopis velutina)
Blue Palo Verde (Cercidium floridum)
Yellow Palo Verde (Cercidium microphyllum)
Smoketree (Dalea spinosa)
Ocotillo ((Fouquieria splendens)
Ironwood (Olenya tesota)
Teddybear Cholla (Opuntia bigelovii)
Hedgehog Cactus ((Echinocereus engelmannii)
Agave (Agavaceae)
Chuparosa (Beloperone californica)
Desert Lavender (Hyptis emoryi)
Fishhook Cactus (Mammillaria microcarpa)
Jumping Cholla (Opuntia fulgida)
Organ Pipe cactus (Cereus thurberi)
Prickly Pear cactus (Opuntia sp.)
Buckthorn Cholla (Opuntia acanthocarpa)

Annuals to seed for good rainfall years
Desert Sand Verbena (Abronia villosa)
Desert Sunflower (Geraea canescens)
Desert Blue Bells (Phacelia campanularia)
Desert Marigold (Baileya multiradiata)
Arizona Lupine (Lupinus arizonicus)
Coulter's Lupine (Lupinus sparsiflorus)
Mexican Gold Poppy (Eschscholtzia mexicana)
Globe Mallow (Sphaeralcea ambigua)

*found in Sonoran as well.
** found in the Great Basin as well.

Water Conservation Landscape Demo Area (various desert adapted species)
Each area should demonstrate modern low flow watering systems and low water tolerate plant species. Visitors will see practical and attractive applications for landscaping their own homes and communities.
Locations: See Appendix B

Additional Ammenities-

Parking

Paved parking area for multiple vehicles.

New Entrance

Obvious entry point off the parking area that is attractive, welcoming and encourages visitors to come and explore the botanical garden.

Information/Education Kiosk

Located just within the entryway to help orientate and inform visitors to what is within the garden. Items to include are site map with section and facility descriptions, brief description to the garden development and messages found within, self-guided brochures, and any park management messages, and seasonal information.

Storage Yard

Storage of tools and equipment for facilities and grounds. Should include security fencing and a lockable shed.

Locations: See Appendix B

J. Implementation:

Fiscal Year 1

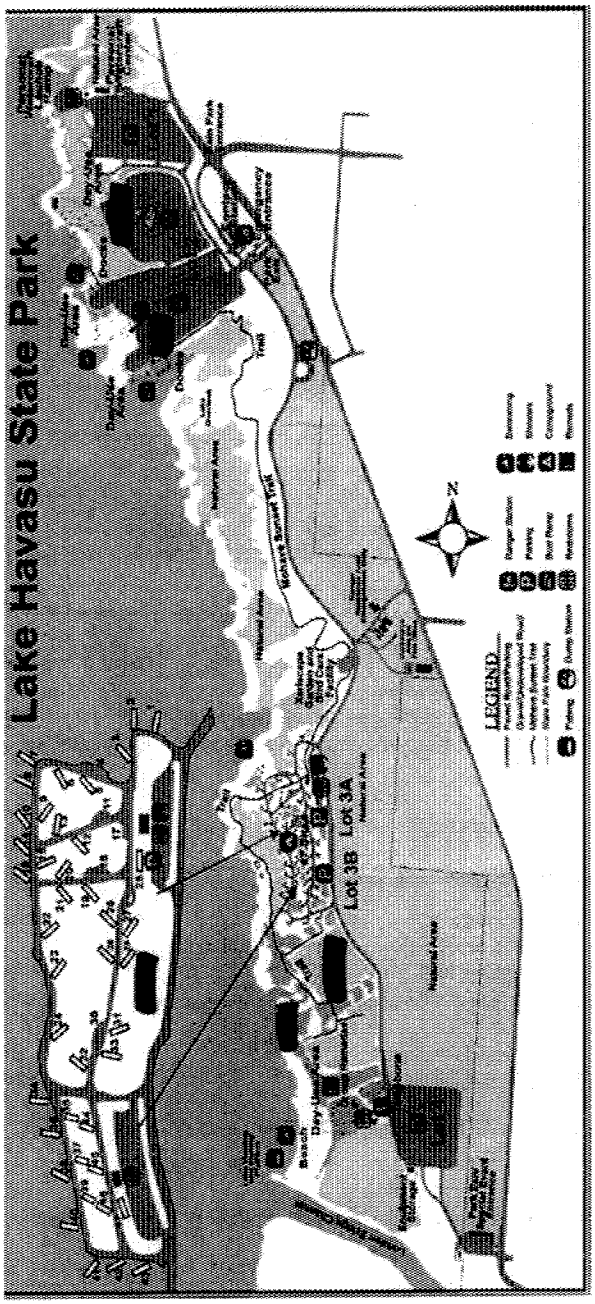
a. ***Stabilization of wash drainage***
b. Design of water conservation demonstration areas by park staff and Master Gardeners.
c. Identification of all current specimens within the Native upland vegetative areas. Documentation of additional vegetation needs.
d. Installation of new waterlines. Recommended that electrical sleeves be placed at the same time. Installation of electrical lines as soon as possible.
e. Planting/installation of all new vegetative materials.
f. Widening and resurfacing of walkways through garden.
g. Design and installation of new entrance, parking area, and information kiosk.
h. Design for uniform signage for plant id labels, interpretive panels, kiosk sign, directional signs, etc.
i. Design of amphitheatre and outdoor school
j. Development of program series for amphitheatre
k. Marketing of garden improvements

