

Natural Lands Management Cost Analysis

28 Case Studies



**Prepared by the Center for Natural Lands Management
for the Environmental Protection Agency
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425 East Alvarado St., Suite H
Fallbrook, CA 92028-2960
(760) 731-7790
www.cnlm.org

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Executive Summary

With funding provided by the Environmental Protection Agency's Small Grant Program, the Center completed a survey of long-term conservation management practices at 28 preserves located in Arizona, California and Oregon (see complete list in Table 1, Introduction). This survey includes case studies, descriptions of the preserves, goals, resource characteristics, management organization, management tasks and budgets. California is still the only state that regularly requires consideration of long-term stewardship through evaluating the management organization, its plans and its funding. Elsewhere in the country, such considerations are often limited to Habitat Conservation Plans under the Endangered Species Act.

The subject projects were chosen to illustrate a variety of situations. Their sizes range from 13 acres to more than 100,000 acres with a total of 325,000 acres surveyed. They are owned by public agencies, private non-profits or private parties in mitigation banks. Their lands may have been acquired through either the conservation (grants, conservation purchases, gifts, etc.) or habitat mitigation process.

The variation between preserves was striking not only in the total management cost but in the kinds of activities necessary to manage them. Annual management costs averaged \$51 per acre per year for all 28 projects (the median was \$122 for the sample). The range in cost per acre per year is \$6 to more than \$2,100. Therefore, for a 100-acre preserve, the annual cost could range from as little as \$600 to as much as \$210,000 per year.

Although the cost of stewardship cannot be predicted with any acceptable level of confidence from the size of the preserve, the economies of scale are dramatic. Costs ranged from around a \$1,000 an acre per year for many smaller projects to well under a \$100 an acre per year for the larger projects.

We caution that while these numbers provide insight into long-term preserve costs, they are not statistically valid and underscore the necessity to complete individual cost analyses for each preserve. This study emphasizes the variation in preserve goals and tasks which determine long-term costs. One cannot conclude that by generalizing these tasks across preserves, preserve management costs would be equal.

Bill Williams River National Wildlife Refuge

Property Description

The Bill Williams River National Wildlife Refuge (Refuge) is a 6,105-acre riparian corridor that terminates into the Colorado River at the border between Arizona and California. In 1935, the 726-foot Hoover Dam was built on the Arizona-Nevada border, followed by twenty smaller dams over the following decades. As the water backed up into a series of lakes, many of the riparian forests along the Colorado River were drowned. The construction of Alamo Dam on the Bill Williams River in 1968 changed the old flood cycle, which reduced stands of native cottonwood and willow trees. Established in 1941 the Refuge sits between the Alamo Dam and the Colorado River about 23 miles south of Havasu City and 10 miles north of Parker.

With nine miles of river reach and the delta with Lake Havasu, the Refuge holds one of the last stands of natural cottonwood-willow forest along the lower Colorado River, creating a unique ecosystem that provides quality habitat for resident and migratory wildlife.

The rare riparian habitat of Refuge draws a variety of neotropical migratory birds as they move from Central and South America to their breeding grounds in the north and includes several warbler species, vermilion flycatcher and summer tanager.

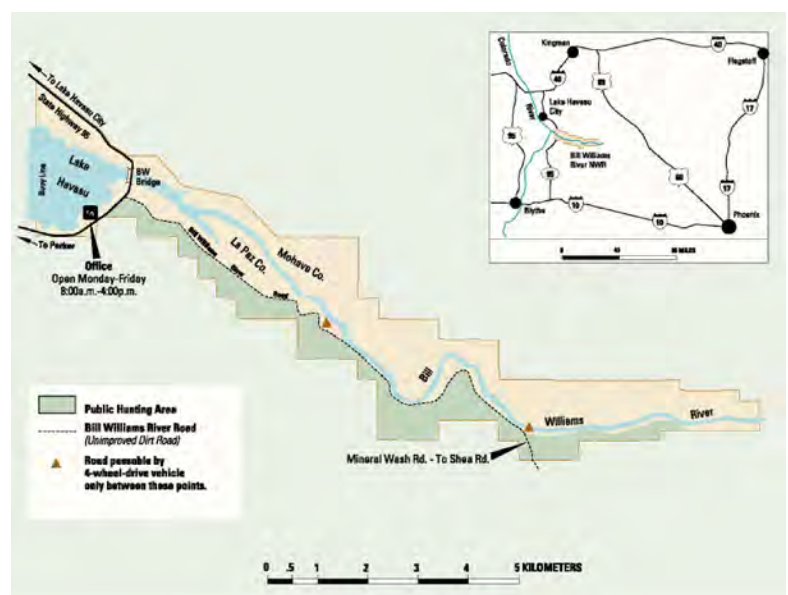
About a dozen federally endangered Yuma clapper rails spend the summer months in the cattails of the marsh and may overwinter. Another endangered bird, the south-western willow flycatcher, nests on the refuge in the willow trees lining the river.

Several species of native fish are found in the waterways of the refuge. Just below refuge headquarters lays a cove where endangered razorback suckers and bonytail chubs are reared. Biologists from the U.S. Fish and Wildlife Service's Arizona

Fishery Resources Office receive young razorback suckers and bonytail chubs from Dexter National Fish Hatchery, a New Mexico facility that produces endangered fish. The fish are introduced into the cove, where they grow to around 10 inches—a size that offers them a chance against predators. At that point they're released into Lake Havasu and other areas, where they are monitored to determine their survival. In the future, these fish will also be released into stretches of free-flowing river.

Refuge staff use various management techniques to protect and restore the native plants and animals at Refuge. Cottonwood and willow trees are planted and maintained, salt cedar is controlled, and native fish are being reintroduced. The Refuge is also working with the Army Corps of Engineers, the agency in charge of water releases from Alamo Dam, to return water flows in the Bill Williams River to a more natural state.

The delta area, including much of the cattail marsh, can be viewed from several turnouts off Arizona Highway 95. The riparian area along Bill



Williams River is best seen by driving the road that begins approximately one-third of a mile south of the river bridge and ends approximately three miles east of the highway. Most of the road was washed out by flooding in 1993, but driving is still possible for approximately three miles from Highway 95. Visitors are welcome to explore the rest of the refuge on foot. A quarter-mile long, informative nature trail is open during office hours.

Hunting is permitted for dove, quail, cottontail and desert bighorn sheep, but is confined to the area south of the Refuge road. Fishing for striped and largemouth bass, catfish, bluegill and other fish is permitted on the Lake Havasu portion of the Refuge according to Arizona Game and Fish Department regulations. Catch-and-release techniques are required with any native fish captured and reported to refuge personnel.

Project Goals

Originally the Refuge was one of three created as mitigation for the construction of Boulder Dam. At present, the intent of the Refuge is to conserve habitat for migratory birds, and in particular, neotropical birds that often use the Refuge's riparian habitat. In addition, the Refuge supports threatened and endangered species. This includes a wide spectrum as the Refuge has a variety of habitats from aquatic to marsh, Sonoran desert and terrace lands.

Biological Description

The Refuge supports the last and largest remnant of the native riparian and first terrace habitats that once filled the valleys of the lower Colorado River and its tributaries. These rare habitats support many native species, now restricted or nearly gone, as well as non-native species which have been introduced deliberately or accidentally by human activities.

Without a full inventory, at least 285 native species of plants have been documented in the refuge thus far.

These unique habitats support many butterfly species. A total of 34 species have been documented in the refuge, 11 (32 percent) of which were found in a recent study to be only at the Refuge. One species, MacNeill's sooty-wing skipper, is of some concern to conservationists due to its rarity. The larvae apparently only feed on one species of saltbush, a native shrub of the lower Colorado River

valley. Adults are often observed flying between the saltbush and honey mesquite.

The Refuge currently supports 27 species of fish. Only three native species are still present including the federally endangered bonytail chub (*Gila elegans*) and razorback sucker (*Xyrauchen texanus*) which had to be reintroduced into the River. One of the other native fish, longfin dace (*Agosia chrysogaster*) has been reintroduced as well. The other native fish were extirpated from the system. The remaining fish are represented by one marine species, which has adapted to freshwater, and other freshwater fish native to Europe, South America, or the eastern United States including sportfishing species like sunfish, bass, crappie, tilapia and catfish.

There are at least 34 species of amphibians and reptiles on the Refuge of which the desert tortoise and the lowland leopard frog are listed as species of state concern. Fortunately the Refuge is free of bullfrogs. Of the 56 species of mammals documented on the Refuge about 15 species are bats. Pronghorn may have been extirpated in the area. The domestic pig is a prominent nonnative species.

Birds are an extraordinary group on the Refuge with 343 species, five federally listed species and eighteen state listed species. Forty-three species are migrant and fifty-nine are permanent. Besides the southwestern willow flycatcher (*Empidonax traillii*) and Yuma clapper rail (*Rallus longirostris yumanensis*), the black rail (*Laterallus jamalensis*), yellow-billed cuckoo (*Coccyzus americanus*), Bald eagle (*Haliaeetus leucocephalus*) and Peregrine falcon (*Falco peregrinus*) are state or federally listed.

Organizational Structure

The Bill Williams Refuge is managed by the U.S. Fish and Wildlife Service. The Refuge office reports to the regional headquarters in Albuquerque N.M. Early on the Refuge was part of a three-Refuge system including Lake Havasu but in 1993 it became its own NWR with its own conservation planning agenda. Volunteers and employees of other scientific organizations also assist with various tasks on the Refuge.

The current staff consists of a refuge manager, assistant manager, two full time rangers, one ecologist and one biologist. The manager would like to hire an outdoor recreation specialist and a maintenance person both of which are included. Most biological monitoring is accomplished through

collaborations with other organizations such as Arizona State University, the U.S. Geological Survey and so on.

The Refuge manager is responsible for all organizational planning and oversight. The assistant manager coordinates tasks and work plans for the staff. The full-time rangers conduct patrols both on the water and on the roadway going through the refuge. Patrols on the water require both rangers for safety purposes. The full-time ecologist provides scientific oversight and planning for the biotic surveys as well as conducts some of the surveys. The full time biologist was responsible for the remainder of the biotic surveys. Additionally a volunteer was responsible for operating equipment and site maintenance.

In all, more than 14,000 hours are spent at the Refuge including approximately 800 volunteer-hours and 1,000 hours of survey assistance from outside scientific organizations.

Habitat Management Tasks

Site Construction is concerned with maintaining the road, fencing and gates and planning such activities. There is about seven miles of road, 3.5 of well-graded road maintained by the county entering the Refuge. Another 3.5 miles of poorly maintained 4-wheel drive road leads to the interior. It is assumed that the County road is graded every year and the remainder every five years. About a quarter of the road is fenced with post and cable meaning about 20,000 feet need to be maintained. The maintenance figure in the PAR includes both labor and materials for the existing infrastructure. No other fencing is required because the Refuge is surrounded by other protected lands and there is no grazing in the vicinity. Volunteers provide assistance with this function and are valued in the budget.

Biotic Survey includes planning survey, coordinating with others that assist (ASU and USGS for instance) analyzing data and preparing reports. Field time includes getting equipment and materials, setting up and accumulating data. Although the work is conducted by a biologist and an ecologist, surveys are labeled by the professional category suitable for the type of survey. Beside surveys for presence and population, focused surveys are conducted for bonytailed chub and flycatcher. Volunteers also provide help with this function and are valued in the budget.

Habitat management is conducted by staff and volunteers. Importantly among these are salt cedar removal where the area is replanted with cottonwood and willows. Tamarisk is also a control issue using both hand removal and spraying. Ongoing revegetation of abandoned croplands is also included.

Public Service work includes maintaining the refuge office and visitor center which is located on Highway 95 as well as quarter mile disabled access trail with 14 interpretive signs. There are another six or so signs on the roadway itself. New docks are being built for fishing and a large new pavilion with picnic tables for education programs is to be installed shortly. RV pads where volunteers may stay are being installed as locations for dock hosts and general refuge volunteers.

Patrolling the trails and river is one of the major tasks taking two full-time rangers. Coordination with hunters and boaters and control of these uses is extensive. Interpretive literature and outreach to the community are also part of this category.

General maintenance includes sanitation control and is provided by staff and volunteers.

Reporting includes a GIS program which does not now exist on the Refuge as well as management plans and reporting both within the Refuge and to the regional office.

Office maintenance includes equipment and services in the Refuge Office. The package of equipment is based on four computers.

Field Equipment includes two fully equipped trucks for the rangers as well as two Boston Whalers to patrol the water. In addition, there are three pickup trucks, one Ford Expedition and a tractor/backhoe. Prices of these items are from dealers for Ford, Boston Whaler and Hobby Horse International.

Operations involve budgeting and accounting tasks as well personnel management and coordination with the regional office.

Habitat Management Cost Estimates

The estimated average annual cost of on-going management of the Refuge is \$1,505,000. This figure includes all staff and volunteers as well as operation and amortization of all capital facilities and equipment. The figure also includes a 10 percent contingency and an administrative rate. The administrative rate of 24 percent is the middle

of the range indicated by staff and is subject to several interpretations.

The major category of cost is public services with almost two-thirds of the total budget or over \$700,000. A distant second is Biotic Surveys with \$124,000 and operations with \$117,000.

End Notes

Western Wildlife Refuges: Thirty-six Ecological Havens from California to Texas by Dennis Wall, Museum of New Mexico Press.

Website: <http://ifw2irm2.irm1.r2.fws.gov/refuges/arizona/billwill.html>.

Personal communication, Richard A. Gilbert, Refuge Manager, August 2003,

Personal communication, Kathleen Blair, Refuge Ecologist, August 2003.

GS Rate Table.

PAR Budget Table— Bill Williams National Wildlife Refuge Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							7,643
Project Planning	Supervise/coordinate	L. Hours	64.00	40.00	1	2,560	
Road Construction & Repair	Grade 3 1/2 mile County	Day	3.00	638.00	1	1,914	
Road Construction & Repair	Grade 3 1/2 mile unimproved	Day	3.00	638.00	5	383	
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	20,000.00	4.00	35	2,286	
Fence, 4' X 6' X 6'	Post & 3/4" Cable	L. Hours	30.00	15.00	1	450	
Gate, Classic	Powder River, Classic	Item	2.00	189.75	30	13	
Lock	Padlock	Item	4.00	19.00	2	38	
- BIOTIC SURVEYS							124,500
Project Management	Supervise/coordinate	L. Hours	600.00	40.00	1	24,000	
Project Management	Analyze and report	L. Hours	600.00	40.00	1	24,000	
Plant Ecologist	Vegetation structure	L. Hours	360.00	34.00	1	12,240	
Fisheries Biologist	Presence and population	L. Hours	540.00	34.00	1	18,360	
Fisheries Biologist	Focused WSC monitoring	L. Hours	270.00	34.00	1	9,180	
Hydrologist	Water level monitoring	L. Hours	270.00	34.00	1	9,180	
Herpetologist	Presence and population	L. Hours	180.00	34.00	1	6,120	
Mammalogist	Presence and population	L. Hours	180.00	34.00	1	6,120	
Ornithologist	Presence and population	L. Hours	360.00	34.00	1	12,240	
Ornithologist	Focused T&E monitoring	L. Hours	90.00	34.00	1	3,060	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							19,970
Hydroseed	Hydroseed	Acre	10.00	600.00	5	1,200	
Plant Procurement	Shrubs	1 Gal.	50.00	3.00	5	30	
Exotic Plant Control	Project Planning	L. Hours	60.00	40.00	1	2,400	
Exotic Plant Control	Hand Removal Tamarisk	L. Hours	320.00	15.00	1	4,800	
Exotic Plant Control	Hand Removal Salt Cedar	L. Hours	100.00	15.00	1	1,500	
Exotic Plant Control	Roundup	Gal.	50.00	35.00	1	1,750	
Exotic Plant Control	Backpack Spray	L. Hours	160.00	15.00	1	2,400	
Exotic Plant Control	Mow	L. Hours	30.00	15.00	1	450	
Exotic Animal Control	Bullfrog culling, gigging	L. Hours	120.00	34.00	1	4,080	
Exotic Animal Control	Trapping-Cowbird	L. Hours	40.00	34.00	1	1,360	
- WATER MANAGEMENT							1,320
Water Testing	Test	Report	3.00	1,200.00	5	720	
Water Testing	Test	C. Hours	40.00	75.00	5	600	
- PUBLIC SERVICES							712,584
Nature Center	Construction/Maintenance	Sq. Ft.	3,200.00	78.00	40	6,240	
Nature Center	Design activities	L. Hours	200.00	35.00	1	7,000	
Patrolling	Patrol	L. Hours	3,600.00	35.00	1	126,000	
Patrolling	Coordinate/Communicate	L. Hours	500.00	35.00	1	17,500	
Parking Area	Add crushed rock and grade	Sq. Ft.	160,000.00	3.00	1	480,000	
Trail	Maintenance	L. Hours	40.00	15.00	1	600	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Sign, Aluminum	Design/Install	L. Hours	100.00	23.00	1	2,300	
Sign, Polyethelene	21" x 14" 10 words	Item	100.00	20.50	5	410	
Sign, Redwood	Interpretive 6'X 12'	Item	20.00	1,500.00	15	2,000	
Kiosk	Pavillion	Item	1.00	120,000.00	20	6,000	
Kiosk	Pavillion equipment	Item	1.00	4,000.00	10	400	
Volunteer Coordinator	Meetings (Mgr.)	L. Hours	120.00	67.00	1	8,040	
Volunteer Coordinator	Meetings (Outdoor Spec.)	L. Hours	300.00	23.00	1	6,900	
Volunteer Coordinator	Meetings (Asst. Mgr.)	L. Hours	120.00	40.00	1	4,800	
Volunteer Coordinator	Meetings (Wildlife Bio.)	L. Hours	50.00	34.00	1	1,700	
Interpretive Literature	Labor	L. Hours	100.00	23.00	1	2,300	
Interpretive Literature	Copy	Page	2,000.00	0.10	1	200	
Community Outreach	Meetings-watercraft (Mgr)	L. Hours	80.00	67.00	1	5,360	
Community Outreach	Meetings on hunting (Mgr)	L. Hours	40.00	67.00	1	2,680	
Community Outreach	Safety Comm. (Outdoor Spec)	L. Hours	300.00	23.00	1	6,900	
Community Outreach	Recreation Planning	L. Hours	200.00	23.00	1	4,600	
Community Outreach	Education Planning	L. Hours	300.00	23.00	1	6,900	
Community Outreach	Education Program	L. Hours	400.00	23.00	1	9,200	
Other	Docks	Item	3.00	60,000.00	40	4,500	
Other	Host RV pads	Sq. Yd,	180.00	6.00	20	54	
- GENERAL MAINTENANCE							7,026
Sanitation Control	Collection and disposal-staff	L. Hours	60.00	40.00	1	2,400	
Sanitation Control	Collection and disposal-staff	L. Hours	80.00	15.00	1	1,200	
Sanitation Control	Collection/disposal-volunteers	L. Hours	160.00	15.00	1	2,400	
Hauling, Truck	Truckload	Item	2.00	57.50	1	115	
Hauling, Truck	Dumping fee	Item	2.00	30.00	1	60	
Trash Liners	Liners	Item	2.00	5.50	1	11	
Toilets, Portable	Monthly Rent	Months	12.00	70.00	1	840	
- REPORTING							17,947
Database Management	Data Input (Asst Mgr)	L. Hours	120.00	40.00	1	4,800	
GIS/CAD Management	Data Management (Mgr)	L. Hours	40.00	67.00	1	2,680	
GIS/CAD Management	Data Management (Bio/Ecol)	L. Hours	100.00	34.00	1	3,400	
Photodocumentation	Field Survey	L. Hours	16.00	34.00	1	544	
Monthly Reports	Monthly Events (Outdoor Spec)	L. Hours	50.00	23.00	1	1,150	
Annual Reports	Summary	L. Hours	20.00	67.00	1	1,340	
Annual Work Plan	Plan and prioritize	L. Hours	16.00	67.00	1	1,072	
Maintenance Report	Monthly Report	L. Hours	4.00	40.00	12	13	
Agency Report	Annual Report	L. Hours	4.00	67.00	1	268	
Monitoring Reports	Monitoring Documenta-tion	L. Hours	40.00	67.00	1	2,680	
- OFFICE MAINTENANCE							45,860
Preserve Office	Janitorial	Sq. Ft.	2,100.00	0.20	30	14	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Preserve Office	Planning and Purchasing	L. Hours	200.00	67.00	1	13,400	
Preserve Office	Planning and Purchasing-Asst.	L. Hours	300.00	40.00	1	12,000	
Preserve Office	Replacement and maintenance	Sq. Ft	2,800.00	85.00	40	5,950	
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	2,800.00	1.00	1	2,800	
Telephone Charges, Annual	Phone Charges	Person	2.00	1,200.00	1	2,400	
Insurance, Fire	Structure (Theft, Vandalism)	\$1000 Valu	20.00	0.04	1	1	
Insurance, Contents	Contents	\$100 Value	1,000.00	0.20	1	200	
Office Supplies, Year	Supplies	Person	0.10	192.00	1	19	
Furniture	Desk	Item	4.00	250.00	10	100	
Furniture	Chair	Item	4.00	150.00	5	120	
Furniture	Bookcase, 3'x5'	Item	4.00	150.00	8	75	
Furniture	File cabinet	Item	4.00	400.00	10	160	
Copier	Copier, 15-18 ppm	Item	1.00	3,833.00	8	479	
Fax Machine	Standard	Item	1.00	400.00	5	80	
Telephone	Touch-tone	Item	2.00	95.00	5	38	
E-Mail	Services	Year	2.00	360.00	1	720	
Cellular Pager	Unit	Unit	2.00	120.00	5	48	
Cellular Pager	Services	Year	2.00	720.00	1	1,440	
Computer, PC & Monitor	Pentium	Item	4.00	2,100.00	4	2,100	
Computer software	Microsoft Office Pkg	Item	4.00	450.00	4	450	
Deskjet Printer	HP DeskJet 895	Item	4.00	399.00	6	266	
GIS ARC/INFO	GIS, PC based	Item	1.00	15,000.00	5	3,000	
- FIELD EQUIPMENT							48,973
GPS, Rover & Base Unit	GPS/Corrected	Item	1.00	5,000.00	5	1,000	
Surveying Equip.	Misc. Equipment	Item	1.00	2,400.00	5	480	
Surveying Equip.	Reels, bobs, etc.	Misc.	1.00	2,400.00	5	480	
Vehicle	Pickup 1 ton	Item	3.00	32,000.00	8	12,000	
Vehicle	Expedition	Item	1.00	34,000.00	8	4,250	
Vehicle	Ranger Vehicles equipped	Item	2.00	52,500.00	8	13,125	
Vehicle	Boston Whaler and trailer	Item	2.00	60,000.00	20	6,000	
Quad Runners, 4WD	Mid-range quality	Item	1.00	4,500.00	8	563	
Vehicle	Fuel	Mile	3,000.00	0.16	1	480	
Vehicle	All equipment maintenance	Year	5.00	300.00	1	1,500	
Vehicle	All equipment maintenance	L. Hours	200.00	20.00	1	4,000	
Other	Water testing and Flow Meters	Item	1.00	15,000.00	8	1,875	
Other	Veg. monitoring equip.	Package	1.00	2,000.00	6	333	
Other	Tractor/backhoe	Item	1.00	40,000.00	15	2,667	
Uniforms	Specific Uniform Allowance	Item	4.00	55.00	1	220	
- OPERATIONS							117,964
Network Interview/Contracts	Maintain contracts	L. Hours	40.00	30.00	1	1,200	
Budgeting	Budget and accounting	L. Hours	24.00	30.00	1	720	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Supervisor Site Visit	Site visits	L. Hours	96.00	67.00	1	6,432	
Project Accounting	Setup and maintain	L. Hours	36.00	67.00	1	2,412	
Employee Reports	Supervise employees	L. Hours	800.00	67.00	1	53,600	
Employee Reports	Coordinate Regional Office	L. Hours	300.00	67.00	1	20,100	
Employee Reports	Supervise employees	L. Hours	500.00	67.00	1	33,500	
Subtotal						1,103,787	1,103,787
Contingency @ 10%						110,379	
Administration @ 24%						291,400	
Total						1,505,566	

2

Buenos Aires National Wildlife Refuge

Preserve Description

The Buenos Aires National Wildlife Refuge (Refuge) is just over 117,000 acres located in the Altar Valley of southwest Pima County, Arizona. The northern boundary is about 45 miles southwest of Tucson and the southern boundary is the Mexican border. There is a wetland at Arivaca Cienega and two riparian areas, Arivaca Creek, and Brown Canyon.

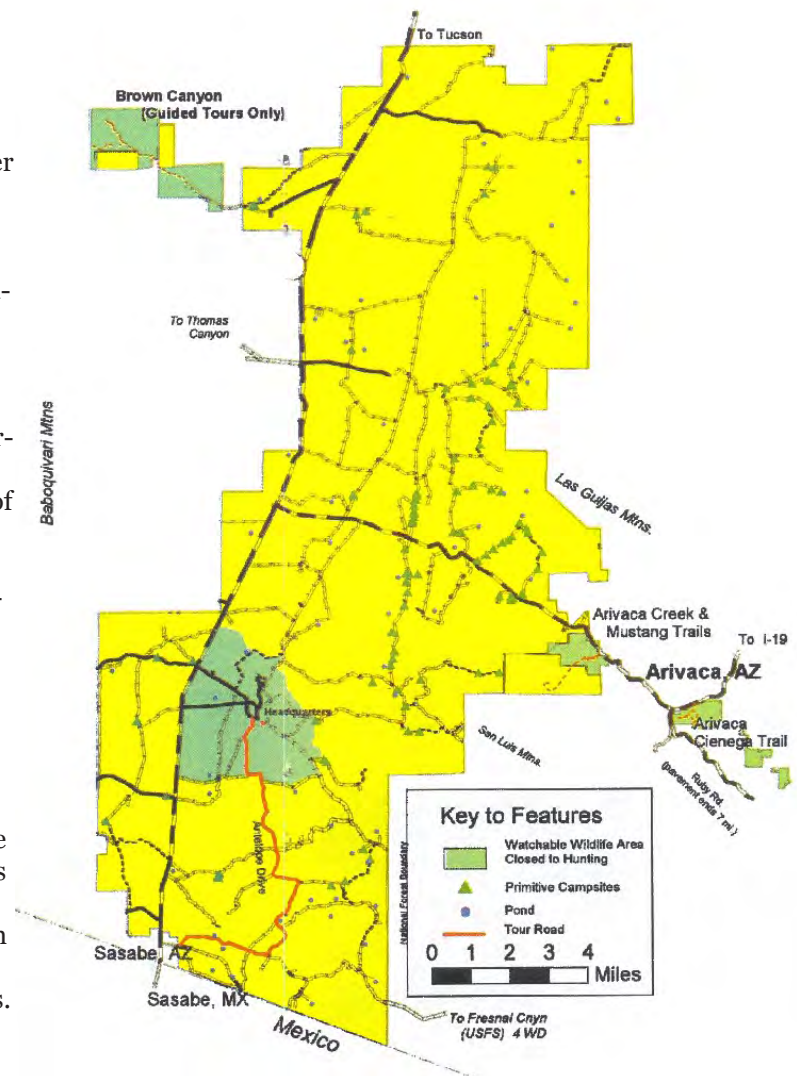
There are extensive improvements on the Refuge as part of the original ranch development which was kept to facilitate management and recreation. There are some 40,000 visitor days of which a large majority are spent birding, sightseeing and being outdoors. However, hunting does occur; over 90 percent of the Refuge is open to deer, javelina, dove and waterfowl hunting. Over 100 primitive campsites are located on the Refuge mostly for hunters but increasingly for others. Horseback riding and mountain biking may occur on roads but not on hiking trails.

The Refuge was established in 1985 to ensure survival of the masked bobwhite quail (*Colinus virginianus ridgwayi*) and other endangered species through restoration of native grasslands. As part of the Sonoran Desert of the U.S. and Mexico border area, the Refuge presently represents the largest ungrazed, semidesert grassland remaining. It supports some 300 species of birds, 58 mammals, 42 reptiles and 22 amphibians. There are some 600 species of plants represented on the Refuge.

The Altar Valley is presently dominated by large stands of exotic grasses and mesquite which prior to heavy grazing in the valley were unknown. In addition, the Refuge is affected significantly by the stream of immigrants crossing the border into this undeveloped territory. Refuge staff has been involved with many kinds of border-related issues in coordination with other agencies including immigrant arrests, drug recovery and rescue operations. Unfortunately, much vandalism, theft and fire is attributed to the immigrants.

Project Goals

The original objective of the Refuge was to restore and protect the flora and fauna of these rare grasslands including the reintroduction of the masked bobwhite quail. Other species that had been lost to the area have returned with cessation of grazing. In addition, there are also eight listed species plus others that are in process for which management



is directed. The goals have broadened to include management of natural diversity and specifically in cooperation with Mexico. Visitors enjoy a high quality wildlife experience and there are outreach efforts made to schools by providing environmental programs to students.

Biological Description

The Refuge is a diverse complex of semidesert grasslands, mesquite grassland, desert shrub, riparian corridors, permanent and ephemeral streams and ponds and mountain canyons. The Chihuahuan, Sonoran, and Madrean geographic provinces come together in the Refuge and some Rocky Mountain species reach their southernmost distribution here.

The semidesert grassland was first recognized in 1982 as a distinct vegetation community that is subtropical, fire-maintained and greatly influenced in density and distribution by alternating periods of wet and dry weather. Since then, disagreement about whether this was a climax community seems less important than the impact of grazing which allowed woody shrubs such as mesquite to proliferate.

The following summary of the plant communities on the Refuge is an indication of the extent to which woody shrubs and non-native grasses have succeeded in this area.

Mesquite Association is primarily restricted to the deeper soils and canopy cover is more than 80 percent.

Mesquite/Lehmann’s Lovegrass Association wherein canopy cover is 3-60 percent.

Lehmann’s Lovegrass Association is on thin soils and is extremely drought tolerant. Native grasses have been unable to compete once this grass is established.

Lehmann’s Lovegrass/Native Grass Association where the mix between the two ranges from 35 percent to 65 percent.

Native Grass Association is where 65 percent of the coverage is native grasses.

Sub-shrub/Grass occurs on uplands where the shrubs are non-native snakeweed or burroweed.

Johnsongrass/Sacaton/Russian Thistle occurs on the deeper soils of wash basins.

The Arivaca area is comprised of a short stretch of Arivaca Creek and the natural cienega that is the creek’s source. The creek makes possible a riparian corridor of cottonwoods and willows creating a gallery forest for nesting and feeding birds. The

Cienega is one of the few permanent sources of water on the Refuge and, additionally, is one of few remaining in the southwest due to groundwater pumping. There are three small lakes and about 100 stockponds created during the ranching period. Most stockponds are diked and dammed and are steep sided and provide little riparian habitat but others are highly productive.

Fire was a predominant characteristic of the grasslands and prevented the invasion of woody species. Overgrazing combined with some drought periods have reduced the size and number of grassland fires which, over time, have allowed woody species to intrude. The Refuge is divided into 50 prescribed burn units with approximately 14,000 acres being burned per year. The burns also benefit cane beardgrass (*Bothriochloa* spp.), Arizona cottontop (*Digitaria californica*), blue grama (*Bouteloua gracilis*), sideoats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsutas*), tanglehead and sprangletop (*Leptochlea* spp.).

Restoration has been successful in supporting a number of species that had been missing from the Refuge. The following table provides the species that have returned as well as the names of threatened and endangered species.

Table 1. Returned and Listed Species

Returned Species	
Baird’s sparrow	<i>Ammodramus bairdii</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
White-tailed kite	<i>Elanus caeruleus</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Listed Species	
Kearney’s bluestar	<i>Amsonia kearneyana</i>
Pima pineapple cactus	<i>Coryphantha sherri robustispina</i>
Cactus ferruginous pygmy-owl	<i>Glaucidium brasilianum cactorus</i>
Chiricahua leopard frog	<i>Rana chiricahuensis</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>

Organizational Structure

The Refuge is managed by the U.S. Fish and Wildlife Service in coordination with a wide range of state and federal agencies including, uniquely, the U.S. Border Patrol. The Service also works closely with neighboring property owners including the Bureau of Land Management. The Comprehensive Conservation Plan finalized in 2003 suggests appropriate staffing would be 35. However currently, there are 21 employees and while more have been anticipated, they are not included in this analysis. The breakdown is shown in Table 2. The majority of the difference in staffing may be attributed to

an anticipated increase in visitor services, biologists, maintenance and immigration. Abbreviations following the position title are used in the PAR budget table to indicate the responsible position.

The Refuge headquarters is located on the Refuge. Volunteers are also housed on the Refuge because of the distance to communities.

Staff time totals nearly 104,000 hours after vacation and sick time has been deducted. In addition to staff, some 10,000 hours is contributed to the Refuge by volunteers for a total of just under 124,000 hours. Some positions such as the communications specialist are regional so that only a portion of the position's time is spent at the Refuge.

Habitat Management Tasks

Habitat management tasks have been evaluated based on staff time and costs. Staff time was allocated by the project leader. Costs per hour are assumed to be the midpoint of the GS levels that describe the position plus 30 percent for taxes and benefits. Since volunteers are housed on the Refuge, they are not volunteers in the strictest sense, therefore, they are valued at \$13 an hour which is higher than is assumed on most projects.

Site construction consists of maintenance of large capital items including fences and roads. At such a large facility, planning and coordination require a significant input of staff hours; in this case about 720. At Buenos Aires, the southern boundary is conterminous with the U.S.-Mexican Border where the five-strand fence must be regularly repaired. Because of the extensive repairs, the life of this fence, which is typically 35 years, has been reduced in this estimate to 15 years which more than doubles the annual dollars for maintenance. A four-strand barbed wire fence surrounds the remainder of the Refuge which is a distance of about 75 miles. In addition to the replacement cost of the fence, the hours spent by volunteers and maintenance personnel is included because of the level of damage experienced.

There is a short distance, 2.3 miles, of paved road maintained by the Refuge as well as 272 miles of dirt road. It is assumed that the dirt roads are regraded about every 30 years using a rate of 18 cents per square foot, although it is likely that some parts are graded more often than others.

About 3,000 square feet of shop space is utilized to store and conduct maintenance on improvements and equipment and as a fire cache.

Biotic surveys are relatively limited and conducted by staff and volunteers. Planning consumes some 450 hours. Surveys themselves are of three types, quail surveys (2,340 hours), breeding bird surveys (180 hours), and vegetation structure and fire impact surveys (810 hours). A thousand hours of biotic survey time is provided by volunteers. The category also includes an item for quail husbandry.

Habitat Maintenance is almost entirely devoted to controlled burns and fire management. To accomplish the extensive fire control efforts on the Refuge, a 1,500-square-foot office for the fire crew is maintained. Four full-time staff, some part-time and the fire crew is needed in addition to planning and supervisory duties by several other staff. In total, over 73,000 hours are focused in this area.

Water Management would cover the 125 ponds that originally functioned as stockponds on the ranch ranging in size from 1/2 acre to 125 acres. Many have lost berms and dams and are no longer functional. However, the Refuge wants to retain the remaining 82 which means maintenance of berms and dams. Assuming an average size of ten acres, over 200,000 linear feet surrounds all 85 ponds. If just 100 feet per pond of berm is necessary to maintain their functionality, about \$8,200 is the replacement cost over a 100 year life. In addition, staff time is allocated for this function.

Public Services include all tasks centered around staff and visitors. About 2,000 square feet in the 6,000-square-foot administrative center of the Refuge houses a visitor's center with a diorama,

Table 2. Employee Positions on Refuge

<i>Administrative</i>	<i>Fire</i>	<i>Biologist</i>	<i>Technical</i>	<i>Safety</i>
Project Leader (L)	Fire Management Officer (F)	Biologist (B)	Mechanic (M)	Refuge Officer (RO)
Deputy Project Leader (DL)	Asst. Fire Manager (AF)	Bio. Tech (BT)	Mtn. Worker (MW)	Asst. Refuge Officer (AO)
Admin. Assistant (AA)	2-Engine Fire Boss (EF)		Groundskeeper (GK)	Asst Refuge Officer2 (AO)
Admin. Clerk (AC)	2-Forestry Tech (FT)			
Outdoor Rec Planner (O)	Program Tech. Half-time (PT)			
GIS (GIS)	Forestry Tech Aid Part-time (FT)			
Communications Specialist	Wildland Urban Interface Part-			
Part-time (CS)	time (WU)			
Program Tech. Half-time (PT)				

interpretive signs and other exhibits. Three other interpretive signs are located outside the administrative area and three more at Arivaca's Visitor Contact Station.

The administrative office occupies the remaining 4,000 feet of the Refuge with offices for staff. Some 23 houses, some old ranch houses, some mobile homes are maintained to house staff and volunteers. Each has a well and septic system requiring maintenance as well. Finally, an approximately 4000-square-foot bunkhouse, the Field School Camp, is used by school groups and others for natural resources study.

A wide variety of signs are used on the property. They include entrance and boundary signs about every one-quarter mile along the boundary. There are six interpretive signs at the visitor's center and at Arivaca Canyon. The "No Hunting" signs around the buildings total roughly 150 and directional signs, parking and wildlife signs along the 272 miles of road are estimated at 55. There are some 82 firepits located at designated campsites across the Refuge which require occasional cleaning. There are no established campgrounds.

Staff time is used for planning, maintenance and conducting outreach both on the Refuge and at meetings off the Refuge. There are both guided tours for visitors as well as education programs provided.

Reporting largely consists of interagency reports and GIS/GPS maintenance. A full-time GIS person who is also a biologist is employed at the Refuge.

Office Maintenance includes janitorial services and supplies and equipment in the office. The office package for the Refuge is estimated to be 13 computers plus two laptops for the staff of 21. Most other assumptions concerning office maintenance is dictated by the number of employees. Several staff members contribute to managing the office and records.

Field Equipment at Buenos Aires includes a large collection of vehicles. Some 30 cars, trucks, mini-vans and SUVs are located on the site, in addition to an array of fire equipment, hauling trucks and tractors. Values for these larger pieces are difficult to ascertain since the models are usually out of production, have long lives and may be replaced with used equipment. The values used are from the manufacturers, John Deere, Caterpillar, Gyro Trac, or where the manufacturer is no longer in business, John Deere. These values are for new equipment to replace the functionality of the existing.

A further consideration concerning equipment values is that the federal and state government are often offered bigger discounts than private organizations so the values may be overstated to that extent. The Gyro Trac is shared among other refuges so 60 percent of its value is attributed to the Refuge.

This category also includes smaller equipment such as sets of hand tools consisting of a hoe, pulaski, shovel and pruners and sets of fire equipment including Nomex suits, boots, fire shelter, hardhat, headlamp, and web gear. Costs for these items are from Comet. Cost for other pieces of equipment come from the manufacturers. It is unlikely that the Field Equipment category for the Refuge is complete. The amount and variety of equipment necessary for the management, fire, and visitor services provided by the Refuge is extensive.

Operations include head office types of tasks including budgeting, personnel, supervision, communications and interagency coordination.

Habitat Management Costs

The estimated annual cost of management at the Refuge is just over \$4,499,000. This figure includes a 10 percent contingency and 22 percent administrative rate which are both program defaults. The largest cost is for habitat maintenance at nearly \$1,305,000 and that is largely because of the extensive use and control of fire. If all of the equipment necessary for controlled burns and wildfire control was also included, the proportion of this task would be even greater. In fact, Field Equipment is the fourth largest category at \$325,000. In between is the extensive Site Construction cost, largely fencing, at \$695,000 and Public Services at \$455,000.

Endnotes

Meeting with former Project Leader, Wayne Shifflett, Fall 2003.

Pers. Comm. with Assistant Project Leader and current Project Leader, Sally Gall, February and March 2004.

Pers. Comm. with Dan Cohan, GIS specialist.

Volunteer Hours Spreadsheet

Capital Equipment spreadsheet

Draft Comprehensive Conservation Plan and Environmental Assessment, U.S. Fish and Wildlife Service, December 2000.

Equipment Manufacturers.

<http://southwest.fws.gov/refuges/arizona/buenosaires/>

PAR Budget Table—Buenos Aires National Wildlife Refuge Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
- SITE CONSTRUCTION/ MAINT.							694,867
Project Planning	Purchase/Plan (L	L. Hours	180.00	69.00	1	12,420	
Project Planning	Purchase/Plan (DL	L. Hours	360.00	42.00	1	15,120	
Project Planning	Purchase/Plan (AA	L. Hours	90.00	19.00	1	1,710	
Project Planning	Purchase/Plan (MW	L. Hours	90.00	19.00	1	1,710	
Rough Grading	Rough Grade 20" wide road	Mile	272.00	19,000.00	30	172,267	
Fence - Installed	Border, Barbed-wire, 5 strd.	Lin. Ft.	36,960.00	5.00	15	12,320	
Fence - Installed	Boundary Barbed-wire, 4 strd.	Lin. Ft.	3,267,000.00	4.00	30	435,600	
Fence - Installed	Maintenance (V	L. Hours	500.00	13.00	1	6,500	
Fence - Installed	Maintenance (MW	L. Hours	500.00	15.00	1	7,500	
Road, Asphalt	Replace, 3" Asphalt	Sq. Ft.	304,000.00	1.25	60	6,333	
Road, Asphalt	Sealer, Every 3rd yr	Sq. Ft.	304,000.00	0.05	3	5,067	
Road, Asphalt	Overlay, After 20 Yr	Sq. Ft.	304,000.00	0.60	20	9,120	
Road, Asphalt	Maintenance (V	L. Hours	500.00	13.00	1	6,500	
Road, Asphalt	Maintenance (MW	L. Hours	180.00	15.00	1	2,700	
- BIOTIC SURVEYS							115,600
Project Management	Plan (L	L. Hours	180.00	69.00	1	12,420	
Project Management	Plan (DL	L. Hours	90.00	42.00	1	3,780	
Project Management	Plan (GIS	L. Hours	90.00	42.00	1	3,780	
Project Management	Plan (B	L. Hours	90.00	26.00	1	2,340	
Wildlife Biologist	Quail Surveys (GIS	L. Hours	90.00	42.00	1	3,780	
Wildlife Biologist	Quail Surveys (V	L. Hours	1	13.00	1	13,000	
Wildlife Biologist	Quail Surveys (B	L. Hours	540.00	26.00	1	14,040	
Wildlife Biologist	Quail Surveys (BT	L. Hours	180.00	18.00	1	3,240	
Wildlife Biologist	Quail Husbandry (BT	L. Hours	1,620.00	18.00	1	29,160	
Wildlife Biologist	Breeding Bird Surveys (GIS	L. Hours	90.00	42.00	1	3,780	
Wildlife Biologist	Breeding Bird Surveys (B	L. Hours	90.00	26.00	1	2,340	
Wildlife Biologist	Veg Structure/Fire (GIS	L. Hours	180.00	42.00	1	7,560	
Wildlife Biologist	Veg Structure/Fire (B	L. Hours	630.00	26.00	1	16,380	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							1,305,010
Controlled Burning	Supervision (F	L. Hours	360.00	36.00	1	12,960	
Controlled Burning	Supervision/Implement (AF	L. Hours	450.00	28.00	1	12,600	
Controlled Burning	Implement (EF	L. Hours	2,160.00	17.00	1	36,720	
Controlled Burning	Implement (FT	L. Hours	2,800.00	19.00	1	53,200	
Controlled Burning	Implement (FC	L. Hours	56,000.00	17.00	1	952,000	
Controlled Burning	Implement (B	L. Hours	90.00	26.00	1	2,340	
Other	Fire crew space	Sq. Ft.	1,500.00	85.00	25	5,100	
Fire Control Program	Maintenance Planning (L	L. Hours	90.00	69.00	1	6,210	
Fire Control Program	Maintenance Planning (DL	L. Hours	90.00	42.00	1	3,780	
Fire Control Program	Maintenance Planning (GIS	L. Hours	180.00	42.00	1	7,560	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Fire Control Program	Maintenance Planning (F	L. Hours	540.00	36.00	1	19,440	
Fire Control Program	Maintenance Planning (AF	L. Hours	540.00	28.00	1	15,120	
Fire Control Program	Maintenance (EF	L. Hours	720.00	17.00	1	12,240	
Fire Control Program	Maintenance (FT	L. Hours	400.00	19.00	1	7,600	
Fire Control Program	Maintenance (PT	L. Hours	900.00	22.00	1	19,800	
Fire Control Program	Maintenance Planning (B	L. Hours	90.00	26.00	1	2,340	
Fire Control Program	Maintenance Planning (FC	L. Hours	8,000.00	17.00	1	136,000	
- WATER MANAGEMENT							17,208
Levee Maintenance	Stockpond Berms/Dams	Lin. Ft.	12,300.00	126.00	100	15,498	
Levee Maintenance	Maintain Berms/Dams (MW	L. Hours	90.00	19.00	1	1,710	
- PUBLIC SERVICES							454,678
Nature Center	Construction/Maintenance	Sq. Ft.	2,000.00	78.00	40	3,900	
Nature Center	Staffing (O	L. Hours	90.00	19.00	1	1,710	
Nature Center	Staffing (V	L. Hours	3,000.00	13.00	1	39,000	
Nature Center	Maintenance (MW	L. Hours	90.00	15.00	1	1,350	
Nature Center	Maintenance (GK	L. Hours	90.00	15.00	1	1,350	
Nature Center	Maintenance (PT	L. Hours	300.00	22.00	1	6,600	
Other Structures	Field School Camp	Sq. Ft.	4,000.00	85.00	40	8,500	
Residence	Construction/Maintenance	Sq. Ft.	34,500.00	90.00	40	77,625	
Residence	Management (DL	L. Hours	180.00	42.00	1	7,560	
Residence	Maintenance (V	L. Hours	2,000.00	13.00	1	26,000	
Residence	Maintenance (MW	L. Hours	1,170.00	15.00	1	17,550	
Residence	Wells	Item	35.00	5,000.00	40	4,375	
Residence	Septic Systems	Item	35.00	4,000.00	30	4,667	
Patrolling	Patrol (RO	L. Hours	900.00	41.00	1	36,900	
Patrolling	Patrol (AO	L. Hours	1,800.00	22.00	1	39,600	
Parking Area	Grade/maintain	Acres	3.00	7,600.00	10	2,280	
Picnic Tables	Stone base	Item	2.00	800.00	40	40	
Trail	Planning/Mtn (O	L. Hours	90.00	19.00	1	1,710	
Trail	Maintenance (V	L. Hours	1,500.00	13.00	1	19,500	
Trail	Maintenance (GK	L. Hours	270.00	15.00	1	4,050	
Sign	Entry, woodw/masonry base	Item	4.00	2,500.00	7	1,429	
Sign	Boundary 10" X 15"	Item	228.00	20.00	10	456	
Sign	Interpretive	Item	6.00	1,500.00	10	900	
Sign	No Hunting	Item	150.00	8.00	10	120	
Sign	Metal Directional, Parking	Item	55.00	20.00	10	110	
Sign	Planning/Mtn (O	L. Hours	90.00	19.00	10	171	
Sign	Planning/Mtn (V	L. Hours	500.00	13.00	10	650	
Sign	Maintenance (GK	L. Hours	180.00	15.00	10	270	
Sign, Metal	Metal 3" Trail Markers	Set of 100	2.00	55.00	5	22	
Sign, Redwood	Interpretive 4'X 6'	Item	6.00	650.00	15	260	
Sign, Redwood	Interpretive 6'X 12'	Item	6.00	2,000.00	15	800	
Volunteer Coordinator	Meetings/Scheduling (O	L. Hours	180.00	19.00	1	3,420	
Interpretive Literature	Labor (O	L. Hours	90.00	19.00	1	1,710	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Exhibit	Diorama	Sq. Ft.	50.00	248.00	1	12,400	
Exhibit	Interpretive 4'x6'	Item	3.00	650.00	8	244	
Exhibit	Plan/Maintain (O	L. Hours	90.00	19.00	1	1,710	
Community Outreach	Meetings (DL	L. Hours	90.00	42.00	1	3,780	
Community Outreach	Meetings (O	L. Hours	90.00	19.00	1	1,710	
Community Outreach	Coordinate Guided Tours (O	L. Hours	90.00	19.00	1	1,710	
Community Outreach	Conduct Guided Tours (V	L. Hours	500.00	13.00	1	6,500	
Community Outreach	Plan Education Program (O	L. Hours	90.00	19.00	1	1,710	
Community Outreach	Education Program (V	L. Hours	500.00	10.00	1	5,000	
Other	Planning (DL	L. Hours	90.00	42.00	1	3,780	
Other	Planning (DL	L. Hours	90.00	42.00	1	3,780	
Other	Planning (O	L. Hours	540.00	19.00	1	10,260	
Other	Planning (GIS	L. Hours	90.00	42.00	1	3,780	
Other	Law Enforcement/Rescue (RO	L. Hours	810.00	41.00	1	33,210	
Other	Law Enforcement/Rescue (AO	L. Hours	1,620.00	22.00	1	35,640	
Other	Fire Protection Built Envir. (WU	L. Hours	450.00	32.00	1	14,400	
Other	TV, Projector, VCR	Set	2.00	1,200.00	5	480	
- GENERAL MAINTENANCE							13,963
Sanitation Control	Collection and disposal (GK	L. Hours	270.00	15.00	1	4,050	
Trash Container	Plastic 30 Gal.	Item	5.00	13.00	5	13	
Toilets, Permanent (MW	Maintenance	L. Hours	90.00	15.00	1	1,350	
Toilets, Permanent (GK	Maintenance	L. Hours	90.00	15.00	1	1,350	
Other	Shops	Sq. Ft.	3,000.00	60.00	25	7,200	
- REPORTING							61,740
GIS/CAD Management	GPS/Analysis (GIS	L. Hours	990.00	42.00	1	41,580	
Agency Report	Interagency (DL	L. Hours	270.00	42.00	1	11,340	
Agency Report	Interagency (DL	L. Hours	90.00	26.00	1	2,340	
Agency Report	Interagency (F	L. Hours	180.00	36.00	1	6,480	
- OFFICE MAINTENANCE							137,460
Preserve Office	Construction/Maintenance	Sq. Ft.	4,000.00	85.00	40	8,500	
Preserve Office	Maintenance (MW	L. Hours	90.00	15.00	1	1,350	
Preserve Office	Maintenance (GK	L. Hours	900.00	15.00	1	13,500	
Preserve Office	Maintenance (PT	L. Hours	300.00	22.00	1	6,600	
Administrative	Operations (AA	L. Hours	540.00	19.00	1	10,260	
Administrative	Operations (AC	L. Hours	1,350.00	15.00	1	20,250	
Administrative	Operations (O	L. Hours	90.00	19.00	1	1,710	
Preserve Office	Janitorial	Sq. Ft.	4,000.00	0.20	30	27	
Nature Center	Janitorial	Sq. Ft.	2,000.00	0.20	30	13	
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	6,000.00	1.00	1	6,000	
Telephone Charges, Annual	Phone Charges	Person	22.00	1,200.00	1	26,400	
Insurance, Fire	Structure (Theft, Vandalism)	\$1000 Valu	70.00	0.04	1	3	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Office Supplies, Year	Stationery/envelopes	Person	22.00	125.00	1	2,750	
Office Supplies, Year	Supplies	Person	22.00	192.00	1	4,224	
Furniture	Desk	Item	22.00	250.00	10	550	
Furniture	Chair	Item	22.00	150.00	5	660	
Furniture	Bookcase, 3'x5'	Item	12.00	150.00	8	225	
Furniture	File cabinet	Item	12.00	400.00	10	480	
Copier	Copier, 15-18 ppm	Item	3.00	3,833.00	8	1,437	
Fax Machine	Standard	Item	2.00	400.00	5	160	
Telephone	Touch-tone	Item	22.00	95.00	5	418	
Answering Machine	Answering Machine	Item	3.00	100.00	5	60	
E-Mail	Services	Year	12.00	360.00	1	4,320	
Cellular Phone	Unit	Unit	12.00	120.00	5	288	
Cellular Phone	Services	Year	12.00	720.00	1	8,640	
Computer, PC Color	Laptop, Pentium	Item	5.00	1,500.00	4	1,875	
Computer, PC & Monitor	133 MHz Pentium	Item	22.00	1,800.00	4	9,900	
Computer software	Microsoft Office Pkg	Item	22.00	450.00	4	2,475	
Laser Printer	HP LaserJet 5L	Item	6.00	500.00	4	750	
GIS ARC/INFO	GIS, GPS	Item	1.00	15,000.00	5	3,000	
Plotter	10 Color 24" X 36"	Item	1.00	3,000.00	5	600	
Other	Postal Machine	Item	1.00	350.00	10	35	
- FIELD EQUIPMENT							324,579
GPS Units	High Accuracy	Item	2.00	6,000.00	6	2,000	
Vehicle	Pickups, Cars, Minivans	Item	30.00	26,000.00	8	97,500	
Vehicle	Vehicle Maintenance (M	L. Hours	1,260.00	19.00	1	23,940	
Vehicle	Heavy Equip. Mtn. (M	L. Hours	540.00	19.00	1	10,260	
Vehicle	Equipment Mtn. (F	L. Hours	360.00	36.00	1	12,960	
Vehicle	Vehicle Mtn. (AF	L. Hours	180.00	28.00	1	5,040	
Vehicle	Vehicle Mtn. (EF	L. Hours	540.00	17.00	1	9,180	
Vehicle	Vehicle Mtn. (FT	L. Hours	800.00	19.00	1	15,200	
Vehicle	Vehicle Mtn. (PT	L. Hours	300.00	22.00	1	6,600	
Vehicle	Riding Mower	Item	1.00	12,000.00	8	1,500	
Vehicle	IH TD20B Fireline Dozer	Item	1.00	249,500.00	25	9,980	
Vehicle	Caterpillar No 12 Grader	Item	2.00	243,900.00	25	19,512	
Vehicle	Case 580-L Backhoe	Item	1.00	70,144.00	25	2,806	
Vehicle	Deere 772CH Grader	Item	1.00	278,800.00	25	11,152	
Vehicle	Caterpillar D8K Grader	Item	1.00	478,101.00	25	19,124	
Vehicle	Bobcat 863	Item	1.00	31,000.00	25	1,240	
Vehicle	Trail King TK-100 trailer	Item	1.00	53,000.00	25	2,120	
Vehicle	Fuel	Gallons	40,000.00	1.50	1	60,000	
Vehicle	Maintenance Parts	Year	30.00	50.00	1	1,500	
Receivers	VHF Transceiver	Item	73.00	180.00	8	1,643	
Other	Camera/Lens	Item	3.00	800.00	10	240	
Other	Vehicle management (DL	L. Hours	90.00	4.00	1	360	
Other	Roller wire w/ Briggs & Statton	Item	1.00	265.00	10	27	
Other	Solar Module Power Unit	Item	1.00	300.00	25	12	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Other	Flatbed trailer	Item	8.00	2,600.00	10	2,080	
Other	Propane Heater with blower	Item	1.00	800.00	10	80	
Other	Refrigerator 18 cf	Item	8.00	700.00	10	560	
Other	Shop vacuum	Item	1.00	200.00	10	20	
Other	Washer Cleaner 1000 psi	Item	6.00	3,095.00	10	1,857	
Other	Freezer 21 cf	Item	6.00	1,700.00	10	1,020	
Other	Fire Pump 1.8 hp	Item	4.00	1,000.00	10	400	
Other	Concrete Mixer 5 hp	Item	1.00	2,700.00	10	270	
Other	Grass mower	Item	3.00	600.00	6	300	
Other	Cargo Trailer	Item	8.00	3,000.00	20	1,200	
Other	Parabolic Microphone	Item	1.00	900.00	10	90	
Other	Telescopes 15x-60x zoom	Item	3.00	300.00	20	45	
Other	Generator gas 4 kw	Item	3.00	500.00	15	100	
Other	Range electric	Item	6.00	700.00	10	420	
Other	Chain Saw	Item	4.00	300.00	8	150	
Other	Incubator-Brooder	Item	4.00	400.00	10	160	
Other	Welding Torch	Item	1.00	400.00	10	40	
Other	Power Saws	Item	3.00	1,200.00	10	360	
Other	Planer 110 v	Item	1.00	500.00	10	50	
Other	Drill Press	Item	2.00	900.00	20	90	
Other	Welder	Item	2.00	2,300.00	20	230	
Other	Spreader	Item	1.00	120.00	10	12	
Other	Post Hole Digger Item	Item	2.00	600.00	10	120	
Other	Battery Charger	Item	1.00	150.00	10	15	
Other	Air Compressor	Item	2.00	1,200.00	10	240	
Other	Ruger Rifle	Item	2.00	500.00	10	100	
Other	Small Electrical Tools	Item	50.00	40.00	5	400	
Other	Portable Radio	Item	8.00	275.00	8	275	
Other	Telemetry Antennae/Receiver	Item	2.00				
- OPERATIONS							227,160
Budgeting	Budget/Bookkeeping (L	L. Hours	180.00	69.00	1	12,420	
Budgeting	Budget/Bookkeeping (AA	L. Hours	900.00	19.00	1	17,100	
Budgeting	Budget/Bookkeeping (AC	L. Hours	360.00	15.00	1	5,400	
Budgeting	Budget/Bookkeeping (RO	L. Hours	90.00	41.00	1	3,690	
Budgeting	Budget/Bookkeeping (AO	L. Hours	180.00	22.00	1	3,960	
Budgeting	Budget/Bookkeeping (EF	L. Hours	180.00	17.00	1	3,060	
Other	Supervision (L	L. Hours	630.00	69.00	1	43,470	
Other	Supervision (DL	L. Hours	270.00	69.00	1	18,630	
Other	Supervision (AA	L. Hours	90.00	19.00	1	1,710	
Other	Supervision (O	L. Hours	90.00	19.00	1	1,710	
Other	Supervision (B	L. Hours	90.00	26.00	1	2,340	
Other	Supervision	L. Hours	180.00	36.00	1	6,480	
Other	Supervision (AF	L. Hours	360.00	28.00	1	10,080	
Other	Supervision (B	L. Hours	90.00	32.00	1	2,880	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Other	Personnel (L	L. Hours	360.00	69.00	1	24,840	
Other	Personnel (DL	L. Hours	180.00	42.00	1	7,560	
Other	Personnel (AA	L. Hours	180.00	19.00	1	3,420	
Other	Personnel (AC	L. Hours	90.00	15.00	1	1,350	
Other	Personnel (GIS	L. Hours	90.00	42.00	1	3,780	
Other	Personnel (O	L. Hours	180.00	19.00	1	3,420	
Other	Personnel (V	L. Hours	90.00	26.00	1	2,340	
Other	Personnel (F	L. Hours	90.00	36.00	1	3,240	
Other	Personnel (AF	L. Hours	180.00	28.00	1	5,040	
Other	Personnel (B	L. Hours	90.00	32.00	1	2,880	
Other	Communications (CS	L. Hours	450.00	32.00	1	14,400	
Other	Interagency Coordination (L	L. Hours	180.00	69.00	1	12,420	
Other	Interagency Coordination (DL	L. Hours	90.00	42.00	1	3,780	
Other	Interagency Coordination (F	L. Hours	90.00	36.00	1	3,240	
Other	Interagency Coordination (AF	L. Hours	90.00	28.00	1	2,520	
Subtotal						3,352,265	3,352,265
Contingency @ 10%						335,227	
Administration @						811,248	
						4,498,739	

Gila Box Riparian National Conservation Area

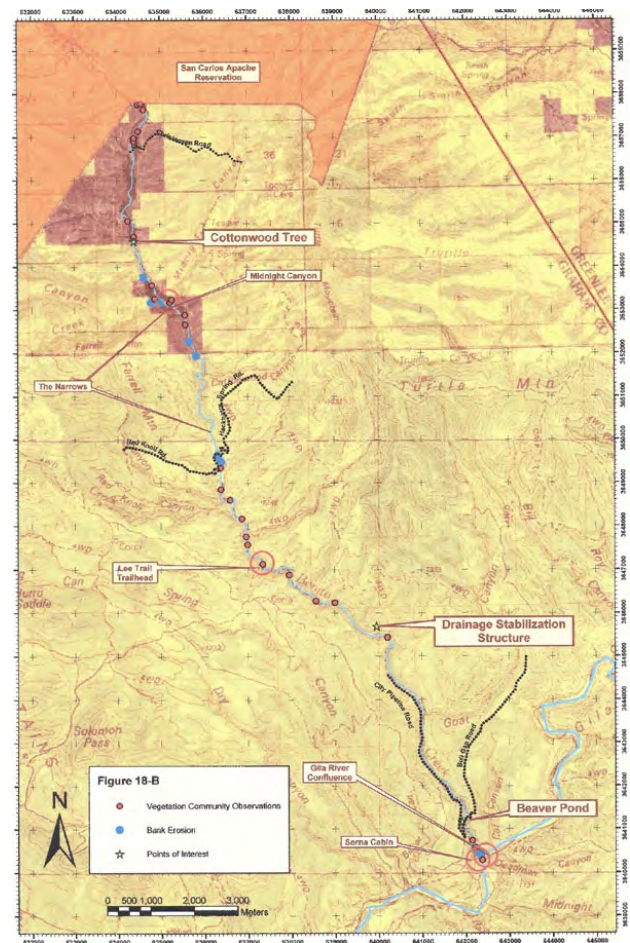
Project Description

Gila Box RNCA, or the “Box” was created in 1990 by Congress to protect two perennial waterways—the Gila River and Bonita Creek and is managed by the Bureau of Land Management. The location is twelve miles east of the City of Safford in Graham and Greenlee Counties. The area containing some 22,000 acres of public land is one of the most significant riparian zones in the southwestern United States and one of only two Riparian National Conservation Areas. Two segments, 8.1 miles of Bonita Creek and 23 miles of the Gila River, are designated as part of the National Wild and Scenic River System. This designation means management for wild and scenic values are to occur within 1/4-mile of high water mark. The scenic, steep-walled desert canyons surround the perennial rivers and creeks. The Box also includes small sections of Eagle Creek and the San Francisco River.

Surrounding lands are relatively unpopulated and rural. Nevertheless, the Box sees about 20,000 visitor-days per year. It is a goal to maintain dispersed recreation in order to reduce impacts by creating 15 to 35 relatively undeveloped sites. Such a large number of facilities including campgrounds, picnic areas, boat ramps, interpretive sites, overlook, parking areas, information kiosks, trails and roads, however, entails significant management efforts. In addition, there are several grazing allotments within the Box wherein cattle had historically been allowed to graze in the riparian zones. Intakes, pipes and pumps are being used to water cattle away from the riparian areas.

Project Goals

The legislation creating the Gila Box RNCA called for the “conservation, protection and enhancement of the riparian and associated areas within the conservation area for aquatic, wildlife, archaeological paleontological, scientific, cultural, recreation, educational, scenic, and other resources and



values.” Priorities have been given to revise and rebuild the extensive infrastructure in the area to maintain more pristine waterways and to manage recreation for the same effect. For this purpose, cattle have been restricted and removed from the riparian areas and water use and infrastructure has been revised to reduce their impacts. Similarly, the impacts of off-road vehicles have been limited by restricting their use in wetland areas and by closing or moving tracks.

Another priority is to maintain and/or enhance populations of threatened, endangered and other priority species. Population objectives will be

established in conjunction with the Arizona Game and Fish Department and U.S. Fish and Wildlife Service.

Biological Description

The riparian zones are Fremont cottonwood, Bonpland and Gooding's willow and Arizona sycamore riparian complexes in deep canyons with steep cliffs and colorful bluffs. Along Bonita Creek, there is a variable canyon side width with incised reaches. Mixed broadleaf riparian dominates with short stretches of mesquite bosque. Several extremely large trees of Fremont cottonwood, Gooding's willow, Arizona sycamore, Arizona walnut, hackberry, and western honey mesquite may be encountered within the Bonita Creek floodplain. One cottonwood measured 5.3 feet in diameter at breast height.

Population status of many of the animal species and the single plant species are unknown since few have recovery plans.

In addition to listed species, the program in the area maintains a priority list of species for management activities including bighorn sheep, javelina, mountain lion, black bear, wild turkey and Montezuma quail.

Invasive-exotic species are also part of the landscape at the Box. An extensive study of a 15-mile stretch of the Bonita Creek segment found 30 exotic species including four, field sowthistle (*Sonchus arvensis*), common purslane (*Portulaca oleracea*), morning-glory (*Ipomoea* sp.), and puncture-vine (*Tribulus terrestris*), that are listed as noxious by the NRCS. In addition, salt cedar (*Tamarix chinensis*), while not so listed is a significant invader causing management control activities. Infesta-

tions are located at 23 sites in this portion of the wetland reach in the Box.

Organizational Structure

The Box is managed from BLM offices in nearby Safford, which allows the management team to share equipment and specialized staff for GIS, maintenance and other duties. At present there are ten persons available to the site although many are shared with the regional office. These include the manager (M), a recreation specialist (RS), a law enforcement ranger (LER), a park ranger and river ranger (R), a fisheries biologist (FB), wildlife biologist (WB) archeologist (A), maintenance worker (MW) and GIS specialist. The management estimate assumes that all positions are in place based on management assessment of the needs of the project. (The manager who has previously been full time has been assigned an additional project which assumes that more staff members will be hired.)

In addition, the Box hires contractors for numerous roles from fence repair to monitoring. Volunteers assist with patrolling and repairs (V). An Advisory Committee (AC), which was part of the original legislation but has been inactive for some time, is being reconstituted and is expected to work on monitoring issues, cattle grazing, and to be helpful in community outreach. The range leaseholders or wranglers (W) assist with some monitoring, fencing and some invasive exotic control. In all, more than 15,000 hours are estimated to be needed for the long-term management at Gila Box.

Estimates of hours and their allocation were provided by the Gila Box manager. The cost figures are calculated using the midstep of the middle GS category for the type of employment adjusted

Threatened or Endangered

Common Name	Scientific Name	Population Status
Peregrine Falcon	<i>Falco peregrinus</i>	FE/SC FE/SE-3-5 birds in the RNCA
Bald Eagle (Wintering)	<i>Haliaeetus leucocephalus</i>	
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	SE/FC
Cactus Ferruginous Pygmy-Owl	<i>Glaucidium brasilianum cactorum</i>	ST/FC
Osprey	<i>Pandion haliaetus</i>	ST
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>	ST
Snowy Egret	<i>Egretta thula</i>	ST ST/FC-150-185 adults per mile
Gila Chub	<i>Gila intermedia</i>	
Razorback Sucker	<i>Xyrauchen texanus</i>	FE/SE-Reintroduced
Arizona Hedgehog Cactus	<i>Echinocereus coccineus</i>	From recovery plan

Candidate

Common Name	Scientific Name	Population Status
Southwest Cave Myotis	<i>Myotis velifer</i>	To be determined
Western Mastiff Bat	<i>Eumops perotis</i>	To be determined
Goshawk (wintering)	<i>Accipiter gentilis</i>	FC/SC
American Bittern	<i>Botaurus lentiginosus</i>	SC
Common Black Hawk	<i>Buteogallus anthracinus</i>	SC-Maintain 10 existing pairs
Belted Kingfisher	<i>Ceryx alcyon</i>	SC
Southwestern Toad	<i>Bufo microscaphus</i>	FC
Lowland Leopard Toad	<i>Rana yavapaiensis</i>	FC

upward by 30 percent for benefits. The specific pay for individuals is not known. Hours contributed by volunteers, the advisory committee and wranglers are also included and values assigned.

Habitat Management Tasks

Site construction includes the maintenance of roads and fencing. Because of ongoing grazing in the area, livestock exclusion fencing from the riparian areas is a major piece of infrastructure. Some 57 miles of five-strand barbed wire fencing is estimated. Additional facilities include water tanks, piping and pumps for the animals.

River crossing fencing is also used to keep cattle out of riparian areas but to allow boaters entrance. The type of fence is still be experimented with, however, a type of hanging fence is included in this estimate.

There are about 28 miles of access and internal two-lane roads that are gravel. An equal number of narrower access and internal roads are dirt. Neither are maintained to a high standard but must be regraded and rocked at intervals. It is expected that each square yard will be regraded once each ten years on average.

Hours for patrolling and planning for maintenance of infrastructure are part of the hours included in the estimate. The cost of the actual maintenance activity is contained in a single figure for materials, labor and equipment from the 2003 R.S. Means construction estimator.

Biotic Surveys

A number of surveys are in process or are planned for the Box including a fisheries baseline, aquatic habitat inventory, migratory bird surveys, breeding bird surveys, wildlife baseline, macro invertebrate sampling and upland vegetation monitoring. Some of these surveys occur every year but others occur at multi-year intervals. This is consistent with the intent of this estimate to focus on long-term requirements. Several positions contributed to the planning and to updating these surveys, however, contractors are used for most of the work. Hours for the contractors are based on the estimates found in the management plan.

Cultural Resource work is included in Biotic Surveys which skews the number for biological efforts significantly. Cultural resources including the structures require evaluation, patrolling and repair and maintenance.

Habitat Maintenance

Although a number of weeds occur at Gila Box, the most obnoxious is salt cedar or tamarisk and the majority of efforts are spent on it. Staff, volunteers, wranglers and contractors all are contributing to its control.

Public Services

The needs of the public are a significant part of the operations at Gila Box. The 20,000 yearly visitors have about 6 miles of dirt trail to traverse. A paved trail is also available for handicap use. Gravel parking lots serve trailheads and view locations. There are also two campgrounds with firepits, grills and picnic tables, and a group-use area for picnicing for a total of twelve developed areas and an estimated total of 50 picnic tables and grills. There are about 8 sets of permanent toilet facilities in the Box. Staff, volunteers and contractors all contribute to the maintenance of these facilities.

Besides directional kiosks, there are also interpretive signs, regulatory signs, location signs, trail signs and portal signs each with different purposes and standards. Signs are sometimes shot out or stolen which reduces their life. The PAR budget estimate is meant to include both maintenance and replacement.

General Maintenance includes roadside trash pickup provided by volunteers and contractors.

Reporting

Gila Box is required to report to Congress as well as prepare internal reports. Hours for this work are estimated for those responsible.

Office Maintenance

This category encompasses stocking and equipping the office. Staff fully dedicated to the Box area occupy about 850 feet of the office presently with



five employees. There are ten employees, however, the full-time equivalent is only about 6.5 persons. Therefore the total office size was estimated at 1,100 square feet. The rest of the standard office items are based on seven people so that seven desks, seven computers and so on are included. GIS software and GPS units may be shared across the larger office so that 30 percent is attributed to the Box.

Field equipment consists largely of vehicles. Presently, there are two presently with the ability to share others in the motor pool. With sharing, the number of vehicles assumed is 6.5 plus a ranger vehicle. There are also two ATVs. All other equipment such as backhoes and graders are included in the cost of maintenance for various types of infrastructure. This is appropriate since much of the heavy work is conducted by contractors and other equipment is shared with the regional office. There are also a number of boats, kayaks, rafts and a jon boat.

Operations includes time spent for personnel, contract, and financial management.

Habitat Management Cost Estimate

The total estimate for the Gila Box is \$928,000 per year including a 10 percent contingency which is the estimating default and an administrative charge of 20 percent which is management's suggestion based on BLM policies. As might be expected for this project, the largest category was in public services with some \$203,000 per year or some 24 percent of the total. Following this figure was site construction at \$176,000 and biotic surveys at \$123,000. Subtracting the cultural resource component of biotic surveys reduces the figure to approximately \$75,000 per year.

Endnotes

Meeting with Manager Bonnie Winslow onsite in October 2003 plus several follow-up conversations.

Gila Box Management Plan, Environmental Assessment and Decision Record, U.S. Bureau of the Interior, Bureau of Land Management, January 1998.

Report Providing for the Declaration of Certain Public Lands as Wilderness in the State of Arizona, House of Representatives, February 20, 1990.

Gila Box Riparian national Conservation Area Business Plan, December 2001

<http://www.nps.gov/ncrc/programs/rtca/nri/states/az.html>

Bonita Creek Noxious Weed Inventory Report Supporting the Gila Box Riparian National Conservation Area Monitoring Implementation Plan Project, August 25-31, 2003.