Fiscal Year 2

a. Production and installation of uniform signage
b. Installation of amphitheatre – programs in new facility January – March
c. Development of field trip curricula for grades K-5
d. Installation of trail lighting – if electrical has not been installed use generator power until hard lines are done.
e. Marketing of upcoming outdoor school and curricula
f. Design of Kid Friendly Area Interpretive stations

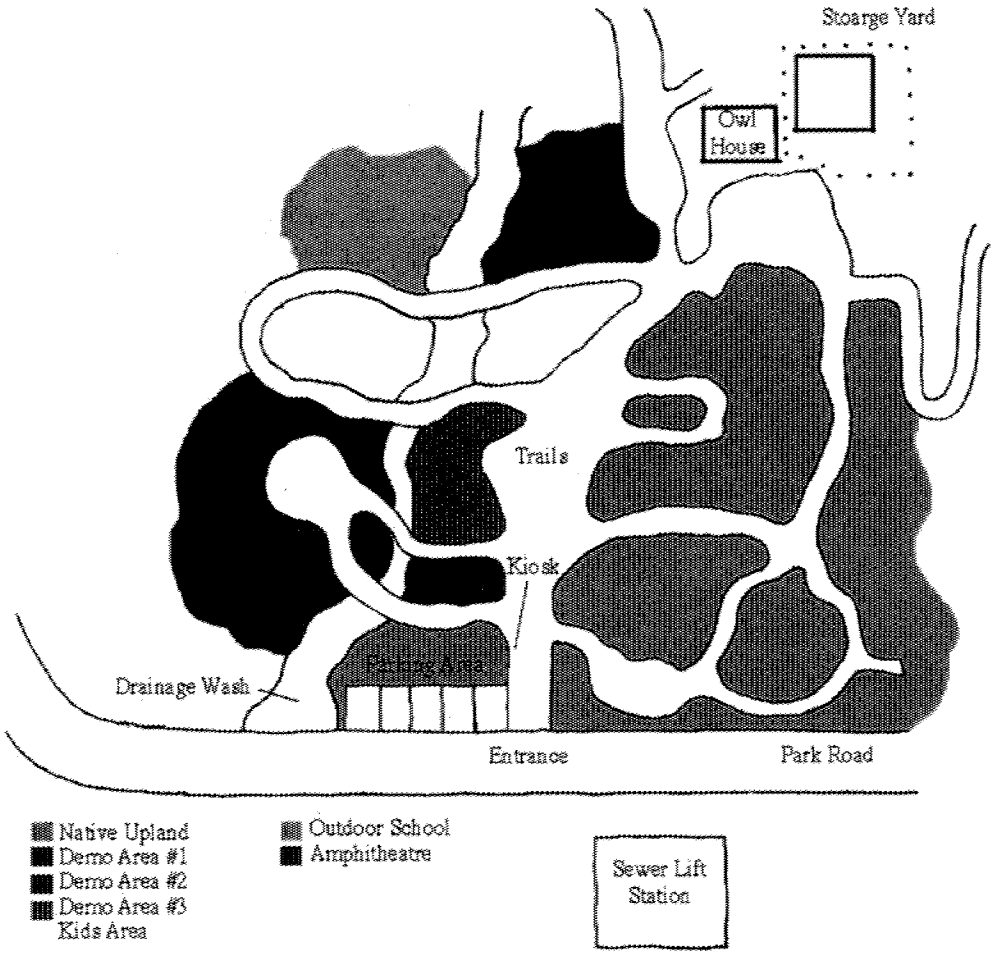
Fiscal Year 3

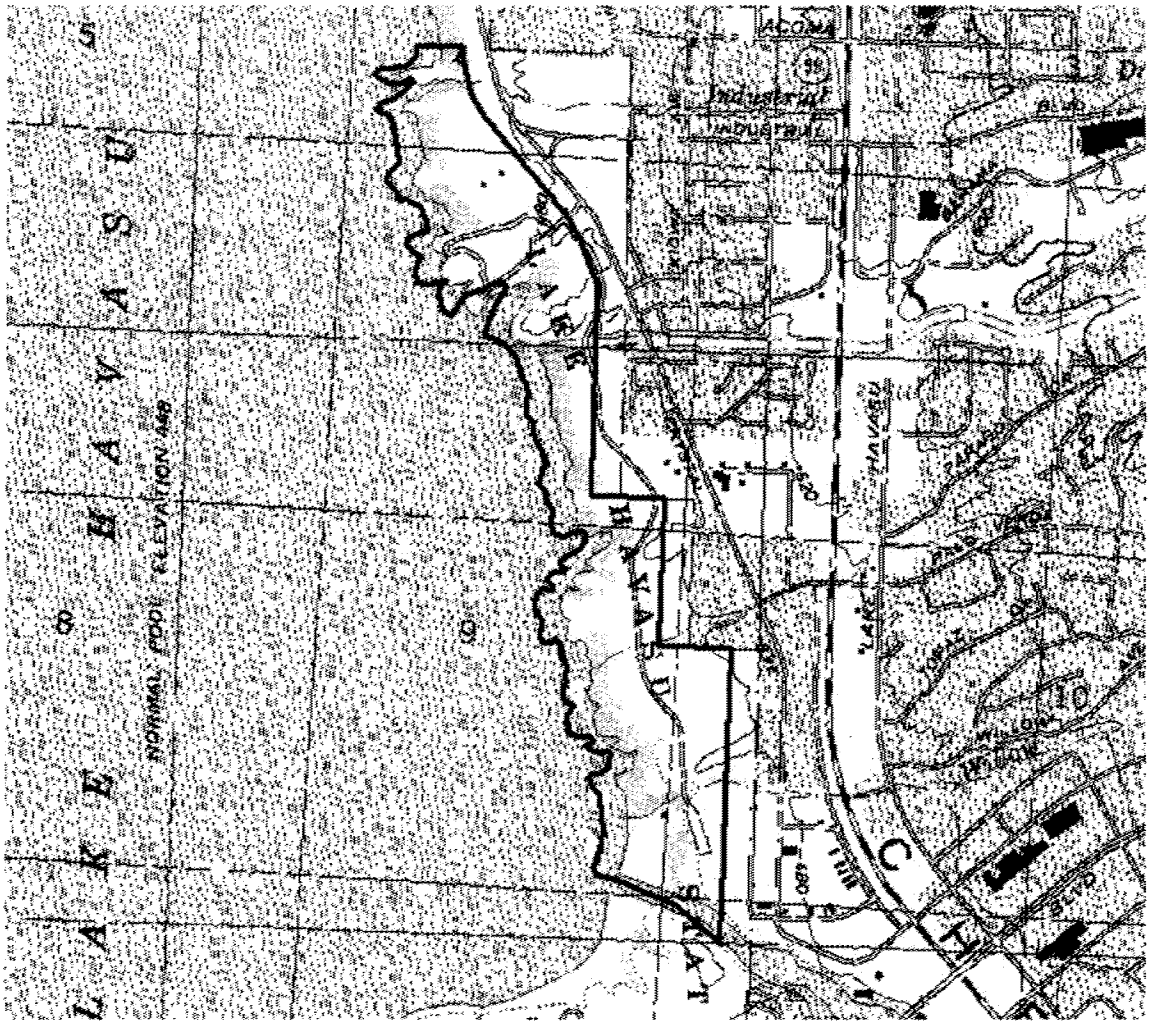
a. Installation of outdoor school
b. Installation of Kid Friendly Area Interpretive stations
c. Scheduling of school groups – trips available October – April (exceptions at park or interpretive staff discretion)
d. Review and evaluate all programs.