PAR Budget Table—Gila Box Riparian National Conservation Area—Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/MAINT.							175,947
Project Planning	Supervise/coordinate (M	L. Hours	90.00	45.00	1	4,050	
Project Planning	Supervise/coordinate (RS	L. Hours	180.00	28.00	1	5,040	
Project Planning	Supervise/coordinate (A	L. Hours	60.00	26.00	1	1,560	
Project Planning	Supervise/coordinate (FB	L. Hours	90.00	33.00	1	2,970	
Project Planning	Supervise/coordinate (WB	L. Hours	60.00	33.00	1	1,980	
Project Planning	Supervise/coordinate (GIS	L. Hours	90.00	23.00	1	2,070	
Project Planning	Advise and Plan (W	L. Hours	30.00	23.00	1	690	
Rough Grading	Grade Dirt Roads	Sq. Yd.	246,400.00	0.80	10	19,712	
Rough Grading	Grade/rock gravel roads	Sq. Yd.	246,400.00	3.00	10	73,920	
Fence - Installed	River crossing	Lin. Ft.	900.00	16.00	15	960	
Fence - Installed	Barbed-wire, 5 strd.	Lin. Ft.	300,960.00	5.00	35	42,994	
Gate, Cattle	5' X 12' gate	Item	30.00	695.00	30	695	
Other	Cattle Water Tanks	Unit	3.00	6,000.00	25	720	
Other	Cattle Water Piping	Lin. Ft.	116,160.00	4.00	25	18,586	
- BIOTIC SURVEYS							123,418
Project Management	Supervise/coordinate (M	L. Hours	90.00	45.00	1	4,050	
Project Management	Supervise/coordinate (FB	L. Hours	90.00	33.00	1	2,970	
Project Management	Supervise/coordinate (WB	L. Hours	60.00	33.00	1	1,980	
Project Management	Supervise/coordinate (AC	L. Hours	40.00	40.00	1	1,600	
Cultural Resource	Surveys (A	L. Hours	90.00	33.00	1	2,970	
Cultural Resource	Surveys (V	L. Hours	56.00	26.00	1	1,456	
Cultural Resource	Patrols (A	L. Hours	120.00	33.00	1	3,960	
Cultural Resource	Patrols (M	L. Hours	90.00	45.00	1	4,050	
Cultural Resource	Patrols (RS	L. Hours	90.00	38.00	1	3,420	
Cultural Resource	Patrols (LER	L. Hours	140.00	40.00	1	5,600	
Cultural Resource	Patrols (PR	L. Hours	180.00	23.00	1	4,140	
Cultural Resource	Patrols (RR	L. Hours	180.00	23.00	1	4,140	
Cultural Resource	Patrols (V	L. Hours	112.00	14.00	1	1,568	
Cultural Resource	Preservation (A	L. Hours	120.00	33.00	1	3,960	
Cultural Resource	Preservation (PR	L. Hours	180.00	23.00	1	4,140	
Cultural Resource	Preservation (RR	L. Hours	90.00	23.00	1	2,070	
Cultural Resource	Preservation (C	L. Hours	160.00	30.00	2	2,400	
Cultural Resource	Preservation Materials	Unit	1.00	3,000.00	1	3,000	
Cultural Resource	Evaluate Uses (A	L. Hours	30.00	33.00	1	990	
Fisheries Biologist	Fisheries Baseline (FB	L. Hours	180.00	33.00	1	5,940	
Fisheries Biologist	Fisheries Baseline (RR	L. Hours	90.00	23.00	1	2,070	
Fisheries Biologist	Fisheries Baseline (C	L. Hours	320.00	85.00	7	3,886	
Fisheries Biologist	Aquatic Habitat Inv (FB	L. Hours	135.00	33.00	1	4,455	
Fisheries Biologist	Aquatic Habitat Inv (C	L. Hours	240.00	85.00	5	4,080	
Fisheries Biologist	Upland Veg. Monitoring (FB	L. Hours	90.00	33.00	1	2,970	
Fisheries Biologist	Upland Veg. Monitoring (W	L. Hours	45.00	23.00	1	1,035	
Fisheries Biologist	Upland Veg. Monitoring (C	L. Hours	320.00	85.00	5	5,440	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Fisheries Biologist	Macro Invert Sampling (FB	L. Hours	45.00	33.00	1	1,485	
Wildlife Biologist	Macro Invert Sampling (PR	L. Hours	90.00	23.00	1	2,070	
Wildlife Biologist	Macro Invert Sampling (WB	L. Hours	30.00	33.00	1	990	
Wildlife Biologist	Migratory Bird Surv. (RR	L. Hours	90.00	23.00	1	2,070	
Wildlife Biologist	Migratory Bird Surv. (WB	L. Hours	30.00	33.00	1	990	
Wildlife Biologist	Migratory Bird Surv. (C	L. Hours	40.00	85.00	1	3,400	
Wildlife Biologist	Aquatic Habitat Inv (WB	L. Hours	60.00	33.00	1	1,980	
Wildlife Biologist	Breeding Bird Surv. (WB	L. Hours	60.00	33.00	1	1,980	
Wildlife Biologist	Breeding Bird Surv. (C	L. Hours	160.00	85.00	1	13,600	
Wildlife Biologist	Wildlife Baseline (WB	L. Hours	60.00	33.00	1	1,980	
Wildlife Biologist	Wildlife Baseline (C	L. Hours	800.00	85.00	15	4,533	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							42,880
Exotic Plant Control	Salt Cedar leader (RS	L. Hours	90.00	38.00	1	3,420	
Exotic Plant Control	Salt Cedar (PR	L. Hours	90.00	23.00	1	2,070	
Exotic Plant Control	Salt Cedar (RR	L. Hours	180.00	23.00	1	4,140	
Exotic Plant Control	Salt Cedar (FB	L. Hours	45.00	33.00	1	1,485	
Exotic Plant Control	Salt Cedar (RR	L. Hours	30.00	23.00	1	690	
Exotic Plant Control	Salt Cedar (AC	L. Hours	11.00	40.00	1	440	
Controlled Burning	Supervision (FB	L. Hours	30.00	33.00	1	990	
Other	Planning Coordinating (M	L. Hours	90.00	45.00	1	4,050	
Other	Planning Coordinating (RS	L. Hours	90.00	23.00	1	2,070	
Other	Planning Coordinating (A	L. Hours	30.00	33.00	1	990	
Other	Planning Coordinating (WB	L. Hours	90.00	33.00	1	2,970	
Other	Planning Coordinating (GIS	L. Hours	45.00	23.00	1	1,035	
Other	Grazing Trespass (M	L. Hours	90.00	45.00	1	4,050	
Other	Grazing Trespass (RS	L. Hours	90.00	28.00	1	2,520	
Other	Grazing Trespass (LER	L. Hours	70.00	40.00	1	2,800	
Other	Grazing Trespass (PR	L. Hours	180.00	23.00	1	4,140	
Other	Grazing Trespass (RR	L. Hours	180.00	23.00	1	4,140	
Other	Grazing Trespass (AC	L. Hours	11.00	40.00	1	440	
Other	Grazing Decision (AC	L. Hours	11.00	40.00	1	440	
- WATER MANAGEMENT							3,525
Water Testing	Quality testing	Report	10.00	1,200.00	5	2,400	
Water Testing	Quality testing (RR	L. Hours	180.00	23.00	5	828	
Water Testing	Quality testing (FB	L. Hours	45.00	33.00	5	297	
- PUBLIC SERVICES							203,055
Patrolling	River Patrol (RS	L. Hours	90.00	38.00	1	3,420	
Patrolling	River Patrol (LER	L. Hours	140.00	40.00	1	5,600	
Patrolling	River Patrol (PR	L. Hours	180.00	23.00	1	4,140	
Patrolling	River Patrol (RR	L. Hours	540.00	23.00	1	12,420	
Patrolling	River Patrol (V	L. Hours	168.00	14.00	1	2,352	
Patrolling	Officer Patrol (LEW	L. Hours	560.00	40.00	1	22,400	
Parking Area	Grade and rock	Sq. Yd.	1,100.00	3.00	1	3,300	
Trail, Asphalt	Install, 2" Asphalt	Sq. Ft.	3,000.00	1.00	40	75	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Trail, Asphalt	Sealer, Every 3rd Yr	Sq. Ft.	3,000.00	0.05	3	50	
Trail, Asphalt	Overlay	Sq. Ft.	3,000.00	0.60	15	120	
Trail	Maintenance	Lin. Ft.	31,680.00	3.00	15	6,336	
Trail	Trail/Sign planning/mtn (RS	L. Hours	90.00	38.00	1	3,420	
Trail	Trail/Sign planning/mtn (PR	L. Hours	90.00	23.00	1	2,070	
Trail	Trail/Sign planning/mtn (GIS	L. Hours	45.00	23.00	1	1,035	
Trail	Trail Major Repair (MW	L. Hours	60.00	30.00	1	1,800	
Trail	Trail/Sign mtn. (V	L. Hours	112.00	14.00	1	1,568	
Sign	Carbonite Regulator	Item	30.00	10.00	5	60	
Sign	Large Regulator	Item	20.00	200.00	5	800	
Sign	Directional Road Signs	Item	30.00	200.00	4	1,500	
Sign	Site Sign	Item	12.00	200.00	4	600	
Sign	Trail Sign	Item	15.00	50.00	4	188	
Sign	Portal Sign (entrance)	Item	6.00	1,000.00	10	600	
Sign, Metal	Metal 3" Trail Markers	Set of 100	1.00	55.00	5	11	
Sign, Redwood	Interpretive 6'X 12'	Item	9.00	2,500.00	15	1,500	
Kiosk, Redwood	Directional	Item	10.00	3,000.00	10	3,000	
Interpretive Literature	Creation (M	L. Hours	90.00	45.00	1	4,050	
Interpretive Literature	Creation (RS	L. Hours	90.00	38.00	1	3,420	
Interpretive Literature	Creation (PR	L. Hours	90.00	23.00	1	2,070	
Interpretive Literature	Creation (A	L. Hours	30.00	33.00	1	990	
Interpretive Literature	Creation (FB	L. Hours	45.00	33.00	1	1,485	
Interpretive Literature	Creation (GIS	L. Hours	45.00	23.00	1	1,035	
Interpretive Literature	Copy	Page	5,000.00	0.10	1	500	
Community Outreach	Relationships/Partners (M	L. Hours	450.00	45.00	1	20,250	
Community Outreach	Relationships/Partners (LER	L. Hours	70.00	40.00	1	2,800	
Community Outreach	Relationships/Partners (FB	L. Hours	45.00	33.00	1	1,485	
Community Outreach	Relationships/Partners (AC	L. Hours	34.00	40.00	1	1,360	
Community Outreach	Cattle Infrastructure (AC	L. Hours	11.00	40.00	1	440	
Community Outreach	Cattle Infrastructure (W	L. Hours	60.00	23.00	1	1,380	
Other	Picnic Tables Concrete	Unit	50.00	700.00	20	1,750	
Other	Grills	Unit	50.00	1,000.00	5	10,000	
Other	Planning Coordinating (M	L. Hours	90.00	45.00	1	4,050	
Other	Planning Coordinating (RS	L. Hours	270.00	38.00	1	10,260	
Other	Planning Coordinating (LER	L. Hours	140.00	40.00	1	5,600	
Other	Planning Coordinating (PR	L. Hours	90.00	23.00	1	2,070	
Other	Planning Coordinating (A	L. Hours	60.00	33.00	1	1,980	
Other	Planning Coordinating (FB	L. Hours	45.00	33.00	1	1,485	
Other	Planning Coordinating (WB	L. Hours	60.00	33.00	1	1,980	
Other	Planning Coordinating (GIS	L. Hours	90.00	23.00	1	2,070	
Other	Advisory Committee (M	L. Hours	90.00	45.00	1	4,050	
Other	Advisory Committee (GIS	L. Hours	45.00	23.00	1	1,035	
Other	Monitor Use Impacts (RS	L. Hours	90.00	38.00	1	3,420	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	Monitor Use Impacts (PR	L. Hours	36.00	26.00	1	936	
Other	Monitor Use Impacts (A	L. Hours	30.00	33.00	1	990	
Other	Monitor Use Impacts (V	L. Hours	56.00	14.00	1	784	
Other	Fee Collection/Compliance (LER	L. Hours	140.00	40.00	1	5,600	
Other	Fee Collection/Compliance (PR	L. Hours	180.00	23.00	1	4,140	
Other	Fee Collection/Compliance (V	L. Hours	112.00	14.00	1	1,568	
Other	Campground clean/mtn (RR	L. Hours	180.00	23.00	1	4,140	
Other	Campground clean/mtn (V	L. Hours	280.00	14.00	1	3,920	
Other	Campground major repair (MW	L. Hours	40.00	30.00	1	1,200	
Other	Campground clean/mtn (C	L. Hours	280.00	20.00	1	5,600	
Other	Read traffic counters (PR	L. Hours	54.00	23.00	1	1,242	
Other	Interp presentations (PR	L. Hours	90.00	23.00	1	2,070	
Other	Interp presentations (FB	L. Hours	45.00	33.00	1	1,485	
- GENERAL MAINTENANCE							17,109
Sanitation Control	Roadside collection (RR	L. Hours	90.00	23.00	1	2,070	
Sanitation Control	Roadside collection (V	L. Hours	224.00	14.00	1	3,136	
Sanitation Control	Roadside collection (C	L. Hours	224.00	20.00	1	4,480	
Hauling, Truck	Truckload	Item	23.00	57.50	1	1,323	
Trash Container, Rub-bermaid	18" X 24" toter	Item	4.00	250.00	10	100	
Toilets, Permanent	Replacement	Unit	8.00	15,000.00	20	6,000	
- REPORTING							29,675
GIS/CAD Management	Data Management (LER	L. Hours	140.00	40.00	1	5,600	
GIS/CAD Management	Data Management (FB	L. Hours	45.00	33.00	1	1,485	
GIS/CAD Management	Data Management (WB	L. Hours	60.00	33.00	1	1,980	
GIS/CAD Management	Data Management (GIS	L. Hours	90.00	23.00	1	2,070	
Agency Report	Reports to Congress (M	L. Hours	90.00	45.00	1	4,050	
Agency Report	In Agency (M	L. Hours	180.00	45.00	1	8,100	
Agency Report	In Agency (RS	L. Hours	90.00	38.00	1	3,420	
Agency Report	In Agency (A	L. Hours	90.00	33.00	1	2,970	
- OFFICE MAINTENANCE							22,461
Preserve Office	Construction Maintenance	Sq. Ft.	1,800.00	85.00	40	3,825	
Preserve Office	Janitorial	Sq. Ft.	1,100.00	0.20	30	7	
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	1,100.00	1.00	1	1,100	
Telephone Charges, Annual	Phone Charges	Person	7.00	1,200.00	1	8,400	
Insurance, Fire	Structure (Theft, Vandalism)	\$1000 Valu	153.00	0.04	1	6	
Office Supplies, Year	Stationery/envelopes	Person	7.00	125.00	1	875	
Office Supplies, Year	Supplies	Person	7.00	192.00	1	1,344	
Furniture	Desk	Item	7.00	250.00	10	175	
Furniture	Chair	Item	7.00	150.00	5	210	
Furniture	Bookcase, 3'x5'	Item	7.00	150.00	8	131	
Furniture	File cabinet	Item	7.00	400.00	10	280	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Copier	Copier, 15-18 ppm	Item	1.00	3,833.00	8	479	
Fax Machine	Standard	Item	1.00	400.00	5	80	
Telephone	Touch-tone	Item	7.00	95.00	5	133	
Answering Machine	Answering Machine	Item	1.00	100.00	5	20	
E-Mail	Services	Year	1.00	360.00	1	360	
Cellular Pager	Unit	Unit	7.00	120.00	5	168	
Computer, PC & Monitor	133 MHz Pentium	Item	7.00	1,600.00	4	2,800	
Computer software	Microsoft Office Pkg	Item	7.00	450.00	4	788	
Deskjet Printer	HP DeskJet 895	Item	3.00	399.00	6	200	
GIS ARC/INFO	GIS/GPS	Item	0.30	15,000.00	5	900	
Plotter	10 Color 24" X 36"	Item	0.30	3,000.00	5	180	
- FIELD EQUIPMENT							47,984
GPS, Rover & Base Unit	GPS/Corrected	Item	2.00	4,000.00	5	1,600	
Vehicle	Large Pickup	Item	6.50	28,000.00	8	22,750	
Vehicle	Ranger Vehicle	Item	1.00	45,000.00	8	5,625	
Vehicle	ATV 4-wd, high end	Item	2.00	7,260.00	6	2,420	
Vehicle	Fuel	Gallons	2,500.00	1.50	1	3,750	
Vehicle	Maintenance	Year	7.50	300.00	1	2,250	
Vehicle Insurance	Insurance	Year	7.50	1,100.00	1	8,250	
Camera 35mm/lens	Low-end camera	Item	1.00	520.00	5	104	
Binoculars	Binoculars 10 X 50	Pair	1.00	300.00	5	60	
Spotting Scope 40X	Scope, High-end	Item	1.00	300.00	10	30	
Tripod	Tripod	Item	1.00	130.00	8	16	
Boat	Rubber raft	Item	2.00	1,575.00	10	315	
Boat	Canoe	Item	2.00	600.00	10	120	
Boat	Jon boat, motor, trailer	Item	1.00	2,300.00	20	115	
Boat	Inflatable kayak	Item	2.00	850.00	6	283	
Radio, Mobile Unit	Radio, SP-50 UHF	Item	5.00	425.00	8	266	
Cellular Phone	Phone, Monthly charge	Item	5.00	30.00	5	30	
- OPERATIONS							37,260
Budgeting	Budget & reconcile (M	L. Hours	90.00	45.00	1	4,050	
Budgeting	Budget & reconcile (RS	L. Hours	360.00	28.00	1	10,080	
Other	Personnel (M	L. Hours	270.00	45.00	1	12,150	
Other	Personnel (RS	L. Hours	90.00	38.00	1	3,420	
Other	Personnel (PR	L. Hours	90.00	23.00	1	2,070	
Other	Purchasing (RS	L. Hours	90.00	38.00	1	3,420	
Other	Purchasing (PR	L. Hours	90.00	23.00	1	2,070	
Subtotal						703,313	703,313
Contingency @ 10%						70,331	
Administrative @ 20%						154,729	
Total						928,373	

Hassayampa River Preserve

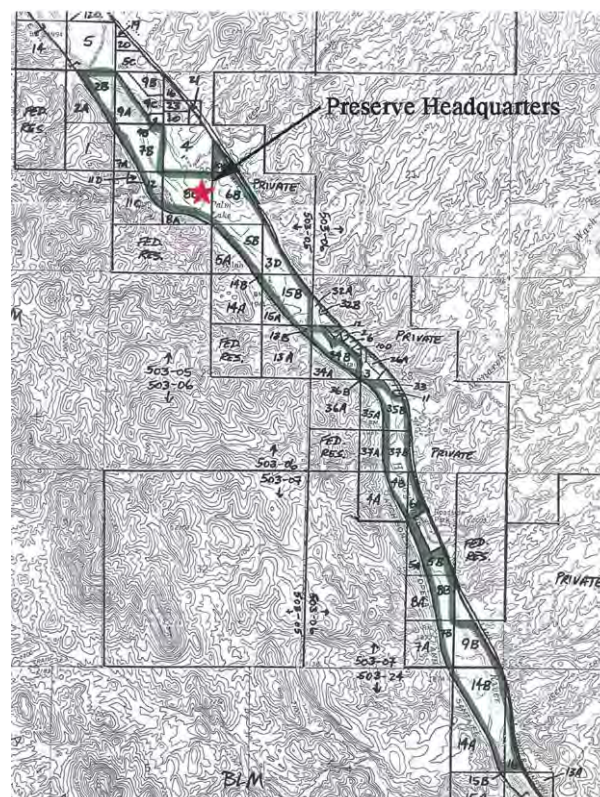
Property Description

The Nature Conservancy's Hassayampa River Preserve (HRP) is located along Highway 60, three miles southeast of Wickenburg, Arizona. The river starts near Prescott and ends with its terminus in the Gila River. The 333-acre preserve represents a unique location along the Hassayampa River as it is one of the only locations where there is perennial surface flow of water. For most of its 100-mile course through the desert, the Hassayampa River flows only underground, but within the preserve, the crystalline bedrock forces the clear waters to emerge, flowing above ground throughout the year. The perennial flow of water has resulted in a lush cottonwood-willow woodland that attracts many species of migrant birds and other wildlife. Adjacent to the riparian corridor is dense mesquite forests and associated Sonoran desert habitat.

The Hassayampa River Preserve was once the Frederick Brill Ranch, a cattle ranch, stagecoach station and orchard owned by a Russian immigrant around 1871. In 1913, the ranch became a guest ranch and in 1986 it became a private nature sanctuary owned by the Arizona Chapter of The Nature Conservancy (TNC).

The HRP is never more than a quarter-mile wide and is 5 miles long tucked between the highway and the railway tracks. The Hassayampa River flows through Palm Lake which occupies four acres. While originally a spring-fed cienega, the lake was dug out and a berm constructed around it circa 1960.

The purpose of the HRP is to protect this unique location along the Hassayampa River and all the wildlife species that depend on it. The primary focus at the HRP is public education and outreach. There is an on-site information center that includes a walk-through educational tour, native plant garden and research facility. The reserve receives 10,000 to 12,000 visitors every year many of whom visit to observe the abundant variety of



migratory birds. Funding for the HRP comes from donations to the national and state offices of TNC and on-site contributions.

Project Goals

TNC's primary management goal is to maintain and protect the perennial flow of water through the HRP. Other goals include maintaining or enhancing the populations of threatened and endangered species, enhancing habitat and public education. TNC has developed a site conservation plan, dated November 1998, which outlines the details of each goal and strategies to accomplish them. Management strategies include working with the local Wickenburg government and surrounding land owners to protect the upstream watershed, monitoring some of the site's resources and engaging

the public through guided tours, educational facilities and brochures.

Biological Description

The Hassayampa River Preserve is located within the Hassayampa watershed that drains about 1,500 square miles in southern Yavapai and western Maricopa Counties. The HRP's location is an important stretch of the river and surrounding habitat.

Primary vegetation communities at the HRP are Cottonwood-willow woodland and mesquite bosques. Although these communities are of very high quality, incursions of salt cedar (*Tamarix* sp.) were observed and a number of historical palms can be found near the preserves headquarters. A small spring-fed lake, Palm Lake, with a surface area of approximately four acres supports many species of waterfowl uncommon in the area but is inundated with non-native bullfrogs (*Rana catesbeiana*). The marshy pond habitat attracts an impressive array of water birds such as the great blue heron, white-faced ibis, and pied-billed grebe. The large willows around the lake provide important nesting habitat for the endangered southwestern willow flycatcher. More than 280 avian species have been documented at the HRP, including threatened and endangered species, such as the southwestern willow flycatcher (*Empidonax traillii extimus*) and yellow-billed cuckoo (*Coccyzus americanus occidentalis*). Other species of note include native fish, such as the longfin dace (*Agosia chrysagastor*).

Organizational Structure

The HRP is managed by TNC using a preserve manager and preserve steward. Preserve plans and earlier management practices indicated significantly more staffing suggesting four full-time personnel plus volunteers.

Staffing at the HRP currently includes 1.0-1.5 full-time employees (FTEs), a preserve manager and assistant preserve manager. The preserve manager commutes from Phoenix, nearly 80-miles, approximately three days per week and has 25-50 percent of his workload consisting of state and national TNC administrative duties. The assistant manager position is currently filled in a steward/custodian capacity with a half-time employee living in a small residence above the offices. However, in the past, TNC employed up to 4 FTEs, including a book store manager, public outreach coordinator

and wildlife biologists. The HRP has a historical house located on the preserve that functions as both a residence and visitor's center.

Since the foregoing indicated a wide arrangement of positions and staff members, the program estimate is based upon current views of long-term requirements. This includes a preserve manager (PM), an operations manager (OM), a preserve steward (PS), and a biologist (B). They are assisted by 4,600 hours of volunteer time. All volunteer time is valued at \$10 an hour in the estimate. The work breakdown is somewhat speculative given current staffing.

Habitat Management Tasks

There are extensive improvements at the site. There are about two miles of rocky dirt roads entering the site which must be graded. About three acres of dirt and rock parking lot is available for visitors. The site is protected with about six miles of 4-strand barbed wire fences and gates with the primary nuisance being vagrant cows. There are also about 1,000 feet of split rail fence along the road and around the parking lot. Maintenance of the fences is typically low; however, intermittent flooding during high rain events may damage, or entirely remove, large sections of fencing requiring extensive work to repair.

There are also several work-related buildings including a shop with 235 square feet, two storage sheds with 170 square feet, and a work ramada with 1,100 square feet. Replacement costs are estimates from the manager.

Although various biological surveys and monitoring activities have occurred in the past, the ongoing monitoring program is limited to bird surveys and water level records. Currently, bird surveys, including mist netting, is the primary monitoring activity. Water level monitoring and fish surveys are also conducted. The site conservation plan also discusses vegetation structure monitoring, upland characterization and invertebrate surveys. Each of these elements is included in the program to be conducted by a biologist/hydrologist and the volunteers with supervision from the preserve manager. The hours for each survey has been estimated by staff.

Although most of the HRP is in excellent condition, a few non-native plant species were observed. Palm Lake is presently dominated by palm trees reducing other species and creating a fire haz-

ard The Lake also contains bullfrogs. Salt cedar is particularly adapted to drought conditions and threatens willows and cottonwoods during those periods. The work requires planning and supervision by the preserve manager and biologist. They direct volunteers who remove both salt cedar and palms by hand.

There are no water structures in the project and no mechanisms for controlling flow other than the berm at the pond. However, the pond is being allowed to fill with sediment and vegetation and no maintenance of the berm is anticipated other than for safety. A 180 square foot structure once covered a spring and later pumps but now is only used for storage. There is a concern that water flows may change due to growth in the community. Work related to the water flows includes monitoring (contained in the biotic surveys) and outreach to the community and government officials (contained in public services).

An interpretive center, a parking lot, trails, a kiosk, interpretive center and restrooms require constant attention and all of the fixed facilities are of older design and specifications. Although the on-site facility is needing some repair, it is protected as a historical place and is not intended to be maintained as a modern structure. The office and visitor center occupy about 4,200 square feet with an 1,800-foot apartment on the second story. The Sanger Educational Building is 1,200 square feet and a guest house with 780 square feet complete the public spaces. The life given the structures is 40 years which works out to about \$17,500 in costs per year for all of the structures. This figure includes about 180 hours for the preserve steward and about 460 hours for the volunteers which at \$20 an hour is \$12,800 (this is only for comparison purposes; volunteers were valued at \$10 in the estimate). The remainder is for equipment and materials.

There are 3.25 miles of trails which need to be weed-whacked or mowed depending on their location and condition. Some of these are often flooded which creates some extraordinary work to rebuild and replace signage at those times.

A bookstore was operated in the past. This estimate assumes that the bookstore is open and staffed for business.

Public outreach is currently one of the larger expenses at the HRP. TNC spends considerable time on public education, outreach and community involvement. Hundreds of school children and

visitors go the preserve for field trips, environmental education and nature viewing. In addition, preserve managers work to protect surrounding properties and upstream water sources to help protect the preserve.

The HRP is very clean from debris and trash and typically does not require much-clean up on an annual basis. Volunteer groups are organized a few times each year to conduct preserve-wide clean-up efforts. Damage caused by stray cattle or flooding is very infrequent and would be difficult to assess annually.

According to the TNC manager on-site, no annual reporting to the government is required except for grant implementation and 501(c)3 reporting. TNC prepares annual budgets based on projected goals and tasks for the year. Although no GIS database is set up or is performed as part of management, equipment and labor was included in the estimate to improve data storage, retrieval and analysis of spatial information and to improve communication.

The current on-site facility with about 1,800 square feet has many of the office equipment and supplies needed to run a nature preserve. A typical office package of office equipment and supplies is included.

Field equipment required for management includes vehicles, ground water and surface water testing equipment (flow and content), GPS, mist nets and various tools and biological surveying equipment.

Habitat Management Cost Estimates

The total annual cost estimate for managing the HRP is estimated at \$453,000 per year including a 10 percent contingency and TNC's recommended administrative rate of 25 percent. Of this, volunteers comprise a significant amount (10 percent) of valuable labor totaling about \$46,000 at \$10 an hour. By far the largest component is Public Services with \$148,000 and Biotic Surveys with \$65,000. Operations constitute \$34,000 in accounting, personnel and grant management costs.

Since the bookstore is open, it should be assumed that some revenues would be derived from it. However, revenues are not known and are not included in this analysis.

Finally, staff notes that this is an ideal budget for the HRP.

End Notes

Meeting with Mike Rigney, Project Manager in September 2003.

Telephone conversations with Marty Lawrence, new Project Manager in February 2004. Labor estimates provided by Project Manager.

Amendment to the Site Conservation Plan for the Hassayampa River Preserve and Wickenburg Sonoran Desert Corridor, October 12, 1999.

PAR Budget Table—Hassayampa River Preserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							22,089
Road Construction & Repair	Grade	Day	1.00	638.00	1	638	
Fence - Installed	Barbed-wire, 4 strd. materials	Lin. Ft.	31,680.00	0.70	35	634	
Fence	Inspection/maintenance (PS	L. Hours	270.00	20.00	1	5,400	
Fence	Inspection/maintenance (V	L. Hours	920.00	10.00	1	9,200	
Gate, Bow Gate	Powder River, Bow	Item	1.00	925.00	35	26	
Lock	Padlock	Item	1.00	19.00	2	10	
Vehicle Barrier	Median Barrier	Lin. Ft.	1.00	45.00	45	1	
Road, Asphalt	Minor maintenance (PS	L. Hours	30.00	20.00	1	600	
Road, Asphalt	Minor maintenance (V	L. Hours	30.00	10.00	1	300	
Road, Asphalt	Sealer, Every 3rd yr	Sq. Ft.	211,200.00	0.05	10	1,056	
Road, Asphalt	Overlay, After 20 Yr	Sq. Ft.	211,200.00	0.60	30	4,224	
- BIOTIC SURVEYS							64,850
Project Management	Plan/Supervise (PM	L. Hours	180.00	45.00	1	8,100	
Project Management	Plan/Supervise (B	L. Hours	360.00	35.00	1	12,600	
Wildlife Biologist	Fish Surveys (B	L. Hours	180.00	35.00	1	6,300	
Wildlife Biologist	Vegetation Structure (B	L. Hours	450.00	35.00	1	15,750	
Wildlife Biologist	Flycatcher Surveys (B	L. Hours	180.00	35.00	1	6,300	
Wildlife Biologist	Flycatcher Surveys (V	L. Hours	230.00	10.00	1	2,300	
Wildlife Biologist	Upland Characterization (B	L. Hours	90.00	35.00	1	3,150	
Wildlife Biologist	Water level surveys (PM	L. Hours	90.00	45.00	1	4,050	
Wildlife Biologist	Water level surveys (B	L. Hours	90.00	35.00	1	3,150	
Wildlife Biologist	Invertebrate Fauna (B	L. Hours	90.00	35.00	1	3,150	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							16,700
Site Analysis	Planning/Supervision (PM	L. Hours	180.00	45.00	1	8,100	
Site Analysis	Planning/Supervision (B	L. Hours	180.00	35.00	1	6,300	
Exotic Plant Control	Palms-Hand Removal (V	L. Hours	92.00	10.00	1	920	
Exotic Plant Control	Salt cedar-Hand Removal (V	L. Hours	138.00	10.00	1	1,380	
- WATER MANAGEMENT							117
Levee Maintenance	Levee Maintenance	Lin. Ft.	50.00	126.00	100	63	
Other	Spring House	Sq. Ft.	180.00	3.00	10	54	
- PUBLIC SERVICES							148,181
Nature Center	Construction/Maintenance	Sq. Ft.	3,000.00	78.00	40	5,850	
Nature Center	Sanger Education Mtn.	Sq. Ft.	1,200.00	78.00	40	2,340	
Nature Center	Visitor Center Staff (OM	L. Hours	90.00	27.00	1	2,430	
Nature Center	Visitor Center Staff (V	L. Hours	920.00	10.00	1	9,200	
Residence	Guest House	Sq. Ft.	780.00	85.00	40	1,658	
Residence	Upstairs Apartment	Sq. Ft.	1,800.00	85.00	40	3,825	
Patrolling	Patrol (PS	L. Hours	180.00	20.00	1	3,600	
Parking Area	Sweep/Maintain (OM	L. Hours	24.00	27.00	1	648	
Parking Area	Sweep/Maintain (V	L. Hours	160.00	10.00	1	1,600	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Trail	Maintenance (PS	L. Hours	270.00	20.00	1	5,400	
Trail	Maintenance (V	L. Hours	460.00	10.00	1	4,600	
Kiosk, Redwood	4'x 3'	Item	1.00	1,200.00	10	120	
Volunteer Coordinator	Training (OM	L. Hours	180.00	27.00	1	4,860	
Volunteer Coordinator	Training (PM	L. Hours	360.00	45.00	1	16,200	
Docent Training	Volunteer Mgmt (PS	L. Hours	270.00	20.00	1	5,400	
Docent Training	Volunteer Mgmt (B	L. Hours	90.00	35.00	1	3,150	
Docent Training	Volunteer Mgmt (OM	L. Hours	270.00	27.00	1	7,290	
Interpretive Literature	Creation Update (PM	L. Hours	270.00	45.00	1	12,150	
Interpretive Literature	Creation Update (OM	L. Hours	270.00	27.00	1	7,290	
Interpretive Literature	Copy	Page	5,000.00	0.10	1	500	
Exhibit	Diorama	Sq. Ft.	50.00	248.00	10	1,240	
Exhibit	Flat Displays	Sq. Ft.	200.00	105.00	7	3,000	
Exhibit	Maintenance (OM	L. Hours	90.00	27.00	1	2,430	
Exhibit	Maintenance (PS	L. Hours	90.00	20.00	1	1,800	
Community Outreach	Education Programs (V	L. Hours	230.00	10.00	1	2,300	
Community Outreach	Education Programs (PM	L. Hours	270.00	45.00	1	12,150	
Community Outreach	Education Programs (OM	L. Hours	90.00	27.00	1	2,430	
Community Outreach	Nature Walks (V	L. Hours	690.00	10.00	1	6,900	
Community Outreach	Contacts/Meetings (PM	L. Hours	180.00	45.00	1	8,100	
Other	Bookstore mgmt (OM	L.. Hours	180.00	27.00	1	4,860	
Other	Personnel mgmt (OM	L.. Hours	180.00	27.00	1	4,860	
- GENERAL MAINTENANCE							4,149
Sanitation Control	Collection and disposal (PS	L. Hours	36.00	20.00	1	720	
Sanitation Control	Collection and disposal (V	L. Hours	230.00	10.00	1	2,300	
Other	Shop	Sq. Ft.	235.00	15.00	20	176	
Other	Storage Sheds	Sq. Ft.	170.00	15.00	20	128	
Other	Work Ramada	Sq. Ft.	1,100.00	15.00	20	825	
- REPORTING							5,030
Database Management	Data Input (OM	L. Hours	20.00	27.00	1	540	
GIS/CAD Management	Data Management (B	L. Hours	90.00	35.00	1	3,150	
Annual Reports	Summary (PM	L. Hours	20.00	40.00	1	800	
Annual Reports	Summary (OM	L. Hours	20.00	27.00	1	540	
- OFFICE MAINTENANCE							16,501
Preserve Office	Janitorial	Sq. Ft.	1,800.00	2.50	1	4,500	
Preserve Office	Construction/Maintenance	Sq. Ft.	1,800.00	85.00	40	3,825	
Utilities, Annual	Elec., Gas, Water , Phone	Item	1.00	1,000.00	1	1,000	
Telephone Charges, Annual	Phone Charges	Person	2.00	1,200.00	1	2,400	
Insurance, Structural	Structure	Item	3,000.00	0.20	1	600	
Office Supplies, Year	Supplies	Person	4.00	200.00	1	800	
Furniture	Desk	Item	3.00	250.00	10	75	
Furniture	Chair	Item	3.00	150.00	5	90	
Furniture	Bookcase, 3'x5'	Item	3.00	150.00	8	56	
Furniture	File cabinet	Item	1.00	400.00	10	40	
Copier	Copier, 15-18 ppm	Item	1.00	500.00	8	63	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Fax Machine	Standard	Item	1.00	100.00	5	20	
E-Mail	Services	Year	1.00	360.00	1	360	
Cellular Pager	Unit	Unit	2.00	120.00	5	48	
Cellular Pager	Services	Year	1.00	720.00	1	720	
Computer, PC & Monitor	Computers and peripherals	Item	3.00	1,600.00	4	1,200	
Computer software	Microsoft Office Pkg	Item	3.00	450.00	4	338	
Deskjet Printer	HP DeskJet 895	Item	1.00	399.00	6	67	
GIS ARC/INFO	GIS, PC based	Item	1.00	1,500.00	5	300	
- FIELD EQUIPMENT							18,205
GPS, Rover & Base Unit	GPS/Corrected	Item	1.00	5,000.00	5	1,000	
Surveying Equip.	Misc. Equipment	Item	1.00	2,400.00	5	480	
Vehicle	Small pickup	Item	2.00	22,000.00	8	5,500	
Power Tools	Mower/weedwhacker	Item	1.00	500.00	5	100	
Other	Water testing and flow meters	Item	1.00	15,000.00	8	1,875	
Other	misc tools and equipment	Item	1.00	2,000.00	8	250	
Other	Purchasing and equip. (PS	L. Hours	450.00	20.00	1	9,000	
- OPERATIONS							34,020
Project Accounting	Accounting/Budget (OM	L. Hours	360.00	27.00	1	9,720	
Project Accounting	Accounting/Budget (PM	L. Hours	90.00	45.00	1	4,050	
Project Accounting	Bookstore (OM	L. Hours	180.00	27.00	1	4,860	
Other	Grant apps/management (OM	L. Hours	90.00	27.00	1	2,430	
Other	Grant apps/management (PM	L. Hours	90.00	45.00	1	4,050	
Other	Personnel (OM	L. Hours	180.00	27.00	1	4,860	
Other	Personnel (PM	L. Hours	90.00	45.00	1	4,050	
Subtotal						329,841	329,841
Contingency @ 10%						32,984	
Administration @ 25%						90,706	
Total						453,531	

Jewel of the Creek Preserve

Property Description

The Jewel of the Creek Preserve (Preserve) is a 27-acre parcel of state trust land that was recently acquired by the Desert Foothills Land Trust. The Preserve is located just north of the town of Cave Creek, due north of Scottsdale, Arizona in Maricopa County.

The Preserve consists of a fairly steep ravine with one of the last remaining perennial streams in Maricopa County running through the bottomland. There is a well-developed riparian area, which quickly becomes upland desert within a few feet of topographical change. Saguaro cactus growing within feet of a dense thicket of willow, cottonwood and other riparian vegetation makes for an interesting and unique preserve. All five tree species found in riparian habitat of the Sonoran Desert ecosystem are found within the Preserve. The unusual year-round presence of water supports a myriad of plant and animal species. There is little salt cedar invasion. Red brome, Bermuda grass and heron's bill are the most common non-native invasive species.

There is a loop trail that traverses the steep slopes and winds down to the creek. A narrow bridge crosses a wet area. Public use is fairly high and expected to grow based on the goals for the site and a

proposed docent program. Public access is and will continue to be carefully monitored and managed. There is a limit of 30 visitors a day, with most coming in the winter months when the weather is more suitable. There could be as many as 5,000 visitors a year. Visitors are required to register with a phone call to the office. However the absence of gates may allow access at some locations.

Livestock grazing is not allowed and has not occurred for over a decade. Horses are not allowed. There are a number of archeological sites (primarily historic sites) within the Preserve.

The Preserve is fairly well protected by surrounding uses. The Spur Cross Ranch Conservation Area is adjacent to the Preserve to the north and west and is managed by the county. State Trust Land is to the south and east and there is one private residence adjacent to the Preserve to the north. An active equestrian center is near the site to the northeast. A dusty gravel road (Spur Cross Road) runs along the east border of the Preserve on top of the ridge. During the monsoon season erosion and runoff from the road cascades over the side and down into the ravine of the Preserve. This results in high trail maintenance.

Project Goals

The management objectives for Jewel of the Creek Preserve are:

- preserve the property in its natural state as open space, protecting the scenic vistas and riparian habitat including wildlife/vegetative communities present on the property;
- protect the cultural, historic, and prehistoric artifacts;
- implement/increase protected habitat areas;
- undertake plant restoration and/or other remediation deemed necessary to restore the property to its natural state;
- identify, document and monitor natural features and attributes of the property, including



but not limited to wildlife/vegetative communities, water quality, water quantity and species diversity;

- enhance present and future groundwater supplies;
- make the property available to scientific and environmental communities for scientific pursuits and research studies;
- implement prudent and appropriate passive public access, as determined after comprehensive evaluation and via the master planning process coordinated in conjunction with the Town of Cave Creek and Maricopa County; and
- develop a sustainable trail system so that safe public access can be granted according to a stipulation required by Arizona State Parks to comply with the Growing Smarter Grant program.

The Preserve was acquired from the state of Arizona and carries a number of restrictions and covenants. They include confining the use to conservation purposes, permitting only activities that support conservation values and other restrictions that are embodied in the Preserve goals.

Biological Description

The Jewel of the Creek Preserve is located within a transition zone between the Basin and Range Provinces of southern Arizona and the Colorado Plateau. This range is called the Central Mountain Zone. Elevations within Jewel are between 2,200 and 2,400 feet. Cave Creek runs through the Preserve from the northeast to the southwest for about one-half mile.

The vegetation is Sonoran Desert scrub, but because the area experiences occasional hard winter frosts some species common to the lower areas of the Sonoran Desert cannot survive.

The riparian habitat provides areas for wildlife for breeding and rearing young, water, forage, escape cover and travel corridors. There is a comprehensive species list for plants, fish, reptiles, mammals, and birds. The southwest willow flycatcher (*Empidonax trailii extimus*) has been sighted and the area provides habitat for the lowland leopard frog (*Rana yavapaiensis*) – a state species of special concern.

All five riparian tree species in Arizona are found on the Preserve: Goodding's willow (*Salix gooddingii*), Fremont cottonwood (*Populus fremontii*), Arizona black walnut (*Juglans major*), Arizona sycamore (*Platanus wrightii*) and Arizona ash

(*Fraxinus velutina*). Fire is a concern on the site. Due to the close proximity of the Preserve to the town limits, a fire hydrant will be installed in the future.

Organizational Structure

The Jewel of the Creek Preserve is owned and managed by the Desert Foothills Land Trust, a non-profit organization with three employees. The Land Trust currently manages 12 other preserves.

The Land Trust has numerous volunteers and plans an extensive docent program based out of Jewel of the Creek. As a non-profit, the Land Trust receives many donations of professional services and goods that help them accomplish their mission.

The mission of the Desert Foothills Land Trust is to protect and preserve sensitive land areas in perpetuity, helping to ensure the survival of the unique plants and wildlife of the fragile Sonoran Desert.

Habitat Management Tasks

Approximately 2,300 hours are spent conducting on-going management at the Jewel of the Creek Preserve including staff and volunteers. The amount of time spent at Jewel is higher than expected for a 27-acre preserve due to the active volunteer program and a significant management program based on the goals. Volunteers participate in almost all aspects of preserve management.

A docent program has been proposed to train 20 volunteers a year and comprises two training programs of 40 hours each. The docent program is estimated to take 150 hours to prepare and deliver each year (80 hours actual classroom delivery and 70 hours to recruit and train trainers, market the program, register participants, coordinate trainings, and so on). Once trained, the docents would spend over 180 hours delivering programs at the various projects each year. Since the proposed program will mostly benefit Jewel, eighty percent of this time will be allocated here or 120 hours for training and 150 hours for docent tours respectively.

The Preserve was recently acquired and the Land Trust is working hard to reroute the trail, remove weeds and conduct other restoration projects. They expect to have all the restoration complete within a few years and then just maintain the site, which will consist primarily of trail maintenance.

There are no major on-going habitat maintenance tasks. Even so, about 540 hours are expected to be devoted to trail maintenance (500 is volunteer time.) Although the trail is short (0.8 miles) it is steep and erodes with the rainstorms.

Two hundred forty hours are spent conducting regular site visits to monitor the area. This number is much higher than one would expect and is due to the active/eager volunteer force and good site access. Only 70 hours are projected to be needed to conduct habitat maintenance annually due to the restoration work occurring now and the small amount of non-native invasive species.

Special events will occur at Jewel and are calculated to take about 180 hours a year with the time divided amongst staff and volunteers.

There are very few facilities and little equipment used at Jewel so costs of these are negligible. There will be a temporary irrigation system to water restoration areas but it was not counted as part of the on-going maintenance.

Jewel is estimated to be 20 percent of the total office maintenance and 20 percent of the administrative budget. For instance, the conservation director spends about 20 percent of his time managing Jewel with weekly site visits lasting about two hours. The time spent on-site is divided into specific tasks. An administrator/project manager's time is also estimated to be 20 percent at Jewel. The executive director was expected to spend 10 percent of his time working on issues at Jewel. Some tasks such as updating the management plan take a little longer than expected because volunteer committees participate in their development. Enforcement would be conducted by the sheriff, but there have not been enforcement problems.

Habitat Management Cost Estimates

The cost of managing the Jewel of the Creek Preserve is \$57,000. Almost \$33,000 is labor costs with much of that in volunteer time. Public services including the new docent program, signs, trail maintenance and community outreach accounts for over \$18,000. Office maintenance costs including rent account for over \$8,000 as did administrative costs including insurance, fundraising and employee travel time.

A 10 percent contingency is included. Because most executive and staff hours are accounted for in the estimate, an administrative rate of only 20 percent was used which would account for some

staff time and the board of director's contributions for legal, financial and public relations activities. This proportion, however, is likely to increase as the organization grows.

End Notes

Davis, Jacky; Peterson, Dave, et. al. Jewel of the Creek Preserve Management Plan. Undated.

Personal Communication, Thom Hulen, Executive Director and Robin Kilbane, Program Manager, February 13, 2003.

Website: <http://www.dflr.org/>

PAR Footnotes

1. Cost is PAR default.
2. Replacement time is estimate.
3. Number is estimated.
4. Cost is estimated based on internet search, supply catalogs or other.
5. Cost is estimated by PAR operator.
6. Rent includes utilities.
7. Jewel is estimated to be 20 percent of office management budget.
8. There is a 0.85 mile loop trail that will require regular maintenance due to the steepness of the terrain and the erosion from monsoon rains.
9. There is approximately 4,000 feet of barbed wire fencing along the east and south borders of the site.
10. The parking lot is small, approximately 175 feet by 100 feet and is gravel.
11. There is a short bridge 21 feet by 2 feet over a wetland. It is built to float, but will likely have to be repaired or replaced every year or two.
12. Interpretive materials are estimated to be 5000 copies of 3 pages.
13. Personnel use their own vehicles. There are an estimated 52 trips to the site. It is 12 miles roundtrip. Roundtrip time is a half hour.
14. A new docent program is proposed. Approximately 80 percent of the cost and the benefit is allocated to Jewel. Training plus preparation and updating of the program will take a total of 150 hours of which 120 are allocated here. Initial development of the program is not counted because it is a one-time cost. Once trained, the docents will conduct two 2-hour tours per weekend day for a total of 8 hours of docent work for the 23 weeks of the high season for a total of 184 hours of interpretive tours of which 150 hours will be spent at Jewel.
15. Fundraising is a critical part of operations at Jewel.
16. Special events are or will be held at Jewel such as a bird festival. Volunteers do much of the work.
17. Project management includes supervision and planning for all projects. It includes a portion of the monthly committee meetings attended by approxi-

mately 8 volunteers who assist in providing oversight to projects.

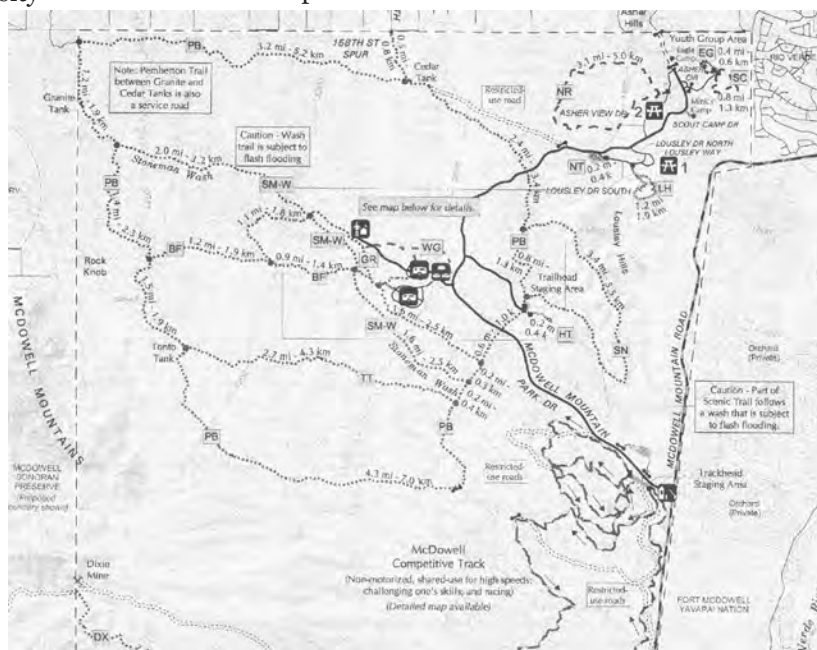
18. Monitoring includes volunteers and staff on the look out for trespassors as well as biological monitoring for plants and animals and updating photo points.
19. Outreach is done by the conservation director meeting with neighbors, adjacent town representatives, the county and delivering talks to interested groups. The executive director and administrator also do outreach for Jewel.
20. There are very few weeds on the site and managers expect to have them controlled in a few years. This time was put in for annual weeding of any new infestations and is done by volunteers and the conservation director.
21. The management plan update hours are high because of the involvement of the volunteer committee which would help edit the report.
22. This represents site visits by the executive director. The conservation director visits the site nearly every day and his time is accounted for by task.
23. Hand tools include hammer, screwdriver, shovel, hoe, weeder.

PAR Budget Table—Jewel of the Creek Preserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							616
Road Construction & Repair	re-gravel Parking lot (10	Yards	162.00	3.00	2	243	
Fence - Installed	Barbed-wire, 4 strd. (9	Lin. Ft.	4,000.00	3.00	35	343	
Gate, Cattle	5' X 12' gate	Item	1.00	695.00	30	23	
Gate	Chain Link	Item	1.00	200.00	30	7	
- BIOTIC SURVEYS							4,770
Project Management	Supervise/coordinate (17	L. Hours	65.00	18.00	1	1,170	
Other	All Monitoring (18	L. Hours	240.00	15.00	1	3,600	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							1,890
Conceptual Plan	Project planning	L. Hours	40.00	21.00	1	840	
Exotic Plant Control	Hand Removal, Labor (20	L. Hours	70.00	15.00	1	1,050	
- WATER MANAGEMENT							
- PUBLIC SERVICES							18,465
Boardwalk	Bridge replacement (11	Sq. Ft.	42.00	8.00	2	168	
Trail	Maintenance (8	L. Hours	560.00	15.00	1	8,400	
Sign, Aluminum	4x6 Entry (5	Item	1.00	200.00	7	29	
Sign	Bronze memorial (5	Item	1.00	500.00	10	50	
Sign, Metal	Interpretive, porcelain (5	Item	4.00	2,500.00	10	1,000	
Sign, Metal	5"x7" Plant Id (5	Item	24.00	20.00	10	48	
Sign, Metal	Boundary	Item	10.00	20.00	5	40	
Bench	Recycled Plastic (1	Item	1.00	600.00	5	120	
Volunteer Coordinator	Class Preparation (14	L. Hours	120.00	19.00	1	2,280	
Interpretive Literature	Copy (12	Page	15,000.00	0.03	1	450	
Community Outreach	Docent Tours (14	L. Hours	150.00	10.00	1	1,500	
Community Outreach	Meetings (19	L. Hours	80.00	21.00	1	1,680	
Other	Special Events (16	L. Hours	180.00	15.00	1	2,700	
- GENERAL MAINTENANCE							1,918
Project Management	Supervise/coordinate	L. Hours	65.00	21.00	1	1,365	
Trash Container	Plastic 30 Gal.	Item	1.00	13.00	5	3	
Other	Volunteer clean up	L. Hours	55.00	10.00	1	550	
- REPORTING							1,286
Annual Reports	Summary	L. Hours	40.00	25.00	1	1,000	
Management Plan	Update Management Plan (21	L. Hours	100.00	20.00	7	286	
- OFFICE MAINTENANCE							8,455
Administrative	Operations	L. Hours	175.00	21.00	1	3,675	
Preserve Office	Rent (6 (7	Annual	0.20	11,064.00	1	2,213	
Telephone Charges, Annual	Phone Charges (7	Annual	0.20	3,600.00	1	720	
Office Supplies, Year	Stationery/envelopes (7	Person	1.00	125.00	1	125	
Office Supplies, Year	Supplies (7	Person	1.00	192.00	1	192	
Furniture	5 Desks (7	Item	0.20	1,250.00	10	25	
Furniture	15 Chairs (7	Item	0.20	2,250.00	5	90	
Furniture	5 Bookcase, 3'x5' (7	Item	0.20	750.00	8	19	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Furniture	5 File cabinets (7	Item	0.20	2,000.00	10	40	
Copier	Copier, rental (7	Annual	0.20	3,000.00	1	600	
Fax Machine	Standard (7	Item	0.20	400.00	5	16	
Telephone	5 Touch-tone (7	Item	0.20	475.00	5	19	
Computer, PC & Monitor	5 Standard (1(7	Items	0.20	10,500.00	4	525	
Computer software	5 Microsoft Office Pkgs (1(7	Items	0.20	2,250.00	4	113	
Computer software	Remote data backup (7	Annual	0.20	420.00	1	84	
- FIELD EQUIPMENT							114
Camera 35mm/lens	Mid-range camera	Item	0.20	500.00	5	20	
Binoculars	Binoculars, Low-end 10 X 50	Pair	0.20	160.00	5	6	
Handtools	Miscellaneous (23	Set	5.00	70.00	4	88	
- OPERATIONS							5,771
Audit	Annual audit (7	Annual	0.20	5,200.00	1	1,040	
Budgeting	Budget & reconcile	L. Hours	25.00	25.00	1	625	
Supervisor Site Visit	Site visits (22	L. Hours	30.00	27.00	1	810	
Travel	Mileage (13	Miles	624.00	0.37	1	231	
Travel	Time (13	L. Hours	26.00	25.00	1	650	
Other	Fundraise (15	L. Hours	35.00	25.00	1	875	
Other	Insurance (7	Annual	0.20	7,700.00	1	1,540	
Subtotal						43,283	43,283
Contingency @ 10%						4,328	
Administration @ 20%						9,522	
Total						57,134	

McDowell Mountain Regional Park



Project Goals

The mission of the Parks and Recreation Department for Maricopa County is to provide recreational and educational opportunities while protecting park resources for residents and visitors so they can enjoy a safe and meaningful outdoor experience. The purpose and goals of the education and recreation program is to provide natural resource interpretation and unique recreation facilities and opportunities so people can appreciate and enjoy the natural environment and have a healthy and exhilarating outdoor experience.

A deed restriction limits the use of the site to parks and recreation purposes only. Other uses may be authorized only where no conflict is demonstrated.

Biological Description

The Park's elevation ranges from 1,550 feet at the southeastern corner, to 3,100 feet along the western boundary.

The Park experienced a lightning caused fire in 1995 that burned over 14,400 acres (over 62 percent) of the Park. The fire (called the Rio Fire) did not damage any infrastructure at the Park due to careful vegetation management around all structures and facilities. Fires occur very rarely in the Sonoran Desert due to the dominance of widely-spaced trees and shrubs that are unsuitable for burning. However, once burned, the effects on the ecosystem may be extreme.

Areas studied after the fire show that significantly more native plant species were burned than non-native plants (94 percent of the burned plant species were native.) The data seem to indicate that the researchers counted species rather than biomass so it is unclear whether the volume of fuel was native vs. non-native plants. There was little information provided on the extent of any non-native invasive species problems.

Major restoration after the fire was determined to be unfeasible due to the size of the burned area. Although it is estimated to cost \$12 million dollars to reseed the area, the strategy is to allow nature to take its course. Some monitoring has been done by local schools to determine what plants survived or are coming back. Park staff note that the area is greening up after recent rains, but data was not provided on the type of plants coming in. Non-natives were noted in several locations. Saguaro cacti are still seen throughout the Park, although many are dead or dying after the fire.

There are no listed species at the Park. Wildlife in the Park includes mule deer, javelina, coyotes, bobcats, occasional mountain lion, cottontail rabbits, jack rabbits, Gila monsters, western diamondback rattlesnakes, Mohave rattlesnakes, blacktail rattlesnakes, lizards and ground squirrels. Common birds at the Park include Anna's hummingbird, Gambel's quail, Harris hawk, northern cardinal, and roadrunner among others. There are several archeological sites within the Park.

Organizational Structure

McDowell Mountain Regional Park is owned and operated by Maricopa County Parks and Recreation Department. There are five full-time employees working at McDowell Mountain. They include the park supervisor, and interpretive ranger, administrative staff person, and two maintenance workers. There is a new half-time worker that is needed to fulfill the educational mission of the Park and manage volunteers and another half-time person to conduct vegetation and wildlife monitoring that is currently only being done occasionally by volunteers from local schools and colleges. Also, there is an extensive park host system with an average of 20 volunteers (camp hosts) living and working part-time at the Park.

Habitat Management Tasks

Approximately 22,900 hours annually are spent working on the long-term management of the Park. This time is divided among the employees with 11,800 hours and 9,600 hours from volunteer hosts, 1,500 hours from other volunteers, community service workers and inmate crews. The total includes some specific work done by the county offices.

The major tasks at the Park include administration, maintenance and outreach. Administration accounts for over 35 percent of the time, but is broadly defined to include fee collection, reporting, training and supervision. Maintenance accounts for about 30 percent of the time and includes landscape maintenance (including weed control), facilities, restrooms, trails and fencing. Outreach was calculated to take nearly 30 percent of the total time and is also broadly defined to include interactions with campers, event management, permits, phone, website, marketing and educational programming and delivery. The PAR breaks each of the major categories into specific tasks.

Some restoration is occurring after the Rio Fire in 1995. This restoration is not counted as a long-term management cost. However, monitoring to determine levels and concentrations of invasive exotic species, expansion or contraction of natural communities, presence of species and impacts of recreational use was added to the program to better understand the biological changes of this area. It is estimated that these surveys would readily consume a half-time specialist.

Salaries were averaged when higher and lower paid staff or volunteers did the same task.

As is often the case, there may be some error in estimating major capital costs and maintenance particularly for fencing. The replacement cost includes both materials and labor, while labor for inspecting and maintaining the fence is also included. Certainly inspection labor is a reasonable addition. However, labor for annual maintenance may be double-counted to some extent. Annual maintenance does not include materials which may offset any potential double counting.

Habitat Management Cost Estimates

The total cost of average on-going management of the Park is estimated at \$795,000 per year.

Public services account for over \$300,000 with community outreach accounting for over \$40,000 annually and volunteer training costing nearly \$20,000. Collection of fees costs nearly \$30,000 per year. Over \$60,000 was set aside annually for restroom replacement. Restroom and other supplies for the public is budgeted at \$13,000 and sealant for the parking lot is estimated at \$17,500 per year. Trail maintenance is another public service costing approximately \$17,600 per year.

Water and electricity costing \$12,000 per year serves the campgrounds and other facilities including the office. Because the majority is used for the public, it is included in the public services category.

Office maintenance activities accounted for almost \$69,000 with staff time for operations, replacement costs for equipment, fees for services and replacement and maintenance costs of the office/shop compound.

General maintenance including facility and landscape maintenance and restroom cleaning totaled nearly \$59,000. Fence maintenance was calculated at an additional \$13,000. Field equipment totaled nearly \$30,000 yearly. Weeding non-native

exotic invasive species was separately calculated to cost \$14,500. Biological monitoring (which is not currently in the workplan) was added at a cost of nearly \$30,000 a year. Completing and submitting reports totaled over \$10,000.

Total cost includes a contingency of 10 percent and the default administrative overhead fee of 22 percent. The administrative fee was used as an indication of the legal, personnel, and administrative support provided by the main parks office.

End Notes

Personal contact Rand Hubbell, Manager and Paul Marusich, Interpretive Ranger, February 11, 2004.

Employee Performance Results Planning & Alignment Worksheet. February 27, 2003.

Integrated Contingency Plan, McDowell Mountain Regional Park. AMEC Earth & Environmental, Inc. Phoenix, AZ August 29, 2002.

Maps: Of campsites, Park, Competitive Track, hunting area.

Maricopa County Parks and Recreation Department Attendance Report 2003-2004.

McDowell Mountain Regional Park Rio Fire Recovery Summary, December 13, 1995.

McDowell Mountain Regional Park Bird Viewing Guide. 1999.

McDowell Mountain Regional Park plant list. Undated.

McDowell Mountain Succession Study Progress Report. Fall 1995 – Spring 1997. Fountain Hills High School.

Memo: July 17, 1995. From Ken Mouw. Subject is Lessons Learned from McDowell Fire.

Memo: September 14, 1995. From Bob Skaggs. Subject is a presentation to the McDowell Park Association.

Phase I Environmental Site Assessment, McDowell Mountain Regional Park. Roy F. Weston, Inc., Phoenix, AZ. October 2000.

Staff job descriptions, undated.

Trail System Plan, McDowell Mountain Regional Park. Maricopa County Parks and Recreation Department. July 1999.

Website: <http://www.maricopa.gov/parks/mcdowell>

PAR Footnotes

- 1 Cost is PAR default.
- 2 Replacement period is estimate.
- 3 Number of units is estimated.
- 4 Picnic table cost includes shipping.
- 5 New playground equipment was recently installed. Site preparation cost an additional \$10,000 but this cost was one-time and was not counted.
- 6 There is one entry station with a restroom that is about to be replaced at an estimated cost of \$250,000.

- 7 Supplies include toilet paper, light bulbs, cleaning supplies for restrooms. The cost is the annual budget for these items.
- 8 There are 12 miles of paved 2-lane road.
- 9 Campsites include water, electric hook-up, picnic table, grill, sealed dirt surface and curbing.
- 10 Cost is estimated based on internet search, supply catalogs or other.
- 11 Maricopa County and the EPA require that the dirt parking lots and open dirt areas be sealed. The sealer is supposed to last 5 years, but management thinks it will only last 3. There is a 30-acre parking lot and an estimated additional 10 acres of area to be sealed. Prices for the sealer came from news articles on the internet and are estimates.
- 12 There is 250 feet of double bar metal railing along the nursery pond. Cost per foot of metal piping is estimated at \$3.25 based on internet prices. Price was doubled to account for both bars. Railing requires painting.
- 13 This is only one simple 4 post/metal roof shade structure now. Management wants to add 24 more. Cost is from management.
- 14 There is one simple amphitheater with sloped sides and a covered concrete pad with electricity. Cost is an estimate for replacement.
- 15 The restrooms with showers are 2020 sq. ft. Some restrooms are currently being replaced, the cost is from management.
- 16 Hands tools include: 12 shovels, 14 rakes, 2 rock bars, 10 brooms, 8 hoes, 8 pruners, and 3 saws.
- 17 Power equipment includes welder arc, drill press, grinder, various saws and a sander.
- 18 There are 19 miles of 4-strand barbwire fence surrounding the property and 1 mile of fence around the nursery pond. Monitoring and maintenance of the fence is divided between hosts and staff.
- 19 The office is a steel building with a concrete floor, divided into an office and a shop. Includes restrooms. Replacement cost is estimate.
- 20 Includes water and electric costs for all public uses (restrooms, camp sites, group camp sites.)
- 21 This is the amount budgeted for fuel annually.
- 22 Administrative duties includes running errands, collecting mail, meetings, email, general paperwork, ordering supplies, counting money from fees, requisitions etc. Time is divided among staff and volunteers with 1920 hours attributed to the hosts, 324 to manager, 288 each to admin. and interpretive staff and 150 to maintenance staff.
- 23 Numerous reports are maintained including weekly revenue reports (cash receipts from entry and camping fees), monthly attendance, quarterly reports, visitor statistics, and inventories.
- 24 Two hosts staff the entry dialy for 26 weeks.
- 25 There are various types of interactions with campers. Hosts spend 1920 hours answering questions and assisting campers. The maintenance crew spends about 80 hours. The manager and interpretive ranger spend 408 hours patrolling and overseeing the site and an additional 200 hours overseeing larger events. The manager spends approx. 208 hrs issuing public use permits.
- 26 There are several animals cared for by Park staff for use in the interpretive program. The animals include those that require state permits - such as a rattle-snake.
- 27 There is no dedicated volunteer coordinator. A half-time position was added in the PAR to assist the interpretive ranger.
- 28 There are 52 miles of trail and 15 miles of competitive track. Hours are split as follows: hosts 403; maintenance crew 270; and other volunteers 500 hours. There is a short barrier free trail around a pond that is leveled by hand and stabilized every 3 years.
- 29 External outreach, meetings, marketing, website maintenance, talks and presentations are done by the manager and the interpretive ranger (312 and 192 hours respectively).
- 30 There is very little monitoring conducted for weeds, rare plants, habitat or wildlife. Considering the resource purpose included in the project's mission, at minimum, invasive exotic species should be located. A part-time position was added to the PAR for regular invasive exotic surveys, plus changes in natural communities size and location and specified plant and animal population and distribution surveys.
- 31 The manager does the planning with assistance from administrative staff.
- 32 This task is conducted by staff at the main county office.
- 33 Landscape maintenance includes clearing brush and weeds for fire protection around all facilities, and tree pruning and maintenance. Removal of exotics for habitat protection was broken out and placed under the Habitat Maintenance section. Time is divided between hosts and staff.
- 34 Facility maintenance includes upkeep for the office/shop, roads, parking lots, and all other facilities on site except public restrooms, trails and fences. Time is divided between hosts and staff.
- 35 A contractor maintains the pump station that provides water to the site.
- 36 The pump station is for water delivery to the entire Park. The cost is an estimate.
- 37 Cost is an estimate provided by management.
- 38 Maintenance of 11 large public restrooms; 5 with showers.
- 39 There is a vehicle wash rack that has an oil/water separator. Cost is estimated.
- 40 Kiosks are simple wooden structures with maps and other information laminated and pinned to board.
- 41 Buried pipe carries the water from a pump station to the camp sites. The amount of pipe is estimated and the cost is the PAR default. There are an estimated 100 water spigots to serve the campsites and other areas. Their cost is estimated.
- 42 Safety classes required by Maricopa County.
- 43 Fee for collection and pickup services.

PAR Budget Table—McDowell Mountain Regional Park Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							31,526
Plans Drawn	Landscape design (32	L. Hours	40.00	30.00	1	1,200	
Fence - Installed	Barbed-wire, 4 strd. (1(18	Lin. Ft.	105,600.00	3.00	35	9,051	
Fence	Barbed-wire, Maint. (18	L. Hours	983.00	14.00	1	13,762	
Gate	Double gate (1	Item	9.00	1,200.00	30	360	
Gate	Standard (1	Item	7.00	695.00	30	162	
Lock	Padlock (1	Item	20.00	19.00	2	190	
Road, Asphalt	Overlay, repair (8(1	Sq. Yd.	170,000.00	0.60	15	6,800	
- BIOTIC SURVEYS							28,800
Plant Ecologist	Field Svy. & Reports (30	L. Hours	960.00	30.00	1	28,800	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							14,651
Plant Procurement	Trees, shrubs	Item	40.00	8.50	3	113	
Exotic Plant Control	Hand/Chemical (33	L. Hours	1,038.00	14.00	1	14,532	
Nest Box, Wood	Bathhouse	Item	1.00	30.00	5	6	
- WATER MANAGEMENT							5,862
Water Control	Valves (41	Item	100.00	15.00	10	150	
Water Delivery	Pipe, 18" Corrugated (41	Lin. Ft.	6,000.00	20.00	30	4,000	
Water Delivery	Pump Maint. (35	L. Hours	3.00	30.00	2	45	
Water Delivery	Pump Station (36	Item	1.00	50,000.00	30	1,667	
- PUBLIC SERVICES							307,435
Access Control	Entry Station (6(2	Item	1.00	250,000.00	30	8,333	
Patrolling	Patrol (25	L. Hours	408.00	22.00	1	8,976	
Parking Area	Sealant (11	Acre	40.00	1,306.80	3	17,424	
Trail	Maintenance (28	L. Hours	1,173.00	15.00	1	17,595	
Sign	Metal entry sign (37	Item	1.00	500.00	7	71	
Sign, Metal	Metal various (37	Item	160.00	20.00	10	320	
Sign, Metal	Interpretive (2(10	Item	4.00	2,000.00	8	1,000	
Bench	Exposed Aggregate (2(3	Item	20.00	350.00	30	233	
Kiosk, Wood	Info Kiosks (40	Item	7.00	800.00	10	560	
Kiosk, Wood	Lg. 3 panel Kiosk (40	Item	1.00	1,000.00	10	100	
Volunteer Coordinator	Mtgs, trainings (27	L. Hours	960.00	20.00	1	19,200	
Interpretive Literature	Labor	L. Hours	96.00	20.00	1	1,920	
Interpretive Literature	Copy	Page	30,000.00	0.05	1	1,500	
Community Outreach	Camper outreach (25	L. Hours	2,000.00	14.00	1	28,000	
Community Outreach	External outreach (29	L. Hours	604.00	22.00	1	13,288	
Utilities, Annual	Elec., Water (20	Month	12.00	1,000.00	1	12,000	
Other	Picnic Table (4(2	Item	168.00	1,000.00	30	5,600	
Other	BBQ small (2(10	Item	168.00	150.00	30	840	
Other	BBQ large (2	Item	3.00	850.00	30	85	
Other	Fire ring (2(10	Item	168.00	120.00	30	672	
Other	Playground Equipment (5	Item	3.00	40,000.00	30	4,000	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	Supplies for public (7	Item	1.00	13,000.00	1	13,000	
Other	Hand Rail (2(10(12	Lin. Ft.	250.00	7.00	30	58	
Other	Drinking Fountain (2(10	Item	11.00	650.00	10	715	
Other	Dump Station (37	Item	1.00	10,000.00	15	667	
Other	Ramada, lg. concrete (37	Item	2.00	100,000.00	35	5,714	
Other	Ramada, small (37	Item	1.00	50,000.00	35	1,429	
Other	Shade structure (13	Item	25.00	1,600.00	15	2,667	
Other	Septic system (37	Item	14.00	10,000.00	20	7,000	
Other	Amphitheater (14	Item	1.00	10,000.00	10	1,000	
Other	Public Restroom (15	Item	6.00	157,000.00	30	31,400	
Other	Restroom w/shower (15	Item	5.00	202,000.00	30	33,667	
Other	Guard Rail, road	Lin. Ft.	150.00	12.00	30	60	
Other	Animal Care (26	L. Hours	96.00	20.00	1	1,920	
Other	Issue Use Permits (25	L. Hours	208.00	26.00	30	180	
Other	Interp. Program Dev.	L. Hours	384.00	20.00	1	7,680	
Other	Interpretive Delivery	L. Hours	772.00	20.00	1	15,440	
Other	Event Supervision (25	L. Hours	200.00	22.00	1	4,400	
Other	Fee Collection (24	L. Hours	2,912.00	10.00	1	29,120	
Other	Sell Firewood	L. Hours	960.00	10.00	1	9,600	
- GENERAL MAINTENANCE							59,084
Sanitation Control	Collection and disposal (43	Monthly	12.00	334.00	1	4,008	
Toilets, Portable	Replacement (37	Item	12.00	800.00	8	1,200	
Toilets, Permanent	Maintenance (38	L. Hours	960.00	18.00	1	17,280	
Other	Landscape Maint. (33	L. Hours	1,038.00	14.00	1	14,532	
Other	Facility Maint. (34	L. Hours	1,576.00	14.00	1	22,064	
- REPORTING							10,472
Agency Report	Various Reports (23	L. Hours	748.00	14.00	1	10,472	
- OFFICE MAINTENANCE							68,943
Administrative	Operations (22	L. Hours	2,970.00	18.00	1	53,460	
Preserve Office	Replacement (19	Sq. Ft.	1,800.00	85.00	30	5,100	
Preserve Office	Janitorial	Sq. Ft.	1,800.00	0.20	1	360	
Telephone Charges, Annual	Phone Charges (1	Person	4.00	1,200.00	1	4,800	
Office Supplies, Year	Stationery/envelopes (1	Person	3.00	125.00	1	375	
Office Supplies, Year	Supplies (1	Person	5.00	192.00	1	960	
Furniture	Desk (1	Item	5.00	250.00	10	125	
Furniture	Chair (1	Item	12.00	150.00	5	360	
Furniture	Bookcase, 3'x5' (1	Item	3.00	150.00	8	56	
Furniture	File cabinet (1	Item	3.00	400.00	10	120	
Copier	Copier (1	Item	1.00	3,833.00	8	479	
Fax Machine	Standard (1	Item	1.00	400.00	5	80	
Telephone	Touch-tone (1	Item	5.00	95.00	5	95	
E-Mail	Services (1	Year	1.00	360.00	1	360	
Voice Mail	Voice Mail, Annual (1	Item	1.00	250.00	5	50	
Computer, PC & Monitor	Standard (1	Item	3.00	2,100.00	4	1,575	
Computer software	Microsoft Office Pkg (1	Item	3.00	450.00	4	338	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Laser Printer	Standard (1	Item	2.00	500.00	4	250	
- FIELD EQUIPMENT							29,888
GPS, Rover & Base Unit	GPS Handheld (10	Item	6.00	250.00	5	300	
Quad Runners, 4WD	Mid-range quality (1	Item	2.00	4,500.00	8	1,125	
Vehicle	Small pickup S-10 model (10	Item	2.00	16,000.00	8	4,000	
Vehicle	Full size pickup (10	Item	1.00	20,000.00	8	2,500	
Vehicle	4x4 Chevy pickup (10	Item	1.00	32,000.00	8	4,000	
Vehicle	Golf Cart (10	Item	1.00	10,000.00	8	1,250	
Vehicle	SUV (10	Item	1.00	20,000.00	8	2,500	
Vehicle	Fuel (21	Annual	1.00	6,000.00	1	6,000	
Vehicle	Tractor w/frontend ldr. (10	Item	1.00	30,000.00	15	2,000	
Radio, Mobile Unit	800 Megahertz	Item	5.00	3,000.00	8	1,875	
Other	Hand tools (16 (10	Item	1.00	1,000.00	8	125	
Other	Generator (10	Item	1.00	1,500.00	15	100	
Other	Power Tools (17 (10	Item	1.00	4,000.00	10	400	
Other	Chain Saw (10	Item	2.00	250.00	8	63	
Other	ATV Trailer (10	Item	2.00	500.00	8	125	
Other	Vehicle Wash Rack (39	Item	1.00	8,000.00	8	1,000	
Other	20000 gal Fuel Tank (37	Item	1.00	15,000.00	30	500	
Other	6000 gal Fuel Tank (37	Item	1.00	6,000.00	30	200	
Other	250 gal Fuel Tank (37	Item	1.00	1,000.00	30	33	
Other	10000 gal Propane tank (37	Item	1.00	6,000.00	30	200	
Other	100000 gal water tank (37	Item	1.00	20,000.00	30	667	
Other	Washer/Dryer (10	Item	1.00	1,000.00	8	125	
Other	Fee Collection Box (10	Item	4.00	2,000.00	10	800	
- OPERATIONS							35,924
Budgeting	Budget & reconcile (32	L. Hours	40.00	30.00	1	1,200	
Administrative	Supervision	L. Hours	416.00	26.00	1	10,816	
Administrative	Reception	L. Hours	384.00	14.00	1	5,376	
Administrative	Planning (31	L. Hours	500.00	20.00	1	10,000	
Employee Training	Classes (42	L. Hours	474.00	18.00	1	8,532	
Subtotal						592,584	592,584
Contingency @ 10%						59,258	
Administration @ 22%						143,405	
Total						795,247	

Robbins Butte Wildlife Area

Property Description

The Robbins Butte Wildlife Area (RBWA) is located approximately seven miles southwest of Buckeye, just east of Phoenix, Arizona in Maricopa County. The Area comprises 1,681 acres, managed by the Arizona Game and Fish Department (AGFD).