Appendix A:
Park layout and facilities map.

Appendix B:
Proposed Botanical Garden Layout.




LAKE HAVASU
NORMAL POOL ELEVATION 448
Industrial
INDUSTRIAL
ACOMA
HAVASU
LAKE
HAVASU
LAKE
HAVASU
STATE
BLVD
10

Lake Havasu State Park

699 London Bridge Road
Lake Havasu City, AZ 86403
928-855-2784
928-855-2647 (FAX)

TO: Patty West, NAU
FROM: Tim Kristof, Park Manager, LHSP
DATE: June 5, 2008
SUBJECT: LHSP WASH REDESIGN ASSESSMENT
COPY: Park file

Lake Havasu State Park is the number one visited Arizona State Park; it is a water based recreation park that has 3 launch ramps, a 47 site campground, a large day use/special event area, a 1.5 mile trail and a xeriscape cactus garden.

This cactus garden started off small and has slowly grown and added benches and other features over the years. It is unfortunately located in a small desert wash area that has infrequently over-ran the area with too much water. It is also fortunate to be located in a wash where the native and non-native desert plants can thrive in this very hot desert climate. I fully support a grant to help design a channel(s) so that this liquid gold we call water can flow through the cactus garden area and into the lake.

The cactus garden is being maintained by a local volunteer who has transformed it into a great place where many winter and local park visitors go to see desert flora and fauna. I have received many positive comments from the public on how wonderful this area is from those who visit just once, to those who visit it almost every week.

Again thanks for preserving a small piece of this heavily used park for the enjoyment of future generations.

Thanks again.

Timothy J. Kristof
Timothy J Kristof
Park Manager, LHSP

"Managing and conserving natural, cultural, and recreational resources"

Arizona State Parks

Arizona Water Protection Fund Commission
Arizona Department of Water Resources
3550 N. Central Ave.
Phoenix, Arizona 85012

June 6, 2008

Re: Lake Havasu Wash Redesign Assessment

Dear Arizona Water Protection Fund Commissioners:

As the director of Arizona State Parks I would like to express my enthusiastic support for the Lake Havasu Wash Redesign Assessment located at Lake Havasu State Park on the Colorado River that is being proposed by the Ecological Monitoring & Assessment (EMA) Program at Northern Arizona University. As a stakeholder, we appreciate the opportunity the project provides to enhance riparian corridor function and wildlife habitat in this lakeside environment.