The RBWA is a rectangular shaped area about 2.5 miles long by about 1 mile wide. The Gila River and Robbins Butte are in the northwest corner of the site. The Area is otherwise relatively flat. The site is bounded by a 2-lane highway on the east and open space under various public ownerships and management goals on the other three sides. Development is proposed for the vast open space southwest of Buckeye and east of the Area. The other lands adjacent to Robbins Butte Wildlife Area are managed for open space, flood control or for wildlife and pose little concern for the management of the RBWA.

In the 1950s, RBWA was selected as one of two areas along the Gila River with the greatest potential for waterfowl habitat enhancement. The RBWA was then purchased with federal aid money for wildlife purposes.

The RBWA provides habitat for a number of listed bird species including the Yuma clapper rail, yellow-billed cuckoo, bald eagle and southwestern willow fly catcher. There are no listed plant species. Salt cedar and Russian thistle are the dominant weeds. Robbins Butte is a rocky outcrop with numerous petroglyphs.

Public use on the site is primarily hunting and birdwatching. Because shooting is an allowed use and the RBWA is only a half hour from Phoenix, there are issues with shooters and also dumping. These issues are only expected to increase as the area between Phoenix and the RBWA is developed over the next decade. There are few facilities on RBWA. There are 10 miles of dirt roads with 12 gates, approximately 6 miles of fencing, an office/



shop, a residence, several storage units, 4 parking areas, 60 acres of cropland and 5 wildlife ponds. There are no maintained trails. The manager for RBWA lives on the property and patrols it regularly.

Project Goals

The goal of RBWA is to optimize the habitat potential of the property for wildlife and for present and future generations of the public to enjoy wildlife-oriented recreation.

The primary management emphasis at RBWA is to provide food crops and nesting habitat for upland game birds. Secondary management emphasis includes enhancing riparian habitat and the riparian-desert upland ecotone.

Because of its funding, the RBWA must be managed consistent with the Federal Aid for Wildlife Restoration program, which requires that the area be managed for wildlife habitat and wildlife related recreational use.

Biological Description

Vegetative cover is a diverse mixture including dense non-native salt cedar thickets, willows and cattail in the river bottom; mature mesquite on the river terrace; saltbush and shrub-sized mesquite up-

land areas; upland desert areas dominated by creosote bush and white bursage; retired agricultural lands that are being restored to a native vegetative community; and agricultural land used to produce food and cover crops for wildlife. In addition to the Gila River, ponds and drinkers provide water for wildlife though the saline content in the ground and surface water is very high. The combination of desert upland, agricultural, and riparian habitats attract a variety of wildlife species.

The RBWA is managed to provide a diversity of native habitats and fields cultivated for wildlife food crops. The area is primarily managed for doves, quail, javelina, mule deer and other small game as well as for listed species, wintering raptors, and predators such as bobcat and mountain lion. Native riparian and xero-riparian habitat is managed and enhanced. Amphibians and reptiles also are common; a minimum of 19 reptile species reside at RBWA. Over 115 species of winter-resident birds have been observed in the vicinity. In addition, many raptors winter in and near the RBWA, including the white-tailed kite.

Salt cedar and Russian thistle are both major invasive-exotics on the wildlife area. Russian thistle is a controllable problem because it grows among the crops and is mowed regularly. However, salt cedar has developed into a monoculture and is very difficult to manage. It is controlled by burning and chemicals. Certain areas have also been identified for control with cutting and burning by inmate crews. There are no listed plant species.

Special status species occurring on or near the RBWA have been identified through the AGFD's Heritage Data Management System, and are listed below. This includes the federally endangered Yuma clapper rail (*Rallus longirostris yumanensis*), and the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), a federally listed candidate species. Those special status species that potentially occur on the RBWA include great egret (*Ardea alba*), snowy egret (*Egretta thula*), and western yellow bat (*Lasiurus xanthinus*).

Organizational Structure

RBWA is owned and managed by the Arizona Game and Fish Department. There is one full-time employee presently managing the RBWA, however, historically there have been two and two are needed. Given this recommendation, the following analysis is based on two employees. The manager lives on-site. There is a supervisor that works at the main office in Tempe (over an hour away)

Common Name	Scientific Name	Status
<i>Amphibians</i>		
Northern leopard frog	<i>Rana pipiens</i>	S,2,WSC
<i>Birds</i>		
Western least bittern	<i>Ixobrychus exilis hesperis</i>	SC,WSC
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	S,WSC
Yuma clapper rail	<i>Rallus longirostris yuma-</i>	LE,WSC
	<i>nensis</i>	
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	C,S,3,WSC
<i>Reptiles</i>		
Sonoran desert tortoise	<i>Gopherus agassizii</i>	SC,WSC

Source: AGFD website

and an inmate work crew. There are no regular volunteers. The manager relies on the local game warden or sheriff for law enforcement.

Habitat Management Tasks

Assuming the two employees recommended for the site, approximately 5,800 hours are estimated for the long-term management and maintenance of the RBWA. The on-site manager and one employee spend at least 80 percent of their time on tasks at Robbins. An inmate crew spends approximately 2,400 hours doing equipment and facility maintenance including weeding. An off-site supervisor spends about 220 hours conducting site visits and conducting administrative tasks.

The most time consuming task at Robbins Butte is the maintenance of habitat through the removal of non-native plants. Approximately 1,500 hours per year are dedicated to this task, primarily by the inmate crew. Revegetation and farming tasks take about 1000 hours. Facility maintenance and equipment maintenance take approximately 800 hours each. Water management takes nearly 600 hours.

Habitat Management Cost Estimates

The total cost of on-going management of Robbins Butte is \$235,000. At about \$45,000 per year, field equipment is the highest cost. This is due to the number of farm equipment particularly. The cost of most equipment is the purchase price provided by management. Some of the equipment is old and may cost more to replace. The high saline content in the water has resulted in corrosion of equipment and a shorter life span for some items. The labor cost of annual maintenance of the equipment is \$12,500.

Habitat maintenance including farming of crops averages about \$40,000. This also includes planning, supervision, replacing plantings and invasive-exotic control.

Water management is the next largest element which includes irrigation equipment, wells and electricity for running the system. The cost of maintaining the four wells is particularly difficult to estimate but is nevertheless a significant component. Electricity is also required for office maintenance but since most is used for the water system it is included here. The total water management cost is nearly \$35,000.

Salaries were averaged when higher and lower paid staff did the same task. Administrative overhead was calculated at the PAR default of 22 percent.

End Notes

Website: www.gf.state.az.us/outdoor_recreation/wildlife_area_robbins.html

Robbins Butte Wildlife Area Management Plan, 1991-1995. November 1990.

Draft Region VI Wildlife Areas Management Plan. Hildebrandt, T.D., and Severson, M.W. May 2002.

Arizona Game and Fish Department PASE Performance Planning Record, February 2001 – January 2002.

Personal contact: Tom Hildebrandt, regional manager, and Mark Severson, onsite manager, February 12, 2004.

PAR Footnotes

- 1 Cost is PAR default.
- 2 Replacement years is estimate.
- 3 Number of units is estimated.
- 4 Cost is estimated based on internet search, supply catalogs or other.
- 5 Cost is estimated by PAR operator.
- 6 Aluminum signs are made by the nearby prison and are considerably cheaper than purchasing them elsewhere.
- 7 Hourly rate is a combination of salary levels based on hours worked by various job classes.
- 8 Restoration involved the planting and maintenance of native vegetation to provide wildlife habitat. Work is divided between the site manager and the tech.
- 9 There are approximately 60 acres in production with 30 acres farmed annually. Barley is grown for wildlife food. None is harvested.
- 10 Facility maintenance includes 6 miles of fence maintenance, repair and maintenance of 10 miles of dirt road, maintenance of 12 gates, maintenance of fuel breaks, sign replacement and building maintenance. Half of the roads are graded once a year and the other half of the roads are graded twice a year. No gravel is used.
- 11 Water management includes maintenance of irrigation system including pumps, pipes and wells and ensuring proper irrigation of wildlife ponds and farm fields.
- 12 Supervise inmate crew conducting habitat maintenance tasks.
- 13 Hours spent talking to visitors about the site and rules and assisting with annual junior dove hunt.
- 14 Hours spent repairing and maintaining farm equipment, vehicles, tractors etc.
- 15 Site manager conducts some monitoring and reporting of sensitive species.
- 16 Inmate crews spend 1440 hours removing salt cedar and other weeds by hand. Site manager and tech spent an additional 250 hours controlled weeds. Several methods are employed including chemicals, burning and mowing.
- 17 Includes 20 hours for errands by site personnel and 20 hours for site supervisor to travel to site (2 hours roundtrip.)
- 18 Accounts for site supervisor oversight and reports.
- 19 There are \$40,000 worth of hand and power tools that were recently purchased. These are items under \$5000.
- 20 Various tractor attachments for cultivation. There are 7 attachments ranging in price from \$875 to \$3000.
- 21 There are 4 trailers varying in price from \$575 to \$3,354.
- 22 There are 3 John Deere tractor attachments: loader \$2600; digger \$800; cutter \$1000.
- 23 A tractor (AC 8030 2 wheel drive) cost \$40,000 and has 4 attachments: ripper, \$2500; shredder, \$6500; drill, \$8000; another shredder, \$6000.
- 24 There are 3 wells with pumps. Replacement time of 13 years is from management and is low due to heavy salt corrosion.
- 25 The office/shop is concrete and metal with a restroom and shower. It is divided into an office and shop.
- 26 Some concrete irrigation ditches and the ports were replaced in the 90s. Cost is management's estimate from the 90s.
- 27 There are two fuel tanks: 1000 gal. underground diesel; 500 gal. above ground. Cost is estimated based on related products.
- 28 Fresh water for domestic purposes must be treated or delivered to the site due to the high saline content of the water on-site. Cost is an estimate.
- 29 Amount of fuel is estimated.
- 30 Safety classes required by agency.
- 31 Payments to Department of Water Resources for water range from \$500 to \$1500 a year.
- 32 The project uses four wells, 3 for agriculture and one for domestic water. The ag wells are about 200 feet deep and produce 1500 gallons per minute. Two of these are pumped by windmills that are 75 feet tall. It is expected that refurbishing (moving parts and sleeves) these wells after ten or 15 years will cost \$10,000 to \$20,000. If the casing is replaced, it could cost \$40,000. Installing a new well could cost from \$60,000 to \$100,000. The domestic well is deeper to provide less saline water but is much smaller in diameter than the ag wells. All four wells are treated the same.

PAR Budget Table—Roberts Island Preserve Annual Average Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/MAINT.							
- BIOTIC SURVEYS							165
Project Management	Supervise/coordinate	L. Hours	3.00	30.00	2	45	
Plant Ecologist	Field Svy. & Reports	L. Hours	8.00	30.00	2	120	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							1,470
Plant Procurement	Trees, shrubs	1 Gal.	10.00	3.00	1	30	
Exotic Plant Control	Hand Remove: 4crew/3 days	L. Hours	96.00	15.00	1	1,440	
- WATER MANAGEMENT							
- PUBLIC SERVICES							3
Sign, Aluminum	Aluminum 14" X 20"	Item	2.00	10.00	7	3	
- GENERAL MAINTENANCE							
- REPORTING							420
Photodocumentation	Supervise/volunteer coord.	L. Hours	3.00	30.00	1	90	
Photodocumentation	Field Survey- volunteer	L. Hours	6.00	10.00	1	60	
Annual Work Plan	Planning/staffing	L. Hours	3.00	30.00	1	90	
Agency Report	Annual Report	L. Hours	3.00	30.00	1	90	
Management Plan	Update	L. Hours	15.00	30.00	5	90	
- OFFICE MAINTENANCE							58
Preserve Office	Rent (1% of total)	Unit	1.00	5.00	1	5	
Furniture	Desk	Item	0.03	250.00	10	1	
Furniture	Chair	Item	0.03	150.00	5	1	
Furniture	Bookcase, 3'x5'	Item	0.03	150.00	8	1	
Furniture	File cabinet	Item	0.03	400.00	10	1	
Copier	Copier, 15-18 ppm	Item	0.03	3,833.00	8	14	
Fax Machine	Standard	Item	0.03	400.00	5	2	
Telephone	Touch-tone	Item	0.03	95.00	5	1	
E-Mail	Services	Year	0.03	360.00	1	11	
Computer, PC & Monitor	133 MHz Pentium	Item	0.03	2,100.00	4	16	
Computer software	Microsoft Office Pkg	Item	0.03	450.00	4	3	
Deskjet Printer	HP DeskJet 895	Item	0.03	399.00	6	2	
- FIELD EQUIPMENT							3
Camera	Digital, mediam	Item	0.03	350.00	5	2	
Hip Waders	Waders	Item	0.03	65.00	5	0	
- OPERATIONS							897
Contracts	Volunteers/Crew	L. Hours	10.00	30.00	1	300	
Budgeting	Budgets/Accounting	L. Hours	3.00	30.00	1	90	
Property Tax Exemption	File	L. Hours	0.50	30.00	1	15	
Supervisor Site Visit	Site visits (2 per yr)	L. Hours	8.00	45.00	1	360	
Travel	per site visit (crew+staff)	Trip	5.00	24.11	1	121	
Insurance	Liability/Fee	Acres	20.00	0.55	1	11	
Subtotal						3,015	3,015
Contingency @ 10%						302	
Administration @ 10%						332	
Total						3,648	

Tortolita Preserve

Property Description

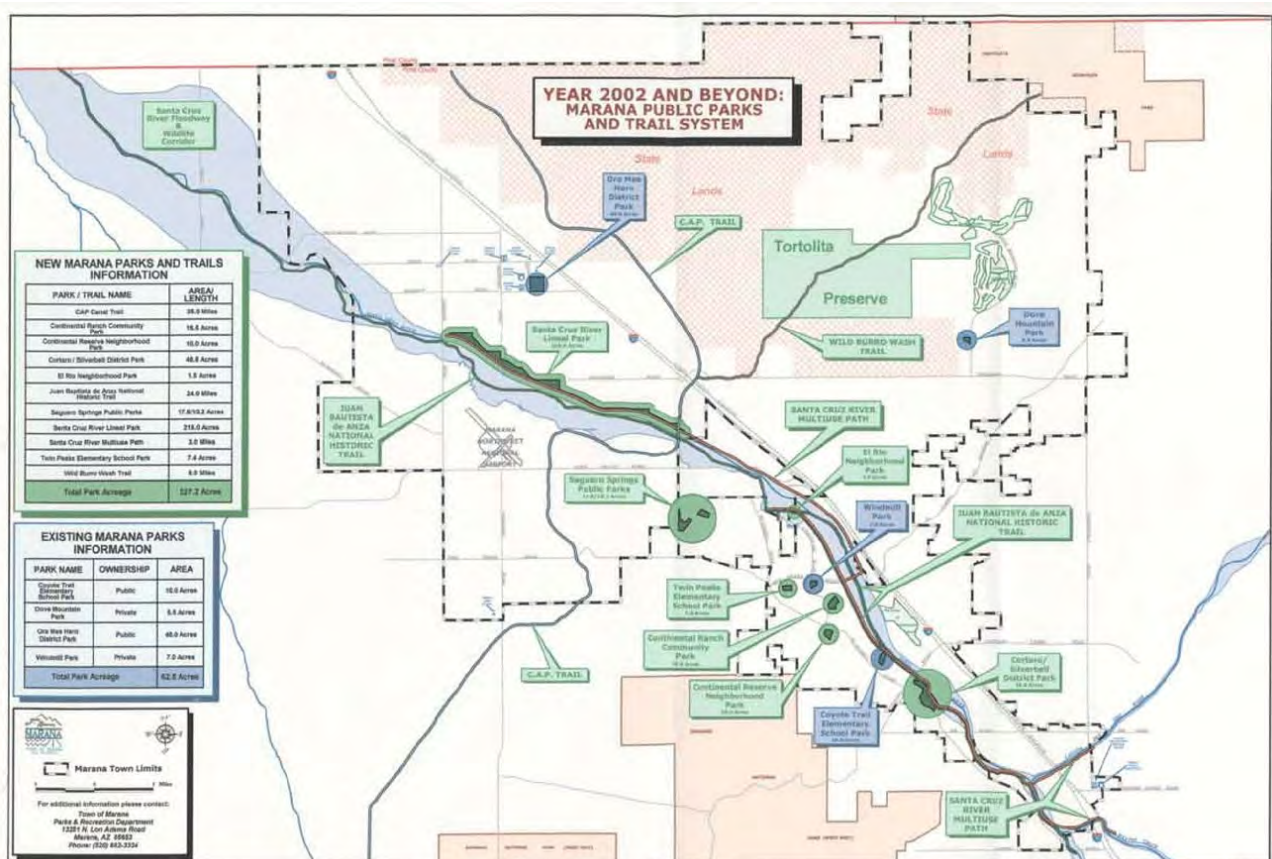
The Tortolita Preserve (Preserve) is a 2400-acre rectangular shaped property located in Pima County, one half hour north of Tucson, Arizona. The mostly flat site has a well developed Sonoran desertscrub plant community and has numerous ephemeral washes running from the northeast to the southwest across the site. Ironwood and saguaro cacti are important plants on the site.

The Tortolita Preserve is state land that was leased to the town of Marana for 100 years to serve as a mitigation site for a resort development adjacent to the Preserve to the north. The guiding document is the Biological Opinion for Dove Mountain development. The Preserve provides habitat for the

endangered cactus ferruginous pygmy owl. At the end of 100 years, the Preserve will go back to the state of Arizona.

The development project on the northwest corner will eventually extend across much of the north side of the preserve. All of the land immediately to the south and west is undeveloped state land (which can be sold for development) that is zoned low density (rural) development. There is a low density neighborhood to the east.

Under the state's past management of the Preserve area, off-road vehicle use (ORV), especially in the larger washes, and target shooting were allowed. Now that the area is a Preserve, these uses are no longer allowed. It may take some time and effort to



halt the uses. In an effort to curb ORV use some of the large washes are cross-fenced and signed. Public use overall, however, is low, in part because the site is not a destination. Primary users are neighbors. Horseback riding and hiking are the main allowed uses. A rough trail runs around most of the perimeter of the site. The area is currently grazed by animals from neighboring ranches. Dumping is an issue along the road adjacent to the site. There are a few signs, about 500 feet of fence, a gate, and a planned parking lot, but no other facilities. The majority of the perimeter of the Preserve is not fenced, but as development in the area continues, some additional protection measures may be needed.

There is a new sewer line that runs from south to north through the middle of the site. The area has been restored with hydroseeding, large plants including saguaro cactus and temporary irrigation. The county is still monitoring the restoration. In addition there is a power line easement across the southwest corner of the Preserve.

Project Goals

The Tortolita Preserve is to be maintained in a natural condition and people are encouraged to visit the site.

The Habitat Preservation Agreement for the mitigation specifically requires that the Preserve be maintained in a natural condition. The agreement requires that the following measures be taken throughout the 100-year period within the Preserve.

1. The Preserve will be maintained in a natural condition except as set forth below.
2. Perimeter fencing if it is determined that adjacent land uses are adversely affecting the biological values of the Preserve.
3. Perimeter signs will be posted and monitored to discourage unauthorized entry.
4. Pygmy owl surveys will be conducted annually using large area search protocol as established by AGFD and USFWS protocol. They will be conducted by the Town of Marana.
5. A plant ecologist will survey the area at least every three years.
6. Exotic species will be inventoried and invasions of exotic species will be controlled.
7. No development is allowed except for trails that are consistent with the Town's trail system plan, construction of offsite utilities

as described in the Dove Mountain Biological Assessment, and other uses as permitted by the USFWS. Trail use is restricted to hiking, non-motorized vehicles and horseback riding.

8. Gates along existing or proposed easements will be checked periodically and maintained as necessary.

Annual lease fees are paid by the resort development company along with management costs incurred to manage the Preserve for the benefit of the pygmy owl and other wildlife in accordance with the requirements of the USFWS and the Habitat Preservation Agreement. When the resort hotel is built, the town through a bed tax will receive \$1.0 million annually which they will then use to pay the annual Preserve lease payments and associated management costs.

Biological Description

Specific biological values on the Tortolita Preserve include a well-developed Sonoran desertscrub plant community. Desertscrub communities are characterized by an abundance of saguaros or large trees, and a diversity of plant species and vegetation strata. Ironwood is a notable component of the plant community. This area provides critical habitat for the endangered cactus ferruginous pygmy owl (*Glaucidium brasilianum cactorum*). There are no listed plant species.

The Preserve is within the paloverde-cacti-mixed scrub series of the Arizona Upland Subdivision of the Sonoran Desertscrub community. The paloverde-cacti-mixed scrub series develops on the bajadas and mountainsides away from valley floors. A bajada is the area between level plains and the foot of a mountain, and is dissected by arroyos, exhibiting numerous variations in slope and pattern. While there is great variation between bajadas, they are generally characterized by good drainage and slowed evaporation, resulting in enhanced growing conditions for xerophytic plants. Cacti are particularly prevalent on bajadas, and woody, spiny shrubs and small trees, and annuals are abundant. In turn the increased diversity of plants supports a variety of wildlife species (Benson and Darrow 1981).

Non-native invasive species are surprisingly scarce on the Preserve. Mediterranean grass (*Schismus barbatus*) and filaree (*Erodium cicutarium*) are common on the Preserve however, neither have significantly altered the abundance of native winter ephemerals on the site. There are four occurrences of buffelgrass (*Pennisetum ciliare*) on site.

Of particular note are the invasive exotics not found on the site. In several surveys over the course of two years, none of the following have been found:

Fountain grass	<i>Pennisetum setaceum</i>
Bermuda grass	<i>Cynodon dactylon</i>
Red brome	<i>Bromus rubens</i>
Mexican palo verde	<i>Parkinsonia aculeate</i>
Lehmann lovegrass	<i>Eragrostis lehmanniana</i>
Sahara mustard	<i>Brassica tournefortii</i>

Fire danger at this site is low, due to the absence of the above exotics, which can increase fuel loads at ground level. Future introductions of exotics will be limited if new development has walled yards, consistent with current development. Walled yards may reduce the amount of seed dispersal from cultivated landscapes by animals and wind.

Grazing is expected to continue on the Preserve so long as it is open range, however, the impacts have been determined by the management to be minimal. There is a reluctance to fence the area due to cost and concerns that wildlife movement would be hindered. Therefore, additional fencing has not been included even though population growth in the area seems to suggest that additional protection will be needed in the long run.

The Arizona Game and Fish Department and the U.S. Fish and Wildlife Service have developed a standardized survey protocol to locate pygmy owls during their breeding season (February–June). Adult and juvenile pygmy owls nesting near roads are fitted with a backpack style radio transmitter. Each bird is monitored to determine location, movements and behavior of the bird, with special attention paid to the distance flown between successive perches and the location where a bird flies across a road. The structure and composition of vegetation around perch structures used by pygmy owls on either side of road is measured. The monitoring occurs over thousands of acres of which the Tortolita Preserve is a part.

Organizational Structure

The Tortolita Preserve is owned by the Arizona State Land Department and leased by the town of Marana under a 100-year commercial lease agreement. The Preserve is being leased by the town as part of a Habitat Preservation Agreement between the U.S. Fish and Wildlife Service, resort developers and the town. This agreement was established as part of an off-site mitigation package developed

to offset the potential impacts of a portion of the Dove Mountain development on the listed endangered cactus ferruginous pygmy owl. The cost of this lease is \$432,000 a year plus inflation.

The town has designated the Preserve as a park and the town park department is responsible for maintaining the site. The Parks and Recreation director is responsible for management planning and ensuring the biological opinion is fulfilled.

Habitat Management Tasks

The most expensive cost at the Preserve is the cost of the lease. Whether or not to include this cost in the analysis is a difficult question. Other projects, of course, incur land costs, which when spent are considered “sunk” costs and altogether subsumed to ongoing expenses. This project is different in that the cost of the lease appears relatively consistent with market prices and has a term of 99 years. On the other hand the cost of the lease is more than ten times the cost of management and so its inclusion entirely misrepresents the cost of stewardship. For this reason, the lease cost is not included.

The most time-consuming task at Tortolita Preserve is patrolling. The patrols are done by two mounted officers for a total of 500 hours a year. The amount of time spent changes with the season.

The site manager spends approximately ten percent or 200 hours managing the Preserve. The main tasks includes volunteer management (60 hours - not currently done, but planned); project management tasks associated with mitigation requirements, 45 hours; site visits, 36 hours and community outreach, 27 hours.

Monitoring for owls is estimated at about 100 hours per year and monitoring for plants at 72 hours every three years.

Volunteers, which are not currently used, are projected to work 400 hours per year on trail maintenance, weed pulling, fence repair, sign replacement and general site clean up.

Assumptions about individual costs are included in the footnotes at the end of this report.

Habitat Management Cost Estimates

The total cost of managing Tortolita Preserve is just under \$57,000. The largest single cost is nearly \$21,000 for site patrols of which \$19,570 is labor hours and the remainder for horses and

equipment. Monitoring for owls and plants accounts for \$7,550 including the project manager's time. Supervisor site visits, which would include some level of monitoring for vandalism, weed infestations, etc., is calculated at an additional \$1,000.

Weed control is expected to take only \$2,000 (work performed by volunteers) based on several monitoring reports that the current and future weed situation is under control. Volunteers in a new program (not yet developed) will account for about \$4,000 worth of work on the site (including the weeding) and just under \$2,000 to manage the program. GIS work, updating the management plan and community outreach are each expected to cost about \$800 annually.

The final cost includes a 10 percent contingency which is the program default and a 22 percent administrative rate which was suggested by the site manager to be appropriate.

End Notes

Benson, L. and R.A. Darrow. 1981. Trees and shrubs of the southwestern deserts. The University of Arizona Press. Tucson.

Biological Opinion on the effects of the Dove Mountain Development in Marana, Arizona, October 23, 2000.

Town of Marana, Tortolita Preserve (Management Plan), no date.

WestLand Resources, Inc. Botanical Baseline Investigations at Tortolita Preserve. May 8, 2003.

WestLand Resources, Inc. Botanical Baseline Investigations at Tortolita Preserve. January 29, 2004.

WestLand Resources, Inc. Botanical Baseline Investigations Products Westland Proposal No. P2131.03. March 24, 2003.

Meeting with Leslie Liberti, City of Marana, week of February 9, 2004 and subsequent phone conversations.

PAR Foot Notes

- 1 Cost is PAR default.
- 2 Cost is PAR default and based on a percentage of the total (depending on the amount of time spent on Tortolita.)
- 3 Boundary signs are required in the lease. It is estimated that there is 1 sign every 1000 feet along the perimeter of the property.
- 4 Area fenced is perpendicular to 2 large washes and is in 2 places on both sides of the wash. Fence is 4 strand with top and bottom smooth and center 2 wires barbed. There is one other fenced area at the south entry to the sewer line.
- 5 These are signs placed in the washes to discourage vehicular traffic. Vandalism is high.

- 6 na.
- 7 Two types of plant surveys are conducted. The first is random walk surveys done two times a year every 3 years for a total of 32 hours. The second survey is monitoring of 3 study plots including photopoints. It is not clear how often this work is to be done, so it was estimated that this work was done once a year for a total of 40 hours.
- 8 Site manager visits the site once a month for 3 hours, including travel time. Activities conducted during site visits include weed monitoring, project planning for volunteers and inspections for vandalism.
- 9 The manager will update the management plan as needed, spending about 2 hours per month on it.
- 10 Site manager spends about 1 hour per month answering questions from the public and an additional hour a month on other community outreach tasks for Tortolita.
- 11 Manager plans to develop a formal volunteer program. It is estimated that after the program is developed, it will take 5 hours per month (on average) to supervise the program and conduct work parties. Expenses for 2 large clean-up events per year is estimated at \$200 each. There will be an estimated 50 volunteers that will donate 8 hrs. each for a total of 400 hours. In addition to the clean-up, volunteers will weed and do trail and parking lot maintenance. Dumpster rental for the events is calculated separately.
- 12 There is an approximately 4.5 mile trail around 3 sides of the perimeter of the site. It is a user-built trail. Once complete, it is assumed to require only minimal maintenance due to the soils. PAR assumes 4 hours per week by a volunteer to clear rocks and erosion from the trail. This activity includes some fence repair and sign replacement as needed.
- 13 There is currently no parking lot, but a small (6 car) lot is proposed. Twice a year maintenance that includes raking the site by volunteers is estimated.
- 14 An informational brochure is proposed to be mailed to the neighboring property owners and distributed on-site. It is estimated to be a 3-page handout, black and white with 250 mailed to neighbors with another 250 available to handout. It would be reviewed and updated annually.
- 15 Tortolita is patrolled by 2 mounted enforcement officers. They spent a total of 500 hours per year on-site and in travel time, which is 13 percent of their time. Time was calculated as follows: 6 month of the year (26 weeks) patrols occur once a week for 6 hrs. a day for a total of 312 hrs. for 2 patrollers. The other 6 months (low season) they do 2 patrols per month for 6 hrs. each for a total of 156 hrs. for the 2 patrollers. There are 2 horses, a trailer, stabling costs, equipment and food.
- 16 The site manager spends about 45 hours per year coordinating and attending interagency and outside agency meetings in connection with mitigation issues. This includes meetings with U.S. Fish and Wildlife Service, the developer, and neighboring property owners. This also includes review of biologi-

cal monitoring to ensure compliance of the mitigation requirements.

- 17 The Arizona Game and Fish Department and the U.S. Fish and Wildlife Service have developed a standardized survey protocol to locate pygmy owls during their breeding season (February – June). Tortolita is only a small acreage within the survey area and it is very difficult to determine how much time is spent just on Tortolita. One hundred hours is an estimate.
- 18 Maps and data are generated by the GIS department at the town of Marana. Time is an estimate.
- 19 Tortolita is estimated to be 15 miles roundtrip from the town hall. Twenty trips per year are assumed.

PAR Budget Table—Tortolita Preserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/MAINT.							76
Fence - Installed	Wire, 4 strand (4(1	Lin. Ft.	500.00	3.00	35	43	
Gate, Cattle	5' X 12' gate (1	Item	1.00	695.00	30	23	
Lock	Padlock (1	Item	1.00	19.00	2	10	
- BIOTIC SURVEYS							7,550
Project Management	Supervise (16	L. Hours	45.00	30.00	1	1,350	
Plant Ecologist	Monitoring (7	L. Hours	72.00	50.00	3	1,200	
Wildlife Biologist	Field Svy. & Reports (17	L. Hours	100.00	50.00	1	5,000	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							1,920
Exotic Plant Control	Hand Removal, Labor (11	L. Hours	192.00	10.00	1	1,920	
- WATER MANAGEMENT							
- PUBLIC SERVICES							25,679
Patrolling	Patrol (15	L. Hours	500.00	39.14	1	19,570	
Parking Area	Maintain (13	L. Hours	8.00	10.00	1	80	
Trail	Maintenance (12	L. Hours	200.00	10.00	1	2,000	
Sign, Aluminum	Aluminum 24" X 24" (5	Item	15.00	35.00	2	263	
Sign, Aluminum	Informational - color	Item	2.00	500.00	5	200	
Sign	Boundary (3	Item	50.00	5.25	10	26	
Docent Training	Volunteer Mgt. (11	L. Hours	60.00	30.00	1	1,800	
Interpretive Literature	Update brochure (14	L. Hours	10.00	30.00	1	300	
Interpretive Literature	Copy (14	Page	1,500.00	0.10	1	150	
Interpretive Literature	Mailing (14	Each	250.00	0.32	1	80	
Community Outreach	Meetings (10	L. Hours	27.00	30.00	1	810	
Community Outreach	Volunteer events (11	Event	2.00	200.00	1	400	
- GENERAL MAINTENANCE							1,250
Dumpster, Rental	Delivery & pickup	Day	2.00	625.00	1	1,250	
- REPORTING							1,620
GIS/CAD Management	Data Management (18	L. Hours	30.00	30.00	1	900	
Management Plan	On-going Update (9	L. Hours	24.00	30.00	1	720	
- OFFICE MAINTENANCE							702
Preserve Office	Rent (2	Sq. Ft.	100.00	0.20	30	1	
Telephone Charges, Annual	Phone Charges (2	Person	0.10	1,200.00	1	120	
Office Supplies, Year	Stationery/envelopes (2	Person	0.10	125.00	1	13	
Office Supplies, Year	Supplies (2	Person	0.10	192.00	1	19	
Furniture	Desk (2	Item	0.10	250.00	10	3	
Furniture	Chair (2	Item	0.20	150.00	5	6	
Furniture	Bookcase, 3'x5' (2	Item	0.10	150.00	8	2	
Furniture	File cabinet (2	Item	0.10	400.00	10	4	
Copier	Copier, 15-18 ppm (2	Item	0.10	3,833.00	8	48	
Fax Machine	Standard (2	Item	0.10	400.00	5	8	
Telephone	Touch-tone (2	Item	0.10	95.00	5	2	
E-Mail	Services (2	Year	0.10	360.00	1	36	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Voice Mail	Voice Mail, Annual (2	Item	0.10	250.00	5	5	
Computer, PC & Monitor	Standard (2	Item	0.10	2,100.00	4	53	
Computer software	Microsoft Office Pkg (2	Item	0.10	450.00	4	11	
Laser Printer	HP LaserJet (2	Item	0.10	500.00	4	13	
GIS ARC/INFO	GIS, PC based (2	Item	0.10	15,000.00	5	300	
Plotter	Color (2	Item	0.10	3,000.00	5	60	
- FIELD EQUIPMENT							1,645
Vehicle	City car (2	Item	0.10	16,000.00	8	200	
Vehicle	Horses (15	Item	0.13	20,000.00	5	520	
Vehicle	Horse Trailer (15(2	Item	0.13	12,000.00	8	195	
Other	Stables (15(2	Year	0.13	2,400.00	1	312	
Other	Volunteer tools	Item	1.00	250.00	2	125	
Other	Horse equipment (15(2	Item	0.13	2,000.00	8	33	
Other	Horse Feed (15(2	Item	0.13	2,000.00	1	260	
- OPERATIONS							1,737
Network Interview/Contracts	Maintain contracts	L. Hours	4.00	30.00	1	120	
Budgeting	Budget & reconcile	L. Hours	10.00	30.00	1	300	
Project Accounting	Setup and maintain	L. Hours	4.00	30.00	1	120	
Supervisor Site Visit	Site visits (8	L. Hours	36.00	30.00	1	1,080	
Travel	Mileage (19	Miles	300.00	0.39	1	117	
Subtotal						42,178	42,178
Contingency @ 10%						4,218	
Administration @22%						10,207	
Total						56,602	

Upper Verde River Wildlife Area

Property Description

The Arizona Game and Fish Department's (AGFD) Upper Verde River Wildlife Area (UVRWA or Area) is located approximately eight miles north of Chino Valley in Yavapai County, Arizona. The property consists of four parcels totaling approximately 796 acres located along the upper Verde River and lower Granite Creek. It was incised from the Cooper-Morgan Ranch that originally consisted of 7,700 acres of deeded land and grazing allotments on 23,397 acres of Forest Service and 21,799 acres of State Trust lands. The property was acquired through the AGFD's Heritage Fund. Habitat types present on the UVRWA include the watershed's associated riparian area, floodplains, cliffs and adjacent uplands.

The primary management emphasis for the UVRWA is to manage riparian habitat and main-

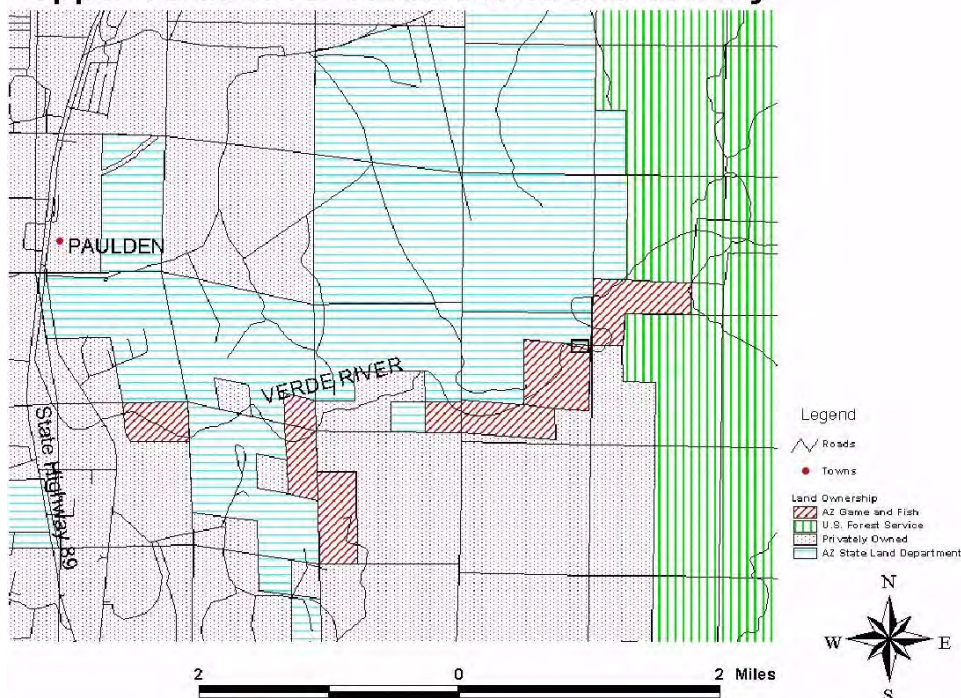
tain native fish diversity. Secondary management emphases are environmental education and compatible wildlife oriented recreation. The UVRWA receives thousands of visitors every year primarily for non-game outdoor recreation. Funding for the Area is derived from the AGFD.

Project Goals

AGFD's management goals are to meet the Department's Heritage Fund program goals for the identification, inventory, acquisition, protection, and management of sensitive species and their habitats. This includes protection of current and potential values for threatened and endangered species, protect and maintain water right values and to periodically inventory and monitor the biological resources on the property. Additionally, management provides controlled public access for recreation, environmental education and research.

The first 5-year management plan for this property was developed in 1996 and re-evaluated in 1997 during a statewide review of AGFD property management plans. No management activities occurred in 1998. However, since that time some of the planned management actions did occur during the last few years of the plan; primarily native fish surveys, fencing and access road maintenance. An updated 5-year plan was developed and finalized in 2002. This plan is used as the basis for all current management activities.

Upper Verde River Wildlife Area and Vicinity



There are no on-site personnel or facilities associated with the property. Site visits by AGFD personnel vary and are sometimes infrequent. Most of these visits are by AGFD rangers looking for unauthorized off-road vehicle use or other illegal activities. Other site visits are for scheduled monitoring and maintenance activities. The AGFD manager for the UVRWA indicated he visited the site approximately once per month on average and commuted from the AGFD's offices in Kingman, approximately 137 miles away.

Biological Description

The Upper Verde River property has four disjunct parcels which collectively include approximately three miles of the upper Verde River, draining easterly from the confluence with Granite Creek to the Prescott National Forest boundary 3.5 miles downstream. One parcel includes about 1.0 mile of Granite Creek upstream from its confluence at the Verde River. The Verde River crosses State Trust lands, Forest Service, and private lands in interspersed stretches. The diverse topography ranges in elevation from 4,200 to 4,600 feet. The width of the river channel and floodplain varies from less than 0.1 to more than 0.5 mile within and among parcels. Prominent cliffs rise 100-300 feet above the river in some segments. Riparian vegetation is characterized as mixed broadleaf deciduous, dominated by Arizona ash, boxelder, Arizona walnut and netleaf hackberry. Tamarisk is occasionally interspersed with native tree species. Low floodplain terraces are dominated by large stands of desert willow, while higher terraces are vegetated with velvet mesquite. The lower Granite Creek area supports a well-developed narrowleaf cottonwood riparian forest.

All of the parcels of the UVRWA were formerly used for livestock grazing. An abandoned homestead exists on one parcel. Associated with the homestead are an old corral that was used for horse training and an approximately 5-acre field that was used for growing crops. Livestock fences are present along some of the property boundaries but are in various stages of disrepair. The department constructed a 1.5-mile barbed wire fence along the riparian zone to discourage off-road vehicle use within the Verde River riparian zone and channel. Portions of this fence are in poor condition because of re-occurring vandalism. In the spring of 2003, an additional steel pipe fence (~2000 ft.) was constructed perpendicular to the riparian channel at the terminus of the access

road and parking area to further secure the riparian zone from vehicle trespass. Because of fencing problems and improperly closed gates, the properties are intermittently used by livestock from adjoining landowners.

Adjoining state and private lands are currently used for livestock grazing. State Trust Lands and Forest Service lands border portions of the property and are leased for livestock grazing. An increasing number of rural residences are being built adjacent to the UVRWA. Two residential developments are planned within two miles of the UVRWA. These may create hydrological problems in the future as wells may impact the local water table.

Comprehensive avian, mammalian, and herpetofaunal surveys have not been conducted for the UVRWA. Special-status species occurring on or near the UVRWA have been identified through the Department's Heritage Data Management System, and includes the federally endangered razorback sucker (*Xyrauchen texanus*), the federally threatened spikedace (*Meda fulgida*), and the federally listed candidate species western yellow-billed cuckoo (*Coccyzus americanus occidentalis*). Additionally, the riparian areas support many species of waterfowl uncommon in the area but are inundated with non-native bullfrogs (*Rana catesbeiana*).

Organizational Structure

The Arizona Game and Fish Department manages the site with some assistance from volunteers.

Habitat Management Tasks

Capital Improvements/Site Construction/Maintenance

The site is generally well protected by fences and gates with the primary problems arising from vandalism and associated illegal vehicle access. Vagrant cows from adjacent properties regularly circumvent the damaged fencing as well and continue to graze and disturb large sections of the riparian floodplain and stream bank. Additional fencing is planned to reduce these problems. Maintenance of the fences is typically low; however, intermittent flooding during high rain events may damage, or entirely remove, large sections of fencing requiring extensive work. The budget assumes that 5,000 feet of 4-strand barbed wire is replaced each year.

The access roadway and parking area require consistent attention. Approximately 4 miles of dirt road are maintained and about one half mile are regraded each year.

Biological Surveys/Monitoring

Currently, there is no fixed monitoring program but biological surveys have been identified in the plan. Previously, a series of fish surveys along the properties was conducted to assess the status of any special-status species and non-native species that may be negatively impacting them. A few academic researchers have initiated projects to assess the impacts of non-native crayfish and game fish on the special-status native fish. Several species of waterfowl, raptors, and bats are known to occur on the properties but additional inventories are not part of the program.

Given the goals of the project, a regular monitoring program to evaluate changes in the vegetation and wildlife communities is included although the current manager feels that the goals are adequately met with intermittent sampling/surveying of a few targeted species. Vegetation structure and species composition, wildlife inventorying and tracking are included.

A wildlife biologist/manager would ideally accomplish project oversight and certain monitoring tasks. This person would supervise and coordinate the activities on the site (20 hrs/yr) and conduct annual plant surveys (40 hrs/yr) and bird surveys (20 hrs/yr); as well as focused monitoring on special-concern plants (8 hrs/yr) and point counts for bird species (20 hrs/yr).

Contracted labor would be utilized for fish surveys to be conducted every other year (40 hrs/yr). Focused monitoring for species of special concern such as the razorback sucker and spinedace would be conducted each year (20 hrs/yr). Additionally, a mammalogist would be contracted to conduct bat surveys and monitoring each year (20 hrs/yr). Alternatively, one of the manager's monitoring tasks could be contracted out (i.e., plant work or bird work) and reduce their hours accordingly.

The hydrology of the stream is being affected by significant upstream development. Monitoring of stream flows, quality and quantity in several locations on the site is important to understanding and preventing impacts to this resource.

Habitat Maintenance

Several programs of exotic control are relevant to this site. Non-native fish, game fish, bullfrogs, and crayfish are present in the stream. The large grazed area associated with the historical homestead is currently in non-native species. Fencing as mentioned above is to control cattle damage to the streambank and to enhance water quality.

Invasive tamarisk is in very low densities along the streambank and should be eradicated from the site. These activities would likely be incorporated into the habitat restoration plans identified above and require the additional expenses associated with contract labor, herbicides and equipment.

Water Management

A recent study was conducted on the sources, flow rates, and water quality of the upper Verde River. In 1985, AGFD had determined minimum flow rates to support the habitat and wildlife needs although existing water rights claims may make maintaining those rates problematic as demand on adjacent properties increases with development. Currently those water rights had not been adjudicated. Given these conditions and the habitat's reliance on minimum flow rates, year around water level monitoring is suggested. The current site manager indicated that these needs were not being addressed except for specific reasons/conditions. The budget includes regular monitoring (Biotic Surveys) and outreach concerning regional hydrological issues (Public Services). The monitoring would include water flows, and levels and be done by a contractor using the contractor's equipment.

Public Service

Facilities for the public include the parking area and trails. Crushed rock was used on the parking area (approx. 600 sq. ft.) but much is lost after heavy rains so maintaining the area with rock and grading is likely to be necessary every other year. There are three miles of trail which require annual maintenance. The assumption is that 20 hours of maintenance and some rock will be required annually.

AGFD personnel conduct intermittent patrols. There are no programs oriented towards public education, outreach and community involvement other than the 1-2 annual trash clean-up events. It is assumed that the kiosk, interpretive signs

included in the capital items budget are built and maintained. The site manager recommends that public outreach needs would be adequately met with these improvements.

General Maintenance

Garbage and dumping are common, more so on holidays and weekends, and volunteer clean-ups are organized twice a year. Two staff members with about 10 volunteers are assumed to spend a day collecting and delivering to a truck that hauls to a trash collection site. There are no maintained fixed toilet facilities on the property. Portable toilets placed adjacent to the parking area and maintained through the summer would likely reduce the environmental degradation associated with most users relieving themselves too close to the watershed.

Reporting

General performance reports on meeting objectives for the site, as identified in the management plan, are completed annually by the site manager to the AGFD. Biology surveys are conducted on an infrequent schedule but summary findings are reported to the AGFD in the same fiscal year.

A brief annual work plan is submitted each year prior to the beginning of the fiscal year and includes an outlined budget identifying the expenditures (<12 line items). In March of 2002 an updated and revised six-year strategic management plan was submitted. There are no management activities that require reporting to any additional agencies.

Currently, the 2002 annual budget and work plan include establishing and maintaining a GIS system describing the area. A GIS program is assumed to be established for 100 such projects so that the allocated cost to UVRWA is 1 percent of the cost. In addition, a shared GPS unit is included in the PAR.

Office Maintenance

There are no on-site facilities. An office for the site manager is provided by the AGFD. His employment responsibilities involve several other sites as well as administrative duties. A representative office with 10 percent attributed to this site is included in the PAR.

Field Equipment

Field equipment required for management includes vehicles, ground water and surface water testing equipment (flow and content) . GPS/GIS, various tools, biological surveying equipment would be included. Equipment for fish surveys would be provided by the contracting party.

Operations

Minimum operations were included in the budget. Contracts for contractors, budgets and site visits were included. The State is self insured and travel is included in other categories.

Habitat Management Cost Estimates

The average annual estimated management costs total \$100,400 per year for the UVRWA. The largest costs are in capital replacement items such as fencing. Together Site Construction costs total about \$25,000 per year. The next largest component is in Public Services with \$16,000 per year. Biotic Surveys is third with \$11,000 in costs per year. This level of monitoring, however, is an addition to the existing program.

The total cost also contains a 10 percent contingency figure and a 22 percent administrative rate to account for the services provided by the central office. The 22 percent rate is the default rate in the analysis.

End Notes

Upper Verde River Wildlife Area Management Plan Draft Version 6/10/02, Arizona Game and Fish Department.

Relative impacts of predation by introduced species on native fishes in the Verde River, Arizona. Master's Thesis Research Plan, Cristina E. Velez, University of Arizona.

Upper Verde River Fish Surveys, July 2000, September 2000. Kevin Morgan, Region III Fisheries Specialist, Arizona Game and Fish Department.

Upper Verde River Fish Surveys, June 2001, September 2001 and May 2002. Andy Clark, Regional Fisheries Program Manager, Arizona Game and Fish Department.

Personal communication, Jeff Pebworth, Region III Manager, Arizona Game and Fish Department.

Website: www.gf.state.az.us/outdoor_recreation/wildlife_area_upper.html.

PAR Budget Table—Upper Verde River Wildlife Area Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							25,261
Project Planning	Supervise/coordinate	L. Hours	16.00	35.00	1	560	
Road Construction & Repair	Grade 1/2 mile	Day	1.00	638.00	1	638	
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	5,000.00	3.00	1	15,000	
Fence	Inspection and maintenance	L. Hours	100.00	40.00	1	4,000	
Gate, Classic	Powder River,Classic	Item	4.00	189.75	30	25	
Lock	Padlock	Item	4.00	19.00	2	38	
Other		Item	1.00	5,000.00	1	5,000	
- BIOTIC SURVEYS							11,390
Project Management	Supervise/coordinate	L. Hours	20.00	35.00	1	700	
Plant Ecologist	Field Svy. & Reports	L. Hours	40.00	35.00	2	700	
Plant Ecologist	Focused SC plant monitoring	L. Hours	8.00	35.00	2	140	
Fisheries Biologist	Field Svy. & Reports	C. Hours	40.00	75.00	1	3,000	
Fisheries Biologist	Focused WSC monitoring	C. Hours	20.00	75.00	1	1,500	
Hydrologist	Water level monitoring	L. Hours	70.00	35.00	1	2,450	
Mammalogist	Field Svy. & Reports	L. Hours	20.00	75.00	1	1,500	
Ornithologist	Field Svy. Pt. Counts	L. Hours	20.00	35.00	1	700	
Ornithologist	YBC & WSC monitoring	L. Hours	20.00	35.00	1	700	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							4,615
Hydroseed	Homestead meadow	Acre	5.00	600.00	5	600	
Exotic Plant Control	Hand Removal various species	L. Hours	40.00	15.00	1	600	
Exotic Plant Control	Roundup	Gal.	5.00	35.00	1	175	
Exotic Plant Control	Backpack Spray	L. Hours	16.00	15.00	1	240	
Exotic Animal Control	Bullfrog culling,gigging	C. Hours	120.00	25.00	1	3,000	
- WATER MANAGEMENT							1,020
Water Testing	Test	Report	3.00	1,200.00	5	720	
Water Testing	Test	C. Hours	20.00	75.00	5	300	
- PUBLIC SERVICES							16,283
Office	Replacement	Sq. Ft.	100.00	85.00	30	283	
Patrolling	Patrol	L. Hours	300.00	35.00	1	10,500	
Parking Area	Add crushed rock and grade	Sq. Ft.	600.00	3.00	1	1,800	
Trail	Maintenance	L. Hours	20.00	15.00	1	300	
Trail	Decomposed Granite	Cu. Yd.	50.00	19.00	1	950	
Sign, Polyethelene	21" x 14" 10 words	Item	100.00	20.50	5	410	
Kiosk, Redwood	Site Specific Design	Item	1.00	5,000.00	20	250	
Volunteer Coordinator	Meetings	L. Hours	8.00	30.00	1	240	
Interpretive Literature	Labor	L. Hours	10.00	45.00	1	450	
Interpretive Literature	Copy	Page	2,000.00	0.10	1	200	
Community Outreach	Meetings on water	L. Hours	20.00	45.00	1	900	
- GENERAL MAINTENANCE							3,380
Sanitation Control	Collection and disposal-staff	L. Hours	32.00	25.00	1	800	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Sanitation Control	Collection/disposal-volunteers	L. Hours	160.00	12.00	1	1,920	
Hauling, Truck	Truckload	Item	0.50	57.50	1	29	
Hauling, Truck	Dumping fee	Item	2.00	30.00	1	60	
Trash Liners	Liners	Item	2.00	5.50	1	11	
Toilets, Portable	Monthly Rent	Months	8.00	70.00	1	560	
- REPORTING							3,220
Database Management	Data Input	L. Hours	20.00	35.00	1	700	
GIS/CAD Management	Data Management	L. Hours	20.00	35.00	1	700	
Photodocumentation	Field Survey	L. Hours	4.00	35.00	1	140	
Annual Reports	Summary	L. Hours	20.00	35.00	1	700	
Annual Work Plan	Plan and Budget Comparison	L. Hours	8.00	35.00	1	280	
Monitoring Reports	Monitoring Documentation	L. Hours	20.00	35.00	1	700	
- OFFICE MAINTENANCE							669
Preserve Office	Janitorial	Sq. Ft.	100.00	0.20	1	20	
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	100.00	1.00	1	100	
Telephone Charges, Annual	Phone Charges	Person	0.10	1,200.00	1	120	
Insurance, Fire	Structure (Theft, Vandalism)	\$1000 Valu	5.00	0.04	1	0	
Insurance, Contents	Contents	\$100 Value	50.00	0.20	1	10	
Office Supplies, Year	Supplies	Person	0.10	192.00	1	19	
Furniture	Desk	Item	0.10	250.00	10	3	
Furniture	Chair	Item	0.10	150.00	5	3	
Furniture	Bookcase, 3'x5'	Item	0.10	150.00	8	2	
Furniture	File cabinet	Item	0.10	400.00	10	4	
Copier	Copier, 15-18 ppm	Item	0.10	3,833.00	8	48	
Fax Machine	Standard	Item	0.10	400.00	5	8	
Telephone	Touch-tone	Item	0.10	95.00	5	2	
E-Mail	Services	Year	0.10	360.00	1	36	
Cellular Pager	Unit	Unit	0.10	120.00	5	2	
Cellular Pager	Services	Year	0.10	720.00	1	72	
Computer, PC & Monitor	Pentium	Item	0.10	2,100.00	4	53	
Computer software	Microsoft Office Pkg	Item	0.10	450.00	4	11	
Deskjet Printer	HP DeskJet 895	Item	0.10	399.00	6	7	
GIS ARC/INFO	GIS, PC based	Item	0.05	15,000.00	5	150	
- FIELD EQUIPMENT							5,453
GPS, Rover & Base Unit	GPS/Corrected	Item	0.10	5,000.00	5	100	
Surveying Equip.	Misc. Equipment	Item	1.00	2,400.00	5	480	
Surveying Equip.	Reels, bobs, etc.	Misc.	1.00	2,400.00	5	480	
Vehicle	Small pickup	Item	0.10	22,000.00	8	275	
Vehicle	Mileage	Mile	3,600.00	0.50	1	1,800	
Vehicle Insurance	Insurance	Year	0.10	1,100.00	1	110	
Other	Water testing and Flow Meters	Item	1.00	15,000.00	8	1,875	
Other	Veg. monitoring equip.	Set	1.00	2,000.00	6	333	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- OPERATIONS							3,540
Network Interview/Contracts	Maintain contracts	L. Hours	2.00	30.00	1	60	
Budgeting	Budget & reconcile	L. Hours	4.00	30.00	1	120	
Supervisor Site Visit	Site visits	L. Hours	96.00	3 5.00	1	3,360	
Subtotal						74,832	74,832
Contingency @ 10%						7,483	
Administration @ 22%						18,109	
Total						100,425	

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Bryte Ranch Mitigation Bank

Property Description

The 573-acre Bryte Ranch is located north of the intersection of Calvin and Grant Line Roads in southern Sacramento County. The property is currently owned and managed by Bryte Ranch, LLC as a vernal pool mitigation bank. The property was once a part of the larger Bryte Ranch estate and was used as grazing land for dairy cattle. Southern Sacramento County has experienced many land use changes, including the conversion of pastureland to vineyards and residential development. Vineyards currently border the property to the south, while an older residential development lies west, and a newly constructed residential development lies east. To the north, the land is still open space, but is being considered as the location for a storm water detention facility by Sacramento County.

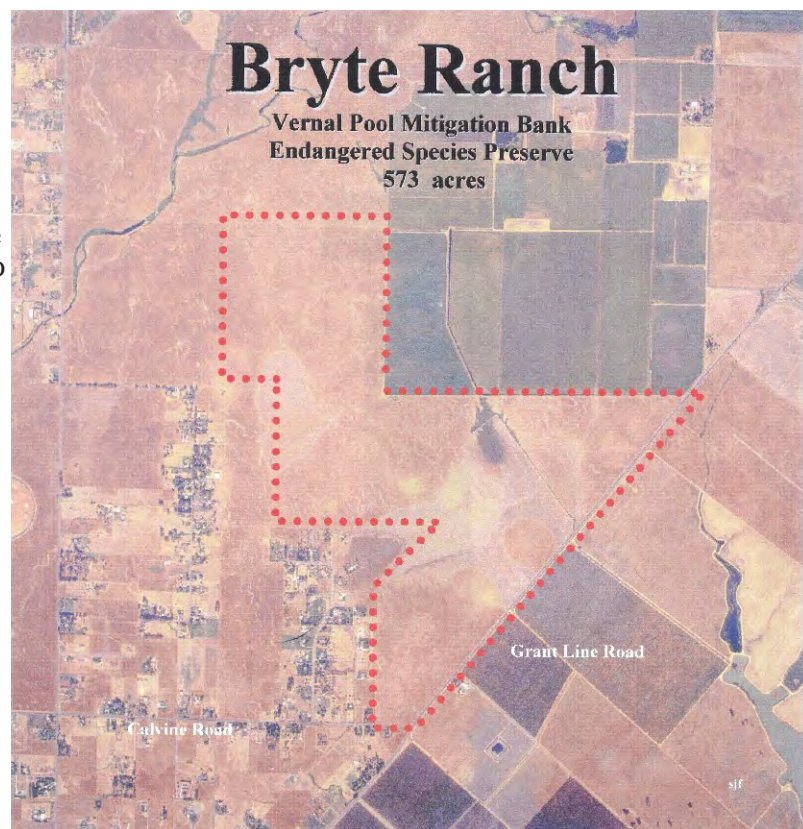
All of the property is leased for grazing. The primary goal of grazing is to maintain the species diversity and desired species composition by reducing the accumulation of thatch and encroachment of weedy species within the wetland and upland areas. Both the numbers of cows and the class of cows are adjusted in order to maintain the target residual dry matter (RDM) level (800-1,000 pounds per acre). Typically the cattle are put on the preserve by mid-November and removed in late spring, when the water source dries.

Project Goals

The overall objective of the Bryte Ranch Operation and Management Plan (Plan) is to maintain, in perpetuity, the existing biological values of the preserve for the benefit of the special status species and the habitats on which they depend. As a U.S. Fish and Wildlife Service approved mitigation bank, the preserve manager's responsibility is to promote, protect, maintain and enhance the vernal pool habitat for the listed invertebrates. The preserve manager is also responsible for hiring qualified personnel to conduct the monitoring activities that require a certified biologist.

Biological Description

The preserve is comprised of rolling grasslands with areas of surface depression that have been classified as vernal pools or swales. The annual grassland habitat is dominated by non-native species, including sticky tarweed (*Holocarpha virgata*), wild oat (*Avena fatua*), and soft brome (*Bromus hordeaceus*). The preserve can be broken into three distinct biological features: the southern portion comprised of nonnative annual grassland and scattered vernal pools, the middle portion comprised of one large body of water, and the northern portion comprised of dense vernal pools ranging in size from several feet to several acres.



Approximately 168 acres of jurisdictional waters of the United States have been mapped on the preserve, and include vernal pool and swales, seasonal wetlands, seasonal wetland drainage, seasonally saturated wetlands, and freshwater marsh. Vernal pools and swales account for approximately 130 acres (741 pools) and are likely to support federally listed species. The additional 38 acres of other seasonal wetland types may also support listed species.

Vegetation in the pools is largely consistent with other pools in the geographic area and include ornate downingia (*Downingia ornatissima*), woolly marbles (*Psilocarphus brevissimus*), white-head navarretia (*Navarretia leucocaphala*), Orcutt's quillwort (*Isoetes orcuttii*), hairgrass (*Deschampsia danthonioides*), pogogyne (*Pogogyne zizphoroides*), spike-rush (*Eleocharis macrostachys*), and coyote thistle (*Eryngium vaseyi*).

Special status invertebrate surveys have determined the federally threatened, vernal pool tadpole shrimp (*Lepidurus packardii*), and the federally endangered, vernal pool fairy shrimp (*Branchinecta lynchi*).

Other non-listed special status species for which the property is within the designated geographic range, and that may potentially occur at the site include California lindriella (*Lindriella occidentalis*), California tiger salamander (*Ambystoma californiense*), western spadefoot toad (*Scaphiopus hammondi*), giant gartersnake (*Thamnophis gigas*), Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), and burrowing owls (*Athene cunicularia*).

Previous investigations conducted by Jones and Stokes Associates in the immediate vicinity of the preserve have indicated presence of five special-status plants: slender Orcutt grass (*Orcuttia tenuis*), legenere (*Legenere limosa*), dwarf downingia (*Downingia pusilla*), Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), and Douglas' mesamint (*Pogogyne douglasii*). These species also have the potential to occur on the preserve.

Organizational Structure

The organizational structure of the project is not yet certain. The bank entrepreneur who is also the owner of the property may manage the bank for a period of time. However, the preserve is also leased annually to a cattle rancher so that the lessee's activities must also be consistent with the goals of the manager. Depending on whether ongo-

ing returns from the property are competitive with alternative investments, the project may eventually be conveyed to an agency or nonprofit for perpetual stewardship.

Habitat Management Activities

Site Construction-All of the preserve is available for grazing. Under site construction, therefore, fencing for cattle, gates and locks are installed and maintained. Maintenance of the fencing and gates to control grazing is the responsibility of the grazing contractor. Deliberate dumping has not been a problem, but periodic trash pick up is necessary. Trespassing and unauthorized use of off-road vehicles has not been a problem. The perimeter of the preserve is fenced and signed every 2,000 feet. Trash pickup and signs occur in General Maintenance and Public Services respectively.

Biotic Surveys-Species monitoring of the vernal pools is required by the U.S. Fish and Wildlife Service in years 1, 2, 5, 8, 11, 14, 17, 20 and every 5 years thereafter. Biological monitoring is conducted by a biologist who has experience sampling/monitoring vernal pools and their special-status species. The required monitoring includes sampling for special-status animals, recording the hydrological conditions, and describing the vegetative community. The required monitoring in the estimated is scheduled every five years for the long term.

A minimum of three visits are made during the wet season to sample for special-status animals. The first visit is made early in the wet season (generally, January to early February) to improve the chances of detecting vernal pool fairy shrimp, and the last visit is made late in the season (generally, March to April). Presence is determined by a qualified and permitted biologist. A subset of pools (5 percent of the 741 pools, i.e., 40 pools) are sampled to determine population trends. These pools are mapped and recorded, and the site map attached to field data sheets. The number of the listed crustaceans, and any other species found on the preserve are estimated.

Hydrological conditions at the time of each sampling are also recorded. Hydrologic measurements at each pool include, pool size-surface area and maximum length and width and maximum depth of the pool.

The vegetation, within selected vernal pools, and other seasonal wetlands is sampled in each moni-

toring year. Total cover, relative cover, species composition and species richness is measured. Sampling occurs during the spring and early summer, as appropriate for the amount and timing of rainfall received during the monitoring years.

Vegetative monitoring also requires spot-checks for special-status species which are conducted according to the Service's "Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants." The general diversity of the flora within the selected vernal pools is recorded as the number of species present within each sampled pool along with any additional species observed during the special-status species spot-checks.

Although not required by the U.S. Fish and Wildlife Service, surveys for Swainson's hawks, white-tailed kites, and burrowing owls are conducted annually.

Habitat Maintenance-During RDM and vegetation surveys, the condition of the vegetation is evaluated to determine the extent of weedy vegetation. When conditions occur in which grazing is not adequately controlling noxious weeds, spot spraying with an approved herbicide is used to supplement the effect of grazing. This function is assumed to be contracted and includes labor, equipment and spray.

Public Services-Since the public is not allowed on this private property, the only cost in this category are signs.

General Maintenance-Similarly, only minor trash pickup is needed because the public is not present on the site.

Reporting-Monitoring reports are written and submitted to the U.S. Fish and Wildlife Services and California Department of Fish and Game annually and contain a summary of management practices, conclusions, and recommendations. Photodocumentation is included as well as a statement of compliance with the terms of the conservation easement. In addition, the habitat management plan is updated as needed, at a minimum of every 5 years.

Office Maintenance-Because the amount of work necessary to manage and maintain the preserve office maintenance is not a full time job (i.e., 1820 hours annually). The preserve does not have an office on site. The office needs are shared by other costs and are prorated by the amount of annual

labor hours. As a private owner, property taxes are paid.

Field Equipment-Similarly, the costs for field equipment (i.e., vehicle, camera, and binoculars) are prorated by the amount of labor hours necessary for a full-time employee. Mileage is calculated from the owner's office to the site.

Operations-Operations include contracting and accounting and liability insurance. As a mitigation site, an endowment for permanent stewardship and an audit of the project's financial status is included. As a private owner, property taxes are paid.

Habitat Management Cost Estimates

Habitat management cost estimates were developed from a review of the Operations and Management Plan, site visits to the property and discussions with the operations manager.

Annual ongoing stewardship costs for the Bryte Ranch Mitigation Bank is about \$44 an acre, or \$18,000 a year. This figure includes a 10 percent contingency and a 24 percent administrative rate. The contingency is a default, the administrative rate was approved by the manager. The largest category is biotic surveys with nearly \$5,300 a year followed by Operations at \$2,300 and Reporting at \$1,600.

Endnotes

Bryte Ranch Conservation Bank Operations and Management Plan, prepared by Steve French, Bryte Ranch, LLC for the California Department of Fish and Game and the U.S. Fish and Wildlife Service. February 2003.

Bryte Ranch site visits, March 23 and 24, 2004.

Correspondence with Steve French (operations manager) October 2003 - March 2004.

PAR Budget Table—Bryte Ranch Mitigation Bank Annual Average Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							1,897
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	17,500.00	3.50	35	1,750	
Gate, Cattle	5' X 12' gate	Item	6.00	695.00	30	139	
Lock	Padlock	Item	2.00	19.00	5	8	
- BIOTIC SURVEYS							5,286
Project Management	Supervise/coordinate	L. Hours	8.00	35.00	1	280	
Project Management	Coordinate Grazing Schedule	L. Hours	10.00	35.00	1	350	
Plant Ecologist	Vegetative Community	C. Hours	50.00	80.00	5	800	
Wildlife Biologist	Easement & Plan Compliance	L. Hours	8.00	35.00	1	280	
Wildlife Biologist	Grazing Plan & Visual RDM est.	L. Hours	16.00	35.00	1	560	
Wildlife Biologist	RDM Sampling & Report	L. Hours	32.00	35.00	1	1,120	
Wildlife Biologist	Pool Measurements	L. Hours	16.00	80.00	5	256	
Entomologist	Species Surveys	C. Hours	50.00	80.00	5	800	
Ornithologist	Special Status Species Survey	L. Hours	24.00	35.00	1	840	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							587
Exotic Plant Control	Herbicide & Application	C. Hours	16.00	110.00	3	587	
- WATER MANAGEMENT							
- PUBLIC SERVICES							19
Sign, Aluminum	Aluminum 12» X 12»	Item	9.00	15.00	7	19	
- GENERAL MAINTENANCE							280
Sanitation Control	Collection and disposal	L. Hours	8.00	35.00	1	280	
- REPORTING							1,646
Photodocumentation	Field Survey	L. Hours	10.00	35.00	1	350	
Other	Acquire aerial photos	L. Hours	1.00	38.00	1	38	
Other	Aerial photo cost	Item	1.00	250.00	1	250	
Annual Reports	Summary	L. Hours	24.00	35.00	1	840	
Management Plan	5 year Plan	L. Hours	24.00	35.00	5	168	
- OFFICE MAINTENANCE							225
Utilities, Annual	Elec., Gas, Water	Item	0.10	150.00	1	15	
Telephone Charges, Annual	Phone Charges	Person	0.10	800.00	1	80	
Office Supplies, Year	Supplies	Person	0.10	500.00	1	50	
Telephone	Phone Services	Item	0.10	600.00	5	12	
E-Mail	Services	Year	0.10	250.00	1	25	
Computer, PC & Monitor	133 MHz Pentium	Item	0.10	1,500.00	5	30	
Laser Printer	HP LaserJet 5L	Item	0.10	500.00	4	13	
- FIELD EQUIPMENT							868
Vehicle	Small pickup 4 x 4	Item	0.10	23,000.00	10	230	
Vehicle	Fuel, Regist., Insur., & Maint.	Mile	1,250.00	0.50	1	625	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Camera 35mm/lens	Digital camera	Item	0.10	350.00	5	7	
Binoculars	Binoculars 10 X 50	Pair	0.10	300.00	5	6	
- OPERATIONS							2,273
Contracts	Grazing lease	L. Hours	8.00	35.00	1	280	
Taxes and Fees	Property or District	Year	1.00	1,163.00	1	1,163	
Computer software	Microsoft Office Pkg	Item	0.10	450.00	4	11	
Audit	CPA Audit	Acre	573.00	0.25	1	143	
Endowment	Process endowment	L. Hours	4.00	30.00	1	120	
Project Accounting	Setup and maintain	L. Hours	8.00	30.00	1	240	
Insurance	Liability/Fee	Acres	573.00	0.55	1	315	
Subtotal						13,080	13,080
Contingency @ 10%						1,308	
Administration @ 22%						3,453	
Total						17,841	

Carpinteria Salt Marsh Reserve

Project Description

The Carpinteria Salt Marsh Reserve (CSMR) is 120 acres in size and borders the city of Carpinteria (approximately 12 miles east of Santa Barbara, California). Ninety percent of southern California's coastal estuaries have been converted to other land uses thereby making CSMR a significant biological resource. CSMR is owned by the University of California and managed as one of their Natural Reserves.

The two maps on this page compare the current (Fig. 1) and historical (Fig. 2) extent of the marsh. Fig. 1 also shows developed areas in white and agricultural areas in pink.

The property is bordered in part by lands owned by the city of Carpinteria and the county, however, the majority of adjacent lands are owned privately. An important recreational beach utilized by both



Fig. 1. Current Marsh.



Fig. 2. Historic Marsh.

residents and tourists is located less than a block away. Residential uses and nearby commercial uses have significant impacts on the property. The University has responded by incorporating educational facilities and low impact ways of visiting the marsh into its design.

Project Goals

As part of the University of California's Natural Reserve System, CSMR is intended to represent an

undisturbed example of natural habitat for the purpose of instruction and research. The primary goals are to manage Carpinteria Salt Marsh and adjacent upland habitats to ensure the preservation and maintenance of natural and cultural resources and to promote research, education, public service and stewardship. Funding for the site has been minimal since its inception, but has included the following sources: UC Natural Reserve System, UC Santa Barbara, grants from various agencies and private donations.

Most management activities fall within the realm of either promoting research and education or maintaining the proper function of the estuary. As a UC reserve, significant time is spent attracting and fostering research on the reserve. This includes promoting the Reserve through lectures, field trips, brochures and publications, and providing databases and mapping systems to support research at CSMR. Funding is also actively pursued for focused research projects relating to the management and restoration of the marsh. There are also significant resources needed for restoring the natural processes in the marsh. Periodic desilting of channels and removal of invasive plants are expensive yet essential to keeping the marsh in as natural a state as possible.

Biological Description

The climate at CSMR generally consists of mild, moist winters and moderately warm, rainless summers. Precipitation averages approximately 18 inches per year. Fog is an important characteristic especially in late spring and early summer. Temperatures are generally mild with the average minimum temperature in January above freezing and the average maximum temperature in August of approximately 75° F.

The watershed of Carpinteria Salt Marsh is confined to the drainages of Franklin and Santa Monica Creeks, and a smaller unnamed drainage

to the west of Santa Monica Creek. The watershed above the marsh, contains chaparral, open fields, orchards and urban areas. The Franklin Creek sub-watershed is approximately 2,732 acres in size and the Santa Monica Creek sub-watershed is approximately 3,853 acres in size. Franklin Creek and Santa Monica Creek converge within CSMR and form a main channel that extends to the mouth of the estuary.