We understand that the purpose of the project is to enhance native plant communities and improve the stream function of the wash, decrease sediment deposition into Lake Havasu, and allow the wash to function as a wildlife corridor by allowing water to flow more naturally through the wash. This project will enhance visitor experiences in the park. This project will also provide many benefits to the university community by allowing a student to participate in the exercise of making a plan that can be used by the park through working with this state agency to fulfill its needs.

Arizona State Parks recognizes the investment in this project requested of the AWPF and is enthusiastic about the opportunity to provide support and assistance for redesigning the wash in the Cactus Garden on the edge of Lake Havasu. We are eager to work closely with the grantee to see this project to completion and to help with its success into the future.

If you have any questions or concerns, please do not hesitate to contact me.

Sincerely,

Ken Travous, Director
Arizona State Parks

Janet Napolitano
Governor

State Parks Board Members

Chair
William C. Scalzo
Phoenix

Arlan Colton
Tucson

Reese Woodling
Tucson

Tracey Westerhausen
Phoenix

William C. Porter
Kingman

William C. Cordasco
Flagstaff

Mark Winkleman
State Land Commissioner

Kenneth E. Travous
Executive Director

Arizona State Parks
1300 W. Washington
Phoenix, AZ 85007

Tel & TTY: 602.542.4174
www.azstateparks.com

800.285.3703 from (520 & 928) area codes

General Fax:
602.542.4180

Director's Office Fax:
602.542.4188

Evidence of control and tenure of land-

Form 1860-9
(November 1964)

The United States of America

To all to whom these presents shall come, Greeting:

A-21584

Arizona State Parks
1300 E Washington
Suite 415
Phoenix, Az 85007

WHEREAS,

Arizona State Parks Board

is entitled to a Land Patent pursuant to the Recreation and Public Purposes Act of June 14, 1926, 44 Stat. 741, as amended and supplemented; 43 U.S.C. 869 et seq. (1982), as authorized by Public Law 99-539, dated November 7, 1986, for the following described land:

Gila and Salt River Meridian, Arizona

T. 13 N., R. 20 W.,
sec. 4, lot 2, E½SW¼;
sec. 9, lot 2, W½SE¼NE¼, N½NE¼, SW¼NE¼NE¼, NE¼SE¼, E½NW¼SE¼;

containing 331.09 acres;

NOW KNOW YE, That there is therefore, granted by the UNITED STATES unto the above said Arizona State Parks Board, the land described for beach and recreation facilities;

TO HAVE AND TO HOLD the said land with all rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto the said Arizona State Parks Board, its successors and assigns forever;

EXCEPTING AND RESERVING TO THE UNITED STATES:

1. Rights-of-way thereon for ditches and canals constructed by the authority of the United States. Act of August 30, 1890, 26 Stat. 391; 43 U.S.C. 945.

2. All minerals, together with the right to mine and remove the same under applicable law and regulations as may be prescribed by the Secretary of the Interior.

INDEX MISCELLANEOUS

PROOFED

FEE # 86 52583

RECORDED IN OFFICIAL RECORDS OF MOHAVE COUNTY, ARIZONA
DEC 23 '86 -11 00 AM
Mohave County Recorder
FEE 50.00

Patent Number 02-87-0005 BOOK 1276 PAGE 424

Lake Havasu State Park

699 London Bridge Road
Lake Havasu City, AZ 86403
928-855-2784
928-855-2647 (FAX)

TO: EMA Program & Patty West
FROM: Tim Kristof, Park Manager
DATE: June 6, 2008
SUBJECT: Letter of intent for project permits
COPY: Park file

Lake Havasu State Park will obtain any necessary permits for the EMA Program and the NAU students to do the Lake Havasu Wash Assessment (LHWA) project. The cactus garden area will greatly benefit from the LHWA project.

Lake Havasu State Park commits and grants permission for the completion of this project. Any assistance the park staff can provide is extended throughout the timeframe of the LHWA project.

Thanks again for your help in making LHSP a better place to visit.

Tim Kristof
Park Manager III

Evidence of physical and legal availability of water: No water will be used in this project.