Carpinteria Salt Marsh Reserve and vicinity contains both upland habitats (e.g., dunes, alluvial fans/deltas, berms, roadside and dredge spoil) and wetland habitats (e.g., intertidal and non-tidal vegetated and non-vegetated flats, ditches, banks, slopes, and depressions), and deepwater habitats (e.g., estuarine, shallow subtidal-channels and marine, offshore subtidal-rocky-reef). The predominant vegetation/habitat form is estuarine emergent wetland dominated by pickleweed (*Salicornia virginica*).

CSMR provides many important ecosystem functions under the categories of hydrology, water quality and nutrient cycling, food chain support and habitat. Important hydrology functions provided by the marsh include shoreline protection from major winter storms, storm runoff capacity during flooding, and protection of groundwater resources as a transition between saline and freshwater resources. The water quality and nutrient cycling function includes improvement in water quality through conversion or assimilation of pollutants in watershed runoff and ground water seepage and the cycling of nutrients among watershed, estuarine, and marine sources. The food chain includes the assimilation of nutrients and detritus by primary producers such as microorganisms and plants throughout the growth and reproduction of various macro-invertebrates such as molluscs and arthropods. It also includes the predation on marsh organisms by estuarine-restricted vertebrate animals as well as estuarine visitors such as marine fish, migratory birds and local mammals.

The habitat function may be most important for endangered species including habitat for resident endangered species such as light-footed clapper rails (*Rallus longirostris levipes*), Belding's Savannah sparrow (*Passerculus sandwichensis beldingi*), and salt marsh bird's beak (*Cordylanthus maritimus maritimus*). Other existing habitat functions include habitat for preservation of native biodiversity such as endemic, estuarine-restricted organisms, nursery functions for marine fish such

as California halibut and diamond turbot, and habitats for migratory birds such as various shore birds and ducks. Socio-economic values of the marsh include the important role of the estuary in the local sports fishery for halibut, research and educational activities, painting, bird watching and guided tours.

CSMR is susceptible to a range of potential threats due to its small size, urban borders and largely unnatural watershed. Development, invasive plants, sedimentation, predators, and spills of hazardous substances all potentially threaten the integrity of the Reserve. Threats to CSMR are substantial and in many cases chronic and thus require active management to keep the natural processes functioning. Ameliorating threats to the marsh make up the majority of the operating costs at CSMR.

Development

Urban development within the watershed can affect the amount and quality of freshwater runoff entering the marsh and contaminant levels in runoff and in shallow ground water. Annual storm runoff directed into the marsh dramatically lowers salinities, erodes channels, and transports large quantities of sediment, debris, nutrients and materials into the marsh. Perennial and temporary runoff entering the marsh is nutrient enriched. Runoff enriched in nitrate entering tidal channels contributes to the rapid deterioration of water quality during periods of reduced tidal flushing. Agricultural development within the watershed also increases rates of erosion, and thus influences the transport of sediments into the marsh.

Invasive plants

Invasive plant species are an important concern at CSMR. While most of the estuarine wetland habitats are dominated by native plants, some of the upland habitats are dominated by introduced species of plants. Sources of invasion by non-native plants include the Union Pacific Railroad right-of-way, stream flows, ocean-deposited rack, and adjacent yards and gardens. One species of particular concern is sea lavender (*Limonium ramosissimum*) because it potentially threatens a population of salt marsh birds-beak which is federally-listed as endangered. Other important invasive plants include giant reed (*Arundo donax*), black mustard (*Brassica nigra*), Italian thistle (*Carduus pycnocephalus*), hottentot fig (*Carpobrotus edulis*), poison hemlock (*Conium maculatum*), pampas grass (*Cortaderia jubata*), sweet fennel (*Foeniculum*

vulgare), croceum iceplant (*Malephora crocea*), myoporum (*Myoporum laetum*), kikuyu grass (*Pennisetum clandestinum*), castor bean (*Ricinus communis*), and Russian thistle (*Salsola tragus*).

Predation on birds

Ground nesting birds in estuaries such as CSMR are extremely vulnerable to predation by various mammals (e.g., weasels, raccoons, skunks, opossums, domestic and feral cats, and red foxes) and some birds (e.g., egrets, herons, gulls, and crows). Eggs, juveniles, and adults are each vulnerable depending on the predator and prey involved. In addition to habitat loss, predation is another significant factor that has contributed to the endangerment of ground nesting birds such as the light-footed clapper rail, a federal and state listed endangered species. Naturalized species such as red fox and feral cats are particularly problematic, even in low numbers.

Sedimentation

Sedimentation impacts to the marsh threaten the long-term viability of the marsh by reducing tidal flushing and habitat diversity and by smothering benthic fauna. The marsh is a conduit for flood water flowing from the watershed to the Pacific Ocean. Large areas of intensively developed agricultural and urban lands surrounding the marsh are subject to flooding, erosion and the deposition of sediment and debris. At least 25 damaging floods have occurred in the Carpinteria Valley over the last 115 years. Flood waters and associated sediments cause the expansion of alluvial fans in the lower watershed which, without management, would eventually fill the marsh. Sedimentation reduces the marsh tidal prism and thus reduces the oxygenation of sediments and removal of pollutants and nuisance algae in channels and on tidal flats.

Factors exacerbating flooding and sediment deposition in the marsh and the surrounding floodplain include large winter storm events, erosion of agricultural land in the lower watershed, fire in the upper watershed, and reduced drainage channel capacities in the marsh. In addition, obstruction of the marsh inlet by sand prevents the drainage of sediment-laden flood waters to the ocean.

Catastrophic events

Carpinteria Salt Marsh is an estuary in an urban setting, surrounded by roads, a highway, and a

railroad corridor that are potential sites for catastrophic pollution events. Its watershed is drained by two streams and a series of artificial and altered drainages that are potential sources of chronic as well as catastrophic events such as storm runoff and flooding. Furthermore, the estuary is along the South Coast of Santa Barbara County, which contains offshore oil platforms and commercial shipping lanes. The site is within an active tectonic zone, where a strong earthquake could cause serious damage to the resources and functions of the estuarine ecosystem. Thus CSMR is highly vulnerable to impacts from catastrophic events. In 1969 an offshore platform oil spill produced an oil slick, some of which covered a portion of CSMR. Twenty five major floods have occurred in the Carpinteria Valley in the last 115 years. In the vicinity of Carpinteria, freeway and railroad accidents have caused serious gasoline and rocket fuel spills in the last decade that demonstrate the need for a response strategy to potential catastrophic events.

Organizational Structure

Carpinteria Salt Marsh Reserve became part of the UC Natural Reserve System after the acquisition of 120 acres in 1977. The site is currently staffed with one reserve manager (1/4 time) and one reserve steward (1/4 time) as well as staff that administer all the UC Reserves in the region.

CSMR is part of the larger Carpinteria Salt Marsh which is approximately 230 acres in size. Other owners of the salt marsh include private individuals, private associations, private corporate, trusts, Santa Barbara County, and the city of Carpinteria. The varied ownerships and surrounding land uses add a great deal of management complexity to this reserve. In addition, there are dozens of state, federal, and county agencies that have jurisdiction or an advisory role regarding the marsh. A management advisory committee composed of owners and agency personnel advises the reserve manager on management of the reserve and implementation of a 5-year management plan.

Habitat Management Tasks

Most of the costs in the site construction section are associated with the maintenance of a gravel road (approximately 1,400 feet long) and the periodic replacement of a chain link fence (approximately 3,000 feet long) on the northern border of the site. This work would be done on contract. Estimated maintenance and replacement cost for this section is \$1,184.

The biotic surveys section includes monitoring vegetation, invertebrates, fish and bird populations and census of endangered species at the site. Variables such as water quality, tides, temperature and precipitation are also routinely monitored. The estimated annual cost for biotic surveys at CSMR is \$3,458.

Habitat maintenance activities will likely resemble ongoing restoration because of the level of threats such as pollution and sedimentation within the urban/agricultural watershed that affect the functioning of the marsh.

In addition, several habitat maintenance tasks are necessary to keep the marsh functioning in a semi-natural state even in non-emergency conditions. These include removal of invasive plants, controlling sediment and contaminants in the watershed and attempts to minimize the effects of new development in the area. Removal of invasive plants is the most labor-intensive task at the marsh and requires 1,000 hours of labor per year. In addition, coordinating with the mosquito abatement district and direct costs of abatement are substantial. The estimated annual cost of habitat maintenance at CSMR is \$41,770.

Tasks in the water management category include periodic de-silting of the channels which is vital for proper tidal flushing and functioning of the estuary. This task is needed once every 15 years and has been roughly priced by bids at approximately \$875,000 assuming the sand can be left at the beach. If it must be moved somewhere else the cost would be upwards of a \$1,000,000. The average annual cost for water management is estimated to be \$58,523, the vast majority for de-silting the channels.

The primary goal of UC natural reserves like CSMR is to provide an outdoor laboratory for research and other educational opportunities which is included in the public services category. Therefore significant time is spent fostering research and promoting educational opportunities at the Reserve. In addition, substantial time is needed to coordinate protection of the marsh with the variety of agencies and landowners in the area. Maintaining the capital structures designed for the public is also part of this category. An additional trail is being considered for the east side of the Reserve to tie into the gravel road, however, its maintenance cost is not included. Total annual cost for this section is estimated to be \$15,285.

The reporting section includes time for writing management plans and recovery plans and costs for aerial imagery. The estimated annual cost for this section is \$2,492.

Office management includes costs for office rent, utilities, equipment and supplies at 40 percent of each item. The manager is assigned to spend one-quarter time, however, actual hours appear to be substantially more. Since it is likely that the manager is working more than standard time, the proportion of the office is similarly increased.

This section includes expenses for a vehicle, weather station and hand tools. The project is assigned 60 percent of the vehicle. The weather station is a basic instrument recording wind, rainfall and temperature. Total annual cost for field equipment is estimated to be \$3,260.

Habitat Management Costs

Considerable resources are needed to keep Carpinteria Salt Marsh Reserve as a functioning outdoor laboratory. Vital tasks such as invasive plant control and de-siltation of channels are extremely costly. Considerable resources are also needed to fulfill the outreach objectives of the site. This summary estimates the total annual cost to operate CSMR to be \$178,000 which includes a 10 percent contingency and a 22 percent administrative rate.

Endnotes

Meeting with Andrew Brooks onsite on February 20, 2004.

Management Plan for Carpinteria Salt Marsh Reserve: A Southern California Estuary, UC Santa Barbara, 1997.

University of California, Natural Reserves Site at <http://nrs.ucop.edu/reserves/reserves.html>

PAR Budget Table—Carpinteria Salt Marsh Reserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							1,218
Road Construction & Repair	Gravel Road Maintenance	Unit	1.00	5,000.00	15	333	
Fence - Installed	Chain Link 6' with one gate	Lin. Ft.	3,037.00	8.33	30	843	
Gate	12' double, swing	Item	1.00	250.00	30	8	
Other	Storage shed	Item	1.00	500.00	15	33	
- BIOTIC SURVEYS							3,458
Plant Ecologist	ID/census endangered spp	L. Hours	24.00	38.00	1	912	
Wildlife Biologist	ID/census endangered spp	L. Hours	16.00	38.00	1	608	
Other	Environmental monitoring	L. Hours	51.00	38.00	1	1,938	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							41,770
Restoration Plan	ID sites and develop plans	L. Hours	20.00	38.00	1	760	
Restoration Plan	Implement enhancement plan	L. Hours	50.00	38.00	1	1,900	
Restoration Plan	Implement enhancement plan	L. Hours	50.00	14.00	1	700	
Other	Agencies- translocation	L. Hours	4.00	38.00	1	152	
Exotic Plant Control	Removal of invasive plants	L. Hours	1,000.00	14.00	1	14,000	
Feral Animal Control	Coordinate with ADC	Item	1.00	38.00	1	38	
Mosquito Abatement	evaluate/approve vector contrl	L. Hours	50.00	38.00	1	1,900	
Mosquito Abatement	mosquito abatement costs	Item	1.00	17,000.00	1	17,000	
Other	Sediment- ID sources & control	L. Hours	115.00	38.00	1	4,370	
Other	Minimize develop.effects	L. Hours	10.00	38.00	1	380	
Other	HOA- reduce exotics,herbicides	L. Hours	15.00	38.00	1	570	
- WATER MANAGEMENT							58,523
Channel Clearing	De-silting of channels	Item	1.00	875,000.00	15	58,333	
Water Testing	H2O quality monitoring program	L. Hours	25.00	38.00	5	190	
- PUBLIC SERVICES							15,285
Sign, Redwood	Interpretive 4'X 6'	Item	1.00	650.00	15	43	
Kiosk, Redwood	4'x 3'	Item	1.00	1,200.00	15	80	
Community Outreach	lectures,field trips,brochures	L. Hours	20.00	38.00	1	760	
Community Outreach	develop k-12 program	L. Hours	10.00	38.00	1	380	
Community Outreach	Teaching opportunities at CSMR	L. Hours	5.00	38.00	1	190	
Community Outreach	Provide CSMR databases	L. Hours	10.00	38.00	1	380	
Community Outreach	Website management	L. Hours	5.00	38.00	1	190	
Other	Sponsor student/other research	L. Hours	200.00	38.00	1	7,600	
Other	Coordinate access- gatekeepers	L. Hours	5.00	38.00	1	190	
Other	Access & interp progrm--City	L. Hours	20.00	38.00	1	760	
Other	Coord. EAFPP w/ vector control	L. Hours	20.00	38.00	1	760	
Other	Field safety/orientation	L. Hours	47.00	38.00	1	1,786	
Other	Coop agreements-landowners	L. Hours	5.00	38.00	1	190	
Other	Management Advisory Comm.	L. Hours	17.00	38.00	1	646	
Other	Agency plans conform mgmt pln.	L. Hours	5.00	38.00	1	190	
Other	Agency- pollution response	L. Hours	30.00	38.00	1	1,140	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- GENERAL MAINTENANCE							
- REPORTING							2,492
Management Plan	5 year management plan	L. Hours	250.00	38.00	5	1,900	
Other	Develop/implement recovery pln	L. Hours	8.00	38.00	1	304	
Other	Acquire aerial photos	L. Hours	1.00	38.00	1	38	
Other	Aerial photo cost	Item	1.00	250.00	1	250	
- OFFICE MAINTENANCE							5,849
Preserve Office	Rental	Per year	0.40	12,000.00	1	4,800	
Utilities, Annual	Elec., Gas, Water	Per year	0.40	1,200.00	1	480	
Office Supplies, Year	Supplies	Person	0.40	192.00	1	77	
Furniture	Bookcase, 3'x5'	Item	0.40	150.00	8	8	
Furniture	File cabinet	Item	0.40	300.00	10	12	
Copier	Copier, 15-18 ppm	Item	0.40	400.00	8	20	
Fax Machine	Standard	Item	0.40	250.00	5	20	
Telephone	Touch-tone	Item	0.40	50.00	5	4	
E-Mail	Services	Year	0.40	360.00	1	144	
Computer, PC & Monitor	Replacement	Item	0.40	2,100.00	5	168	
Computer software	Various	Item	0.40	250.00	1	100	
Deskjet Printer	HP DeskJet 895	Item	0.40	250.00	6	17	
- FIELD EQUIPMENT							3,350
Vehicle	Small pickup	Item	0.60	24,000.00	10	1,440	
Vehicle	Fuel	Gallons	250.00	2.00	1	500	
Vehicle	Maintenance	Year	0.50	300.00	1	150	
Vehicle Insurance	Insurance	Year	1.00	1,100.00	1	1,100	
Other	First Aid Kit	Item	1.00	50.00	5	10	
Other	Various hand tools	Item	1.00	250.00	5	50	
Other	weather station/environ. monit	Item	1.00	1,500.00	15	100	
- OPERATIONS							774
Contracts	Produce contracts	L. Hours	10.00	38.00	1	380	
Budgeting	Budget & reconcile	L. Hours	8.00	38.00	1	304	
Project Accounting	Setup and maintain	L. Hours	3.00	30.00	1	90	
Subtotal						132,720	132,720
Contingency @ 10%						13,272	
Administration @ 22%						32,118	
Total						178,110	

Dye Creek Preserve and Lassen Foothills Conservation Easements within the Lassen Foothills Project

Property Description

The property consists of two parts: the Dye Creek Preserve with 37,540 acres of operating ranch and Lassen Foothills Conservation Easements that encompasses 58,000 acres. Together they are referred to as the Preserve. Both are located in the northeastern region of the Sacramento Valley (eastern Tehama County) in northeastern California and are managed by The Nature Conservancy (TNC). The Preserve is located at the heart of TNC's Lassen Foothills Project. (The Foothills Project includes other properties such as the Vina Plains vernal pool complex which is not included in this survey.) Little Antelope Creek serves as the Preserve's northern boundary and Mill Creek, which provides the highest elevation salmon spawning habitat in North America, serves as its southern boundary. The Tehama Wildlife Area, managed by the California Department of Fish and Game, and the Ishi Wilderness Area, managed by the U.S. Forest Service, border the Preserve to the east. Agricultural lands border the Preserve to the west. The 37,540 acre Preserve encompasses nearly the entire Dye Creek watershed.

The overall management goal of the ranch and conservation easements is to exhibit the feasibility of biodiversity conservation within the context of an economically viable ranching operation which includes both hunting and grazing activities. To

this end, the ranch is used by TNC and partners to develop and demonstrate ecological restoration techniques and other conservation related land manage-

ment practices that are compatible with ranching operations.

The Dye Creek Preserve and Lassen Foothills Plains Conservation Easements are showcases to demonstrate to key public agencies and private landowners the feasibility and ecological and economical benefits of innovative practices to restore and sustain biodiversity. These Preserves aid in demonstrating to agencies and private landowners that conservation easements on private ranches are both biologically and economically viable.

Project Goals

The biological significance of the Lassen Foothills area was initially identified by TNC in 1982, when they first acquired lands in the project area for their Vina Plains Preserve. Stretching from the Sacramento River bottomlands to the montane forest and meadows of Lassen National Park, the Lassen Foothills Project encompasses a mosaic of California's most threatened biological communities. The long-term vision of the project is to protect the viability of 11 upland and aquatic sites within a 900,000 acre project area on the western slopes of Lassen Peak. Conserving the biological diversity of this relatively intact landscape will require the protection of extensive grasslands and blue oak woodlands, six significant tributaries to the Sacramento River, and long-term compatible land uses on the matrix of large private ranches and public lands.

The overall management goal of the Dye Creek Preserve is to demonstrate the feasibility of biodiversity conservation within the context of an economically viable ranch, which includes both grazing and hunting operations. The management objectives are grouped into five categories: biological resources, cultural resources, ranching operations, education and public access, and site and facilities maintenance. Specific objectives from the management plan for the Dye Creek Preserve include the following.



Biological Resources

- secure the foothill yellow-legged frog population and native fish assemblage in Dye Creek.
- promote and facilitate inventories of small mammals, upland birds, reptiles, amphibians, upland invertebrates, and rare plants.
- continue ongoing research and monitoring with project partners.
- maintain and enhance native plant diversity and forage through long-term fire management.

Cultural Resources

- continue protecting Native American archaeological sites from vandalism and wildlife management activities.
- update the current archaeological map of the Preserve and integrate into GIS.

Ranching

- continue grazing lease and optimize grazing practices.
- maintain healthy populations of game animals to support hunting operations.

Education and Public Access

- develop good working relationships with local schools.
- sponsor public tours, docent-led walks and volunteer opportunities.
- coordinate with other staff to determine volunteer opportunities and Preserve staff needs.

Facility Maintenance

- ensure that conditions on-site are safe and the resource is protected from fire, trespass and poaching.

Additional goals cited by management include the conservation of large function oak woodland landscapes for resident birds, migratory deer and large predators.

Similar to the Preserve, the overall goal of the conservation easements is biodiversity conservation through the use of economically viable ranches. These ranches are privately owned, but the land use is restricted by specific terms in the conservation easement. The cost of managing the Preserve and easement compliance monitoring for these ranches is included in this analysis.

Biological Description

Dye Creek bisects the property from east to west and supports a diverse native fishery, as well as

a healthy population of yellow-legged frogs. The lower reach of Dye Creek provides habitat for rearing the threatened Chinook salmon. The Preserve also encompasses the state's largest stand of blue oak woodlands in conservation ownership. Other natural communities within the Preserve include grasslands, vernal pools, seasonal wetlands and riparian forest. The mosaic of uplands serve as wintering habitat for the Tehama deer herd, the largest migratory deer herd in the state. Over 600 plant species have been documented on the Preserve, including 14 species of rare plants such as woolly milkvetch (*Limnanthes floccosa*) and adobe lilly (*Fritillaria pluriflora*). One hundred and twenty five different species of birds and 40 different species of mammals, including 13 species of bats, have been also documented on the Preserve.

In addition to these significant biological values, the Preserve is also considered one of the most significant and best preserved Native American cultural sites in the West. Extensive research has been conducted within the Preserve on Yana and Yahi culture.

Invasive exotic plants such as Medusa head and yellow star thistle impact the Preserve and require control measures. Wildfire as opposed to controlled burns is also a management concern as it is both damaging and expensive to fight. On the other hand, monitoring results indicate that prescribed fire is reducing fuel loads as well as achieving better plant balances, with a general maintenance or increase in the cover of native plants and significant reductions in Medusa head and to a lesser extent in yellow star thistle.

Organizational Structure

In 1988, state controller Gray Davis and the Bank of America settled a lawsuit of unclaimed bank accounts that benefitted the Preserve and other ecologically significant lands. The settlement was the first domestic "debt for nature" swap. The Preserve is legally owned by the Exchange Bank of Santa Rosa with the state of California as the beneficial owner. TNC manages the Preserve under a 25-year renewable management lease. Two goals are outlined in the master management lease: enhance wildlife values and improve public access. The previous land uses of grazing and hunting are continued on the Preserve and pay for property taxes, operations, facilities maintenance and habitat management. TNC subleases the grazing

and hunting operations on a five year basis which generates significant income for the project.

TNC administers the Preserve and associated easements out of its preserve office, but also receives extensive support from its offices in Chico and San Francisco. As lessee, TNC has most of the rights and responsibilities of ownership. TNC is responsible for the Dye Creek Preserve operation and management, and is required to pay property taxes and water fees. Responsibilities include, preparing and implementing an overall management plan, administering and monitoring subleases, budgeting and accounting, coordinating scientific research, monitoring a public education program and sponsoring public uses.

To help achieve the biological management and lease goals, TNC has a number of subleasees and partners including a grazing sublease, a hunting sublease and an education partner. There is also an advisory committee appointed by the state controller and TNC to provide input into Preserve management plans that are required every five years.

The Preserve's employees include two full-time and one part-time staff plus oversight by the Red Bluff and San Francisco office. There is a full-time manager and full-time assistant manager as well as a part-time office coordinator. Monitoring and research are also conducted by volunteers and visiting professors and their students.

Volunteer Hours

Volunteer hours in the form of three month interns and seasonal volunteers for specific tasks that occur throughout the year are used to fulfill the project goals (Table 1). In the past, volunteers have performed a wide array of general site safety and maintenance tasks. These have included, removing trees that threatened buildings, replacing windows, doors, and roofs, and various painting and carpenter associated tasks. Volunteer and intern time is valued in the project estimate.

Table 1. Annual volunteer hours and tasks in relation to project goals.

	<i>Biological</i>	<i>Cultural</i>	<i>Education</i>	<i>Maint.</i>	<i>Total</i>
Interns	228	0	0	252	480
Volunteer	200	25	150	225	600

Habitat Management Tasks

Similar to the habitat goals and objectives, the habitat management tasks are grouped into five

categories: biological resources, cultural resources, ranching operations, education and public access, and site and facilities maintenance. The tasks are described in the following paragraphs which correspond to the budgeted items. Tasks are defined not only as work performed by employees and others but also services purchased and amortization of capital items. Where more than one group can be identified as performing the same task, they are often shown as a separate line item with the appropriate pay rate. Volunteer time is valued at \$10 an hour.

Under site construction, approximately 77 miles or 406,000 linear feet of barbwire fence is used to enclosed cattle, and the cost of replacement is divided over 45 years. Sublessees are to maintain these fences but the ultimate responsibility lies with TNC as lessee. The 125 miles of dirt roads are also to be maintained by sublessees. Because of TNC's lease agreement, these figures are included in the project estimates. Roads are estimated to be an average of 15 feet wide and the total mileage regraded every 25 years.

More than 4,000 labor-hours are involved in biotic surveys which comprise cultural, biological and conservation easement compliance monitoring. Biological monitoring includes plant, avian, deer and pig surveys. This work includes staff, volunteers, interns and students.

Conservation easement monitoring consists of two types. Compliance monitoring is conducted to determine if the specific terms of the easement are being met. Biological monitoring is also conducted to determine if the biodiversity and ecological health of the easement property is being preserved over the long term.

Conservation easement compliance monitoring is conducted at least annually and always includes a visit to the site and a meeting with the property owner. Before each visit, the property's easement documentation is reviewed and taken into the field for reference. During the visit, the owner and TNC will estimate the residual dry matter (RDM) in pounds per acre. If both agree the RDM is at or above the minimum required by the easement and management agreement then no other measurements are required. If both agree that the RDM has dropped below the lower limit, then TNC and the owner will agree in writing on a resolution for the next grazing season. Solutions may include a reduction in the number of cattle, a change in cattle distribution or a change in the duration of

grazing. If there is a disagreement regarding the average RDM remaining on the property, TNC will return to the property and estimate RDM levels by clipping the vegetation to 1/4 inch stubble in ten 0.96 square foot plots along transects throughout the easement. The samples will then be weighed in the field and RDM will be estimated. At each visit a compliance monitoring report is also completed and pictures with a GPS location are taken of any irregular activities or alterations to the property, including alterations due to natural events, such as, floods, fires and storms.

Biotic surveys for the easements is more difficult to assess. The number of annual visits will vary by property and much of the technology of conducting these measures is still under development. However, there are some simple and practical measures that are included as part of this analysis. At each visit, pictures are taken at designated photo points and a text file attached that describes all of the vegetation within 100 feet of the point. On some easements, permanent 50-meter transects are set up to measure grassland vegetation every 10 m. These transects are surveyed in mid-spring, just as the grasses are entering their boot stage. All data is entered into a GIS database.

Habitat maintenance is concerned with exotic plants on the Dye Creek Preserve as well as bullfrogs and sunfish in the creeks. Exotic plants are being eliminated through controlled burns and cattle grazing. The actual cost of the burn is not included as it is provided by the local volunteer fire department for training purposes, however, planning and supervising controlled burns is conducted by staff. Control of bullfrogs and green sunfish is conducted by staff and volunteers.

Weed invasions are also a threat on conservation easement properties as well. Estimates of the cover of invasive weeds and trouble areas are recorded at each visit. Observations on weed invasions are shared with the owner and control actions suggested. However, since no control activities are conducted by the staff, this work is contained in easement monitoring under Biotic Surveys.

Water is purchased for the Dye Creek Preserve at an annual cost of \$26,000 a year and is included under Water Management. Water is used for two purposes: for cattle where they are not allowed to access the creeks and for adjusting creek levels during drought years.

Public Services are a large part of the activities at Dye Creek. There is a lodge that can accommodate

visitors and several other residences. The Lodge is valued at \$125 per square foot while the other buildings are valued at \$85. All have a 45-year life. All these structures are the responsibility of the manager.

In addition, the trails to be maintained are about 2.5 miles long. These are maintained with labor from volunteers. The 13 miles of canals on the property are the responsibility of a local special district and are not a responsibility of the project. In addition, there is volunteer training and the extensive outreach described in an earlier section in connection with the conservation easements, other landowners and agencies.

General maintenance includes trash pick-up and maintenance of other buildings at Dye Creek Preserve. There are about 14 other buildings including garages, storage areas and barns. All are valued at about \$40 per square foot and given a life of 40 years.

Reporting includes GIS, annual reports and management plans, particularly fire plans.

Office maintenance is based on six computers. Solar panels have been purchased for the office which may reduce utility and other costs over time. The Preserve office with about 2,000 square feet is a converted bunkhouse with three offices, bunk room, kitchen and conference room.

Field equipment includes GPS units to implement GIS mapping of the project. There are also three SUVs and two trucks dedicated to the site. Maintenance and fuel is covered at 50 cents per mile.

Few items were included in the Operations category since many of these activities occur at the regional office and are included in administrative costs. However, contracts and accounting and budgeting are included as line items. Property taxes are also in this category and are a substantial cost to this project.

Habitat Management Cost Estimates

Habitat management cost estimates were developed from the tasks needed to manage the Preserve and conservation easements. The fiscal years' 2001 and 2002 budgets were utilized plus planned tasks and capital replacement. Because volunteers help complete tasks that would otherwise need to be completed by a seasonal employee, their value is estimated and is included.

Annual ongoing stewardship costs for the Dye Creek Preserve and associated conservation easements, is about \$14 per acre, or \$531,000 a year. The cost includes a contingency of 5 percent which is the default of the program and an administrative rate of 25 percent which was suggested by Dye Creek management.

Because of the extensive monitoring of the conservation easements, biotic surveys constitutes the largest portion of the budget with \$102,000. Public services is next with \$71,000 and site construction third with \$61,000.

Endnotes

Fire management plan for Inks Creek, Tuscan Buttes, Dye Creek and Vina Plains for The Nature Conservancy, Barry Callenberger and Zeke Lunder, Spring 2003.

Sacramento Valley Groundwater Basin, Dye Creek Sub-basin, Hydrologic Region Sacramento River California's Groundwater, Sacramento Valley Groundwater Basin, Bulletin 118.

Draft Lassen Foothills Conservation Easement Monitoring Protocol, TNC 2003.

Results of Spring Floristic Survey 1998, Dye Creek Preserve, Tehama County, June 1998, S. Bainbridge.

Animals of Dye Creek Preserve, TNC, September 30, 1997.

Lassen Foothills Project Plan Update, TNC, February 2, 2001.

Gray Davis Dye Creek Preserve Five-Year Management Plan, July 1, 2002- June 30, 2005.

Rangeland Burning in Tehama County, TNC, December 2000.

Dye Creek Preserve Major Equipment List.

Correspondence with Tiffany Holbrook (Operations Manager) July 2003- February 2004

Meeting with Rich Reiner (Senior Project Ecologist), Tony Nelson (Grasslands Project Manager), Jake Nelson (Project Manager, Lassen Foothills Project), Peter Hujik (Dye Creek Project Manager), and Dawit Zeleke (Project Director, Northern Sacramento Valley), November 17, 2003.

Dye Creek Preserve site visit, July 26, 2003.

Structure List, Dye Creek, March 23, 2004

PAR Budget Table—Dye Creek Preserve and Conservation Easements Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							61,256
Fine Grading	Grade existing 15' Roads	Mile	125.00	3,960.00	25	19,800	
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	406,560.00	3.50	45	31,621	
Fence - Installed	Maintenance	L. Hours	80.00	10.00	1	800	
Gate, Cattle	5' X 12' gate	Item	130.00	695.00	10	9,035	
- BIOTIC SURVEYS							102,250
Cultural Resource	Field Svy. & Reports	L. Hours	300.00	25.00	1	7,500	
Cultural Resource	Field Svy. & Reports	L. Hours	25.00	10.00	1	250	
Wildlife Biologist	Program Management	L. Hours	677.00	30.00	1	20,310	
Wildlife Biologist	Partner Coordination	L. Hours	200.00	30.00	1	6,000	
Wildlife Biologist	Rare Plant Surveys	L. Hours	72.00	25.00	1	1,800	
Wildlife Biologist	Rare Plant Surveys	L. Hours	40.00	10.00	1	400	
Wildlife Biologist	Avian Surveys	L. Hours	60.00	10.00	1	600	
Wildlife Biologist	Deer and Pig Surveys	L. Hours	48.00	10.00	1	480	
Wildlife Biologist	Harvest Surveys	L. Hours	46.00	10.00	1	460	
Other	Easement Compliance	L. Hours	600.00	25.00	1	15,000	
Other	Easement Compliance	L. Hours	200.00	30.00	1	6,000	
Other	Manage/Monitor Cattle Grazing	L. Hours	1,718.00	25.00	1	42,950	
Other	Monitor Cattle Grazing	L. Hours	50.00	10.00	1	500	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							11,350
Exotic Animal Control	Bullfrog/Sunfish Removal	L. Hours	120.00	25.00	1	3,000	
Exotic Animal Control	Bullfrog/Sunfish Removal	L. Hours	40.00	10.00	1	400	
Controlled Burning	Prepare burn plan	L. Hours	148.00	25.00	1	3,700	
Controlled Burning	Coordinate/Supervise burn	L. Hours	170.00	25.00	1	4,250	
- WATER MANAGEMENT							26,000
Water Source	Purchase	Annual	1.00	26,000.00	1	26,000	
- PUBLIC SERVICES							72,906
Residence	Replacement	Sq. Ft.	3,000.00	85.00	40	6,375	
Residence	Bunkhouse Replacement	Sq. Ft.	1,800.00	85.00	40	3,825	
Residence	5 residences Replacement	Sq. Ft.	4,357.00	85.00	40	9,259	
Nature Center	Lodge Replacement	Sq. Ft.	4,581.00	125.00	40	14,316	
Utilities	Electricity	Sq. Ft.	13,738.00	0.40	1	5,495	
Utilities	Septic Maintenance	Unit	4.00	300.00	5	240	
Utilities	Well Maintenance	Unit	1.00	15,000.00	25	600	
Utilities	Well Casing	Unit	1.00	40,000.00	60	667	
Trail	Maintenance	L. Hours	60.00	10.00	1	600	
Volunteer Coordinator	Schools, Organizations, Public	L. Hours	160.00	25.00	1	4,000	
Docent Training	Oreintation, CPR, Supervision	L. Hours	180.00	25.00	1	4,500	
Community Outreach	Program Oversight Management	L. Hours	211.00	30.00	1	6,330	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Community Outreach	Coordinate Public Hikes/ Tours	L. Hours	80.00	30.00	1	2,400	
Community Outreach	Visitor Volunteer Database	L. Hours	60.00	30.00	1	1,800	
Community Outreach	Docent led Hikes	L. Hours	150.00	10.00	1	1,500	
Other	Education Lessee Oversight	L. Hours	60.00	30.00	1	1,800	
Other	Program Development Funding	L. Hours	80.00	30.00	1	2,400	
Other	Coordinate for Staff needs	L. Hours	60.00	30.00	1	1,800	
Other	Annual Reporting	L. Hours	40.00	25.00	1	1,000	
Other	Outbuilding maintenance	Sq. Ft.	2,000.00	40.00	20	4,000	
- GENERAL MAINTENANCE							21,328
Project Management	Supervise/coordinate	L. Hours	123.00	25.00	1	3,075	
Septic Fields	Maintenance	Unit	4.00	300.00	5	240	
Well	Maintenance	Unit	1.00				
Other	General Landscaping	L. Hours	80.00	10.00	1	800	
Other	Misc. Safety/Site Maintenance	L. Hours	157.00	10.00	1	1,570	
Other	14 Bldings-Storage/Garages	Sq. Ft.	15,643.00	40.00	40	15,643	
- REPORTING							7,260
Database Management	Data Input	L. Hours	144.00	10.00	1	1,440	
GIS/CAD Management	Data Management	L. Hours	96.00	30.00	1	2,880	
Annual Reports	Summary	L. Hours	32.00	30.00	1	960	
Management Plan	5 year Plan	L. Hours	80.00	30.00	5	480	
Fire Management Plan	Report	L. Hours	60.00	25.00	1	1,500	
- OFFICE MAINTENANCE							21,866
Preserve Office	Maintenance	L. Hours	40.00	10.00	1	400	
Preserve Office	Construction/Maintenance	Sq. Ft.	2,079.00	85.00	40	4,418	
Preserve Office	Electricity	Sq. Ft.	2,079.00	0.50	1	1,040	
Office Supplies, Year	Supplies	Year	1.00	4,253.00	1	4,253	
Copier	Copier, 15-18 ppm	Item	1.00	3,833.00	8	479	
Computer, PC Color	Laptop, Pentium 4	Item	3.00	1,400.00	4	1,050	
Computer, PC & Monitor	2.6 GHz Pentium 4	Item	3.00	1,000.00	4	750	
Laser Printer	HP LaserJet	Item	3.00	500.00	4	375	
Other	Office Furniture	Item	1.00	7,350.00	10	735	
Other	Solar Electricity/Panels	Item	1.00	18,000.00	15	1,200	
Other	Wood Sheds	Item	2.00	2,000.00	15	267	
Other	misc. expenses	Item	1.00	6,900.00	1	6,900	
- FIELD EQUIPMENT							21,794
GPS, Rover & Base Unit	GPS/Corrected	Item	4.00	600.00	5	480	
GPS, Rover & Base Unit	GPS/Trimble	Item	1.00	2,000.00	5	400	
Vehicle	SUV	Item	3.00	27,500.00	10	8,250	
Vehicle	Travel-Fuel,Registration,Main.	Miles	0.50	3,062.00	1	1,531	
Vehicle	Maintenance	L. Hours	60.00	10.00	1	600	
Vehicle	Ford F-150	Item	2.00	26,000.00	10	5,200	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	Fire Tools, Clothing, Equipt.	Item	1.00	80,000.00	15	5,333	
- OPERATIONS							42,400
Contracts	Produce contracts	L. Hours	20.00	60.00	1	1,200	
Budgeting	Budget & reconcile	L. Hours	10.00	30.00	1	300	
Project Accounting	Setup and maintain	L. Hours	30.00	30.00	1	900	
Other	Property Tax	Item	1.00	40,000.00	1	40,000	
						388,411	388,411
						38,841	
						106,813	
Total						534,065	

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Laguna Wildlife Area

Property Description

The Laguna Wildlife Area (Preserve) is located in Sonoma County, northwest of Santa Rosa and east southeast of the Russian River. The 539-acre Preserve is divided into 13 separate parcels that are owned and managed by the California Department of Fish and Game (DFG). The parcels were purchased through mitigation to help Preserve the native vernal pool habitats within the Santa Rosa Plain. In combination with privately owned mitigation lands, federal, city, and county lands, over 1,200 acres within the Santa Rosa Plain are protected. This is part of the second largest wetland complex in northern California. DFG has developed plans to acquire lands to create larger parcels, however, acquisition depends on willing sellers.

The lands surrounding the Preserve are a mixture of agricultural lands and urban development. The surrounding agricultural lands are comprised primarily of row crops, hay, vineyards and pasture. Urban development is largely from the cities of Santa Rosa and Sebastopol and is both single-family homes on large tracts and high density planned housing.

Biological Description

The Preserve is primarily comprised of vernal pools, nonnative grassland, and oak and riparian woodland. In addition to the special status species within the vernal pool communities (e.g., fairy shrimp and California tiger salamanders), a number of special status plants may occur within the Preserve. Among the plants found are three endemic species of federally endangered plants (Sonoma sunshine, Burke

The Preserve is primarily comprised of vernal pools, nonnative grassland, and oak and riparian woodland. In addition to the special status species within the vernal pool communities (e.g., fairy shrimp and California tiger salamanders), a

number of special status plants may occur within the Preserve. Among the plants found are three endemic species of federally endangered plants (Sonoma sunshine, Burke's goldfields, and Sebastopol meadowfoam), four state species of special concern, (many-flowered navarretia, semaphore grass, legenere, and alkali milkvetch), and three California Native Plant Society listed species (Baker's navarretia, dwarf downingia, and Douglas' pogogyne).

Yellow star thistle, and Canada and bull thistle have been observed within the Preserve. In order to preserve and promote the native plant species, these invasive exotic species will need to be controlled.

Project Goals

The overall management goal of the Preserve is to conserve the biological resources within the Preserve and allow acceptable levels of public use, including hiking and hunting. DFG categorizes the Preserve as a Type C Wildlife Area and under this designation there can be no developed trails or interactive hunting program. Hunting is allowed on parcels between Occidental Road and Guerneville Road during waterfowl, pheasant and dove hunting seasons. The remainder is closed. Although no management plan has been written, specific goals would include conducting biological surveys and developing and implementing cattle grazing plans to manage for native vegetation.

Habitat Management Organization

The Preserve is maintained by regional biologist Allan Buckmann. Maintaining the Preserve is only a small part of his job responsibilities, and this amount of time is insufficient to complete the necessary tasks. The long term goal is to have another biologist dedicated, at least half-time, to the management of the Preserve. The cost of this position is included in the analysis. Additionally,

because over the long term, the hiring of seasonal employees is not secure (due to the state's budget constraints, DFG has had to lay off seasonal employees and cannot hire or contract out any work for at least another year), all tasks are estimated at the cost of a permanent biologist.

Habitat Management Tasks

Presently, the management emphasizes trespass control, maintaining fences, and landowner contacts.

About ten miles of fence surround the 13 parcels that are separated from each other by buildable properties and agriculture, particularly grazing. The figure used was estimated from maps and parcel areas provided by DFG.

Biological inventories and monitoring are included in the analysis for special status plants, tiger salamanders, and fairy shrimp. Vegetation management through grazing and exotic plant removal are included as part of the management plan. Grazing will be managed by visual estimates of residual dry matter by a plant ecologist (with a target range of 600-800 pounds of RDM per acre). The cost of these tasks have been estimated and included in the analysis.

Exotic-invasive plant removal is to be accomplished through hand removal and spraying. Firebreaks along property boundaries are also disked. Patrolling consumes an estimated 176 hours a year. Signing the property and community outreach are also intended to increase protection.

Reporting includes database management of biotic surveys and other information supported by photodocumentation. Management plans, annual plans and annual reports are included.

The costs of an office, office expenses, a vehicle, and mileage could not be separated from the annual cost incurred by the entire Yountville Regional Office (more than 15 employees). Estimates of these costs were made by assuming the preserve manager would work out of his home, as is typical of many DFG regional biologists, and would need one vehicle and a cell phone. Costs of a phone, office supplies, and computer hardware were taken from actual costs incurred by the regional biologist. Mileage was estimated from vehicle log books and a value of \$0.50 per mile was used to estimate the cost of fuel, registration, insurance, and vehicle maintenance.

Administrative tasks including contracts, budgeting and accounting are also part of the projected budget.

Habitat Management Cost Estimates

Habitat management cost estimates were developed from a combination of actual costs and estimated expenses based on planned management activities. The largest figure was for biotic surveys, which while planned are not being conducted at this time. Protecting the property evidenced by fencing, patrolling and various forms of outreach constitutes the second largest contributor to costs.

Annual ongoing stewardship costs averaged about \$113 per acre, or \$61,000 a year including a 10 percent contingency which is the default figure and an administrative rate of 20 percent. This is the approximate midpoint of the DFG range of rates (19.8 percent to 20.3 percent) which depends upon the source of the funds.

Endnotes

Interview and tour of Preserve with Allan Buckmann and Christina Fabula, conducted by Cliff Feldheim, July 30, 2003.

PAR Budget Table—Laguna Wildlife Area Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/MAINT.							5,156
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	54,935.00	3.25	45	3,968	
Gate, Cattle	5' X 12' gate	Item	27.00	345.00	10	932	
Lock	Padlock	Item	27.00	19.00	2	257	
- BIOTIC SURVEYS							15,792
Project Management	Supervise/coordinate	L. Hours	40.00	47.00	1	1,880	
Plant Ecologist	Survey/RDM	L. Hours	176.00	47.00	1	8,272	
Wildlife Biologist	Field Svy. & Reports	L. Hours	40.00	47.00	1	1,880	
Entomologist	Fairy shrimp	L. Hours	40.00	47.00	1	1,880	
Herpetologist	Tiger salamander	L. Hours	40.00	47.00	1	1,880	
- HABITAT RESTORATION							5,560
Exotic Plant Control	Hand Removal, Labor	L. Hours	40.00	47.00	1	1,880	
Exotic Plant Control	Backpack Spray	L. Hours	40.00	47.00	1	1,880	
Fire Breaks	Disk	Acre	30.00	60.00	1	1,800	
- HABITAT MAINTENANCE							
- WATER MANAGEMENT							
- PUBLIC SERVICES							10,564
Patrolling	Patrol	L. Hours	176.00	47.00	1	8,272	
Sign, Aluminum	Aluminum 12" X 12"	Item	17.00	15.00	7	36	
Community Outreach	Meetings	L. Hours	16.00	47.00	1	752	
Owner Contact	Meetings	L. Hours	16.00	47.00	1	752	
CRMP Coordination	Joint Management	L. Hours	16.00	47.00	1	752	
- GENERAL MAINTENANCE							752
Project Management	Supervise/coordinate	L. Hours	16.00	47.00	1	752	
- REPORTING							2,331
Database Management	Data Input	L. Hours	8.00	47.00	1	376	
Photodocumentation	Field Survey	L. Hours	8.00	47.00	1	376	
Annual Reports	Summary	L. Hours	16.00	47.00	1	752	
Annual Work Plan	Prepare	L. Hours	16.00	47.00	1	752	
Management Plan	Updating Report	L. Hours	8.00	47.00	5	75	
- OFFICE MAINTENANCE							1,687
Administrative	Operations	L. Hours	16.00	47.00	1	752	
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	5.10	54.00	1	275	
Telephone Charges, Annual	Phone Charges	Person	5.10	50.00	1	255	
Office Supplies, Year	Stationery/envelopes	Person	0.43	125.00	1	54	
E-Mail	Services	Year	5.10	25.00	1	128	
Computer, PC & Monitor	133 MHz Pentium	Item	0.43	2,100.00	5	181	
Laser Printer	HP LaserJet 5L	Item	0.43	500.00	5	43	
- FIELD EQUIPMENT							3,446
Surveying Equip.	Hand held gps unit	Item	0.43	703.00	5	61	
Vehicle	Small pickup	Item	0.43	16,000.00	8	860	
Vehicle	Mileage	Mile	5,000.00	0.50	1	2,500	
Other	Digital Camera		0.43	300.00	5	26	
- OPERATIONS							872

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Contracts	Produce contracts	L. Hours	16.00	47.00	1	752	
Budgeting	Budget & reconcile	L. Hours	2.00	30.00	1	60	
Project Accounting	Setup and maintain	L. Hours	2.00	30.00	1	60	
Subtotal						46,161	46,161
Contingency @ 10%						4,616	
Administration @ 22%						11,171	
Total						61,948	

Mendota Wildlife Area

Project Description

The Mendota Wildlife Area (MWA) encompasses 12,425 acres and is located in western Fresno County, approximately four miles southeast of the town of Mendota, California. MWA is owned by the state of California and operated by the California Department of Fish and Game. Primary goals of the site are to: 1) provide suitable habitat and living space for the preservation of native species, including nongame and endangered animals and plants, 2) protect surrounding agricultural lands from depredating waterfowl by providing feeding and resting areas for waterfowl, 3) provide access to public lands for hunting and fishing opportunities and 4) provide for multiple use of the area when this use will not unduly interfere with the primary use of the land. Funding for MWA is provided by hunting revenues, the state of California and by the federal government via Pittman-Robertson Funds.

MWA is virtually the only significant managed wetland habitat of substantial size in the south-central San Joaquin Valley, and constitutes an oasis in the midst of extensive farmland. The area is a major and significant component of the Pacific Flyway, fostering the survival of migratory waterfowl and associated species from Alaska to Mexico, in addition to providing critical habitat for numerous resident species.

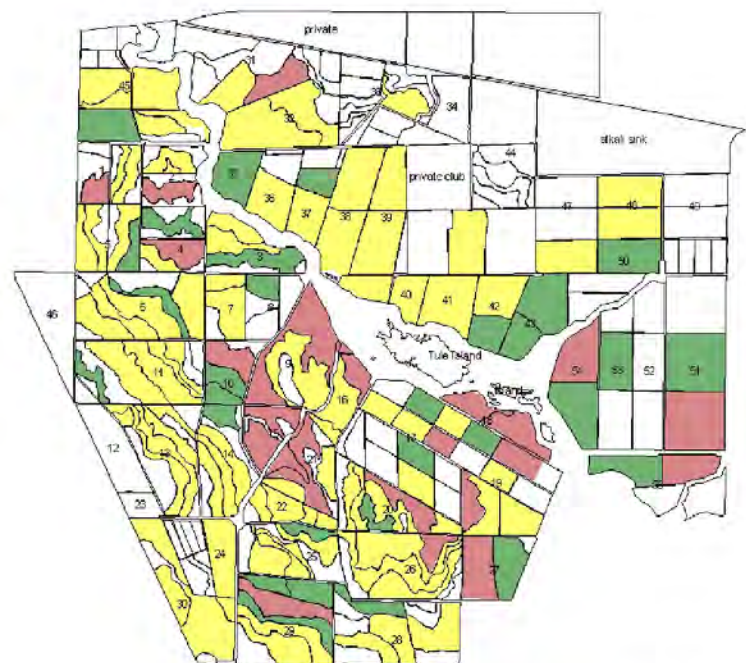
Project Goals

Initial approval for the acquisition of land at MWA occurred in 1954 with subsequent acquisitions in 1956, 1958, 1965, 1979 and 1990. The management focus at MWA is the maintenance of healthy wetlands for the benefit of waterfowl and other wetland-dependent species. This in turn provides public hunting and fishing opportunities

and reduces waterfowl depredation on nearby farmlands, two of the main goals at MWA. Because the natural water systems have been disrupted in the San Joaquin Valley as a result of conversion to farmland, the wetlands at MWA are intensively and artificially maintained with surface irrigation water. A series of levees, ditches, culverts, pumps and other infrastructure are necessary for maintaining the wetland in its current state. Feed and cover crops are planted for waterfowl each year to limit depredation on adjacent farmlands.

MENDOTA WILDLIFE AREA

PROPOSED MOIST SOIL HABITAT 2003



MOIST SOIL HABITAT

- Watergrass
- Swamp Timothy
- Combination

Most of the site is seasonally flooded wetland, but attempts are made to keep water year-round on approximately 10 percent of the site. This provides critical habitat for many species of ground nesting birds and for warmwater fish populations.

In addition, the San Joaquin pocket mouse (*Perognathus inornatus inornatus*) and the Lost Hills saltbush (*Atriplex vallicola*) are possibly found on site and are candidates for federal listing.

Common name	Scientific name	State listed	Federally listed
Ferris' bird's beak	<i>Cordylanthus palmatus</i>	Endangered	Endangered
Hoover's eriastrum	<i>Eriastrum hooveri</i>	not listed	Threatened
San Joaquin wooly-threads	<i>Lembertia congdonii</i>	not listed	Endangered
Swainson's Hawk	<i>Buteo swainsoni</i>	Threatened	not listed
Fresno kangaroo rat	<i>Dipodomys nitratooides exilis</i>	Endangered	Endangered
Giant garter snake	<i>Thamnophis couchii gigas</i>	Threatened	Threatened
Blunt-nosed leopard lizard (possible)	<i>Gambelia sila</i>	Endangered	Endangered

The upland areas are limited in size, but are also important in that they provide habitat for threatened or endangered species. The upland areas are also used for dove and pheasant hunting. Another goal for the site is to provide education and interpretation services.

Biological Description

As is typical of the San Joaquin Valley, MWA is basically flat with elevations ranging from 160-165 feet above sea level. The soils are fine-textured clays and sufficiently saline to restrict some vegetation types. The water table is generally high and drainage is poor.

The climate at MWA consists of hot, dry summers and mild, cool winters, with temperatures (°F) ranging from lows in the 20s in January and highs over 100 in July. Precipitation averages less than six inches per annum and comes in the form of winter rains. Infrequent winter rainfall events are interspersed with periods of mild, sunny weather and/or dense fog. Summers are generally extremely hot and dry.

Major plant communities and habitat types are seasonally flooded brackish emergent wetland, valley foothill riparian and, to a lesser extent, alkali sink scrub. Approximately 200 species of migratory and resident birds are known to use the area. Wildlife species of particular interest in addition to various species of migratory waterfowl, pheasant, and several potentially occurring rare, threatened or endangered plants and animals. Natural diversity database records indicate that the following rare species have been sighted on or near MWA in recent times.

Organizational Structure

At present the area is funded for the following positions: one associate wildlife biologist, one wildlife habitat supervisor I, one wildlife habitat assistant, one fish and wildlife assistant I, two tractor operator laborers, two wildlife biologist and one half-time position for an office assistant. However, this number of positions is believed to be insufficient to maintain the habitat in its current condition. PAR tasks identify the position generally responsible according to the Draft Management Plan for the Mendota Wildlife Area dated 1994. The staffing recommendations in this plan include those in the budget analysis.

Habitat Management Tasks

The major item includes a 4-strand barbed wire fence along approximately 13 miles of the boundary.

The biotic surveys section encompasses a variety of monitoring tasks for game and non-game species at MWA. Surveys for waterfowl, colonial birds, grebes, raptors, pheasants and shorebirds are conducted at least once per year. Management studies are also included in this section such as an ongoing study of pheasants. In addition, periodic surveys for threatened and endangered species are conducted. The estimated annual cost for biotic surveys at MWA is \$117,467.

Habitat maintenance includes activities associated with vegetation management in wetlands and management of upland areas for threatened/endangered species and game birds. This section includes substantial costs for labor and for heavy equipment operation and maintenance. The

estimated annual cost for habitat maintenance is \$241,203.

Water management tasks are those habitat management tasks directly associated with water control and marsh management. As mentioned previously, the natural water systems have been disrupted at MWA and therefore the wetlands are intensively managed through a series of levees, ditches, culverts, pumps electricity and other infrastructure. Labor and water costs make up approximately 94 percent of the costs in this section. The estimated annual cost for water management is \$178,839.

To support public services and staff, there is a headquarters complex consisting of 5 residences and an office. A small checking station is also located on the public entrance road south of Highway 180.

One of the original purposes for establishment of the MWA was to provide public hunting opportunities, and this remains a primary goal of the site. Secondary objectives include providing opportunities for angling and for education. Currently there is little demand for education and interpretative services since the nearby Los Banos Wildlife Area gets the vast majority of this type of user. The estimated annual cost for public services is \$144,000 all of which is used to maintain structures and labor to administer the various hunting programs.

General maintenance includes costs for trash cleanup plus maintenance of auxiliary buildings. There are a number of these including sheds, shops and other storage buildings. This figure is about \$145,000 per year.

Office Maintenance includes labor costs for an office assistant, office equipment and supplies and general expenses for running the wildlife area. Ranges and refrigerators for the bunkhouse and residences are also included in this section.

Field equipment includes most of the heavy equipment used on the MWA. This section includes expenses for vehicles, including their operation and maintenance, fuel and insurance costs. Uniform expenses are also included in this section. Costs are expected replacement costs for the function served by each vehicle.

The operations section includes labor for administration including budgeting, contracts, supervision of activities and travel costs.

Habitat Management Costs

Intensive management is required to produce the desired objectives at MWA. Therefore, there are considerable labor requirements as well as significant costs for water, utilities and the operation, maintenance and eventual replacement of heavy equipment. This summary estimates the total annual cost to operate MWA to be \$1,434,000 which includes a 10 percent contingency and 22 percent overhead rate both of which are program default rates.

The biggest factor in the tasks is habitat maintenance with \$241,000 which also includes the farming operation. Second is water management because of the control systems on the wetlands and the irrigation for farming. Water management totals \$178,000. Third at \$145,000 is general maintenance because this project has many ancillary structures requiring inspection and maintenance.

Much of the difference between the estimated costs in this summary and recent DFG budgets is attributable to a proposed change in staffing to meet current needs at the wildlife area. The draft management plan for MWA recommends 12 permanent personnel plus 32 months of seasonal aid time to effectively run the wildlife area. This summary includes the increase in personnel time recommended in the management plan. Another factor contributing to the difference in operating costs is that the 2003 budget for MWA does not account for the eventual replacement costs of equipment and structures which are estimated to be greater than \$2.3 million.

Endnotes

Ashford, L.K. Jr. 1994. A Management Plan for the Mendota Wildlife Area (Draft). State of California, Department of Fish and Game Report. 47 pp.

Mendota Wildlife Area Annual Monitoring Program. 12 pp.

Budget Allotment 2003, California Department of Fish and Game.

Federal Aid in Wildlife Restoration- Annual Work Plan. Summary of Estimated costs and Related Data. Fiscal Year 2000-2001, Mendota Wildlife Area.

Mendota Wildlife Area Equipment List.

Corresponded with Steve Bruggeman, June-October 2003.

Met with Steve Bruggeman (Wildlife Biologist) on October 9, 2003.

PAR Budget Table—Mendota Wildlife Area Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							10,381
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	68,640.00	3.00	35	5,883	
Fence	Repair/posting bndry-FWA2	L Hours	173.00	26.00	1	4,498	
- BIOTIC SURVEYS							117,467
Wildlife Biologist	T&E species survey-WB	L. Hours	346.00	35.00	1	12,110	
Wildlife Biologist	T&E species survey-WHS1	L. Hours	346.00	40.00	1	13,840	
Wildlife Biologist	Pre-develop survey-WB	L. Hours	173.00	35.00	1	6,055	
Wildlife Biologist	Pre-develop survey-WHS1	L. Hours	173.00	40.00	1	6,920	
Wildlife Biologist	Pre-develop survey-WHS2	L. Hours	173.00	40.00	1	6,920	
Wildlife Biologist	5 year T&E spp survey- contrac	C. Hours	865.00	45.00	5	7,785	
Other	Pop monitoring/studies-WB	L. Hours	519.00	35.00	1	18,165	
Other	Pop monitoring/studies-WHS1	L. Hours	519.00	40.00	1	20,760	
Other	Pop monitoring/studies-FWA1	L. Hours	519.00	26.00	1	13,494	
Other	Pop monitoring/studies-SA	L. Hours	1,038.00	11.00	1	11,418	
- HABITAT RESTORA- TION							
- HABITAT MAINTEN- NANCE							241,203
Mosquito Abatement	control costs-entire refuge	Item	1.00	35,000.00	1	35,000	
Other	Wetland veg control- FWA1	L. Hours	173.00	26.00	1	4,498	
Other	Wetland veg control-TOL	L. Hours	692.00	30.00	1	20,760	
Other	Upland mgmt-WHS1	L. Hours	519.00	40.00	1	20,760	
Other	Upland mgmt-FWA1	L. Hours	519.00	26.00	1	13,494	
Other	Upland mgmt-SA	L. Hours	1,557.00	11.00	1	17,127	
Other	Manage T&E habitat-WHS2	L. Hours	173.00	40.00	1	6,920	
Other	Manage T&E habitat-FWA1	L. Hours	173.00	26.00	1	4,498	
Other	Service heavy equip-TOL	L. Hours	2,076.00	30.00	1	62,280	
Other	Service heavy equip-SA	L. Hours	692.00	11.00	1	7,612	
Other	Agricultural supplies	item	1.00	5,000.00	1	5,000	
Other	John Deere 8300 wheel tractor	item	1.00	88,000.00	30	2,933	
Other	Versatile 800 wheel tractor	item	1.00	33,000.00	30	1,100	
Other	Ford 8700 wheel tractor	item	1.00	60,000.00	30	2,000	
Other	Crawler	item	2.00	24,000.00	30	1,600	
Other	Case Inter. 7140 tractor	item	1.00	42,000.00	30	1,400	
Other	300 gal self prop. spray rig	item	1.00	15,000.00	20	750	
Other	John Deere 350 gal sprayer	item	1.00	5,000.00	15	333	
Other	Fimco 25 gal sprayer	item	1.00	200.00	10	20	
Other	Heavy equip-operation/maint.	item	1.00	30,000.00	1	30,000	
Other	Domries 12' stubble disk 36"	item	1.00	10,000.00	30	333	
Other	Miller 14' disk 32" blade	item	1.00	10,000.00	30	333	
Other	Schmeiser 12' cultipack	item	1.00	3,000.00	30	100	
Other	Bege scraper 12'	item	1.00	2,500.00	30	83	
Other	Big Ed 20' folding finish disk	item	1.00	22,000.00	30	733	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	Buffalo disk ridger	item	1.00	5,800.00	30	193	
Other	Big Valley Disc	item	1.00	30,000.00	30	1,000	
Other	Implement carrier	item	1.00	3,000.00	30	100	
Other	Cultivator 5-row	item	1.00	3,000.00	25	120	
Other	Lister 5-row	item	1.00	1,500.00	40	38	
Other	Schmeiser Cook plow	item	1.00	2,500.00	30	83	
- WATER MANAGE- MENT							178,839
Water Control	Flood/drawdown-FWA2	L. Hours	692.00	26.00	1	17,992	
Water Control	Marsh mgmt/winter food-FWA2	L. Hours	1,038.00	26.00	5	5,398	
Water Control	Marsh mgmt/winter food-WB	L. Hours	519.00	35.00	5	3,633	
Water Control	Marsh mgmt/winter food-WHS1	L. Hours	173.00	35.00	5	1,211	
Water Control	Marsh mgmt/winter food-FWA1	L. Hours	519.00	26.00	5	2,699	
Water Control	Marsh mgmt/winter food-TOL	L. Hours	1,384.00	30.00	5	8,304	
Water Control	Levee/culvert repair-FWA1	L. Hours	346.00	26.00	5	1,799	
Water Control	Levee/culvert repair-TOL	L. Hours	1,038.00	30.00	5	6,228	
Water Control	Marsh mgmt-WHS1	L. Hours	173.00	40.00	5	1,384	
Water Control	Marsh mgmt-FWA2	L. Hours	1,038.00	26.00	5	5,398	
Water Control	Marsh mgmt-FWA1	L. Hours	173.00	26.00	5	900	
Water Control	Marsh mgmt-TOL	L. Hours	692.00	30.00	5	4,152	
Water Control	Summer wetland maint-FWA2	L. Hours	519.00	26.00	5	2,699	
Power	Electricity	Item	1.00	68,768.00	1	68,768	
Other	Water costs	Unit	1.00	41,350.00	1	41,350	
Other	Diesel pump	Unit	3.00	15,000.00	20	2,250	
Other	4 inch trash pump	Unit	1.00	2,500.00	20	125	
Other	Low-lift pumps	Unit	12.00	5,000.00	30	2,000	
Other	Case 580 backhoe	Unit	1.00	25,000.00	15	1,667	
Other	John Deere 410 backhoe	Unit	1.00	12,000.00	15	800	
Other	Yonkers-Johnson ditch plow	Unit	1.00	2,500.00	30	83	
- PUBLIC SERVICES							133,792
Residence	Residence	Item	5.00	100,000.00	50	10,000	
Residence	Bunkhouse	Item	1.00	100,000.00	50	2,000	
Other	Waterfowl hunting prog.-WB	L. Hours	519.00	35.00	1	18,165	
Other	Waterfowl hunting prog.-WHS1	L. Hours	519.00	40.00	1	20,760	
Other	Waterfowl hunting prog.-WHS2	L. Hours	519.00	40.00	1	20,760	
Other	Waterfowl hunting prog.-FWA1	L. Hours	519.00	26.00	1	13,494	
Other	Waterfowl hunting prog.-FWA2	L. Hours	519.00	26.00	1	13,494	
Other	Waterfowl hunting prog.-SA	L. Hours	1,038.00	11.00	1	11,418	
Other	Maintain public access-TOL	L. Hours	346.00	30.00	1	10,380	
Other	Upland hunting/fishing-WHS1	L. Hours	173.00	40.00	1	6,920	
Other	Upland hunting/fishing-SA	L. Hours	173.00	11.00	1	1,903	
Other	posting signs-FWA1	L. Hours	173.00	26.00	1	4,498	
- GENERAL MAINTENANCE							145,214
Sanitation Control	Collection and disposal	Item	1.00	2,000.00	1	2,000	
Other	LPG	Item	1.00	2,350.00	1	2,350	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	Shop	Item	1.00	200,000.00	50	4,000	
Other	Tractor shed	Item	1.00	60,000.00	50	1,200	
Other	Other structures	Item	1.00	50,000.00	50	1,000	
Other	Inspect/repair structure-WHS1	L. Hours	519.00	40.00	1	20,760	
Other	Inspect/repair structure-FWA2	L. Hours	173.00	26.00	1	4,498	
Other	Inspect/repair structure-FWA1	L. Hours	1,038.00	26.00	1	26,988	
Other	Inspect/repair structure-SA	L. Hours	1,038.00	11.00	1	11,418	
Other	Maintenance structures	Item	1.00	71,000.00	1	71,000	
- REPORTING							
- OFFICE MAINTENANCE							78,605
Administrative	Operations-OA2	L. Hours	2,076.00	20.00	1	41,520	
Preserve Office	Office	Item	1.00	500,000.00	50	10,000	
Office Supplies	Office wide	Person	5.00	400.00	1	2,000	
Telephone Charges, Annual	Phone Charges	Item	1.00	3,500.00	1	3,500	
Taxes and Fees	Property or District	Year	1.00	2,000.00	1	2,000	
Furniture	Desks-1, Chairs-3	Set	5.00	650.00	10	325	
Computer, PC & Monitor	Dell Optiplex	Item	4.00	2,000.00	7	1,143	
Deskjet printer	Deskjet printer	Item	1.00	150.00	10	15	
Laser printer	Laser printer	Item	1.00	300.00	10	30	
Other	Canon electric typewriter	Item	1.00	300.00	10	30	
Copier	Copier	Item	1.00	1,000.00	10	100	
Fax machine	Fax machine	Item	1.00	250.00	10	25	
Other	Range	Item	6.00	500.00	15	200	
Other	Refrigerator	Item	5.00	650.00	15	217	
Other	Minor equipment	Item	1.00	2,000.00	1	2,000	
Other	General expenses	Item	1.00	15,000.00	1	15,000	
Other	postage	Item	1.00	400.00	1	400	
Other	sewer	Item	1.00	100.00	1	100	
- FIELD EQUIPMENT							68,748
Quad Runners, 4WD	Mid-range quality	Item	1.00	4,500.00	10	450	
Vehicle	Ford F150 4x4	Item	3.00	20,000.00	10	6,000	
Vehicle	Chevy C-10 pickup	Item	1.00	15,000.00	10	1,500	
Vehicle	Chevy 1-ton Flatbed	Item	1.00	15,000.00	10	1,500	
Vehicle	Ford Dump Truck	Item	1.00	20,000.00	10	2,000	
Vehicle	Ford Ranger	Item	1.00	10,000.00	10	1,000	
Vehicle	GMC 4x4	Item	3.00	20,000.00	10	6,000	
Vehicle	GMC King Cab	Item	1.00	15,000.00	10	1,500	
Vehicle	Gasoline/diesel fuel	item	1.00	20,000.00	1	20,000	
Vehicle	Vehicle operations/maintenance	Year	1.00	17,000.00	1	17,000	
Other	Grader	Item	2.00	25,000.00	30	1,667	
Other	Ford loader	Item	2.00	11,000.00	30	733	
Other	Lincoln welder	Item	4.00	2,000.00	20	400	
Other	Pneumatic air lift	Item	1.00	500.00	20	25	
Other	Dayton steam cleaner	Item	1.00	3,000.00	20	150	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	Honda portable air compressor	Item	1.00	800.00	15	53	
Other	Air compressor	Item	3.00	1,600.00	20	240	
Other	Drill	Item	4.00	120.00	10	48	
Other	Drill press	Item	1.00	400.00	20	20	
Other	Floor jack	Item	1.00	170.00	20	9	
Other	Forklift	Item	1.00	2,500.00	20	125	
Other	Portable generator	Item	1.00	1,000.00	20	50	
Other	Generator	Item	1.00	4,000.00	30	133	
Other	Grinder	Item	4.00	150.00	10	60	
Other	Lawn mower	Item	2.00	500.00	10	100	
Other	Electric parts washer	Item	1.00	100.00	20	5	
Other	Sander	Item	3.00	140.00	10	42	
Other	Various power saws	Item	7.00	170.00	10	119	
Other	Radial arm saw	Item	1.00	650.00	10	65	
Other	Miter saw	Item	1.00	300.00	10	30	
Other	Shop vacuums	Item	3.00	60.00	10	18	
Other	Weed eater	Item	2.00	120.00	10	24	
Other	John Deere space heater	Item	1.00	350.00	20	18	
Other	Flail mower	Item	1.00	2,500.00	15	167	
Other	Rotary mower	Item	2.00	8,000.00	15	1,067	
Other	Dandl mower	Item	1.00	11,000.00	15	733	
Other	Broadcast seeder	Item	2.00	3,300.00	20	330	
Other	chainsaw	Item	3.00	450.00	20	68	
Vehicle Insurance	Insurance	Year	1.00	3,500.00	1	3,500	
Uniforms	Specification Unif. Allowance	Item	1.00	1,800.00	1	1,800	
- OPERATIONS							94,240
Travel	Total yearly travel	item	1.00	3,680.00	1	3,680	
Budgeting	Budget & reconcile	L. Hours	10.00	30.00	1	300	
Network Interview/Contracts	Maintain contracts	L. Hours	10.00	30.00	1	300	
Other	Administrative-WHS2	L. Hours	519.00	40.00	1	20,760	
Other	Administrative-WHS1	L. Hours	1,038.00	40.00	1	41,520	
Other	Project planning-WHS2	L. Hours	692.00	40.00	1	27,680	
Subtotal						1,068,489	1,068,489
Contingency @ 10%						106,849	
Administration @ 22%						258,574	
Total						1,433,912	

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San Elijo Lagoon Ecological Reserve

Property Description

San Elijo Lagoon Ecological Reserve (Reserve) is a 900 acre reserve located along the coast of San Diego County in the city of Encinitas, California. The Reserve is one of San Diego County's largest coastal wetlands and is fed by a 77 square-mile watershed with two main tributaries, Escondido Creek and Orilla Creek.

The Reserve is primarily a shallow-water estuary. It is divided into basins by Highway 101, the railway, and Interstate 5. A century of artificial constriction has resulted in reduction of the natural ability of the estuary to open to the ocean. In recent years successful efforts by the county, state, U.S. Fish and Wildlife Service and the San Elijo Lagoon Conservancy have improved the water quality by periodically dredging open the inlet allowing a tidal exchange critical to the health of the estuary.

There are over 5 miles of hiking trails in the reserve open to the public and a nature center is located at the northwest side of the reserve. The nature center hosts the county ranger's offices, a

parking lot, restrooms, drinking water and a one-mile loop trail.

The Reserve is cooperatively managed by the San Elijo Lagoon Conservancy (SELC), San Diego County and the California Department of Fish and Game (DFG).



Project Goals

Management goals for the preserve are to protect and enhance the preserve and to provide the public with an enjoyable outdoor experience. Since the Reserve's hydrology has been altered by freeways, railways and other human disturbance, site managers have been working for many years to improve or restore hydrologic flows (both from the ocean and from upstream creeks). In addition, objectives include creating habitat for sensitive species, restoring or enhancing degraded areas, and engaging the public in outdoor experiences and education.

Biological Description

The reserve encompasses approximately 900 acres of diverse habitat with six plant communities: coastal strand, salt marsh, freshwater marsh, riparian scrub, coastal sage scrub and mixed chaparral. These habitats support over 300 species of plants, 20 species of fish, 20 species of reptiles and amphibians, 24 species of mammals and over 295 species of birds. Listed species include the light-footed clapper rail, least Bell's vireo, least tern, snowy plover, peregrine falcon and coastal California gnatcatcher.

Although most of the habitat is of high quality, the lagoon is not in its natural state and its tidal and upstream inflows have been altered by human



development. There are signs of degradation from non-native plant species and alteration of habitat types due to changes in salinity and water flow.

Organizational Structure

The Reserve is owned mostly by the county of San Diego and the state of California with SELC owning less than 100 acres. The Reserve is managed by DFG, SELC and the county of San Diego. SELC handles most of the scientific monitoring, habitat restoration and public outreach coordination and has been responsible for most of the site fundraising, both through grants and public donations. SELC has over 2,000 members that donate time and money to the organization and participate in field activities. The county manages the nature and visitor center, maintains trails and provides rangers and enforcement support.

Although SELC is in the process of hiring more personnel, they have had about 4 full-time personnel during the last several years. The SELC's personnel includes an executive director (ED), field biologist (B), administrator (A), and public outreach person (PO). The County provides two full-time rangers (R) and DFG shares in planning, invasive-exotic spraying and provides signs. The abbreviations following the job title is used in the PAR budget to indicate the responsible position.

It is estimated that volunteer (V) hours through both county and SELC activities totals just over 900 hours.

Habitat Management Tasks

Hours for habitat management tasks are based on estimates by staff. Costs of goods and services are based on staff estimates, software default rates where appropriate, and supplier estimates. Hourly rates include the midrange of comparable GS rankings including an allocation of 35 percent for employer taxes and benefits. Volunteers are valued at \$10 per hour.

Site Construction includes heavy maintenance fencing. At Reserve, there are about 2,000 feet of fence including chain link, smooth wire, split rail and post and rope. The assumption in the estimate is that all fencing has an average cost of \$8 per linear foot and a life of 25 years. In addition, about 50 hours of volunteer labor is utilized for minor repairs.

The primary biological management task is to restore or enhance the hydrological systems of

the lagoon. SELC handles most of the hydrology work, has studied the lagoon for many years and put together a comprehensive lagoon enhancement report and management plan. The Corps of Engineers is building on this work through core sampling and project evaluation which will include, as an alternative, the relocation of the lagoon inlet and dredging and removing cobbles on a yearly basis. With or without this enhancement program, ongoing hydrological management will include channel dredging which is contained in the water management section.

Much monitoring, therefore, is concerned with water flows, quantity, salinity, temperature, dissolved oxygen (D.O.), conductivity, and pH readings. This will be an ongoing effort upon completion of the current restoration project. In addition, monitoring for sensitive species, particularly birds, will also be ongoing.

Invasive exotic plants at the Reserve include iceplant, arundo, acacia, mustard, castorbean, pampas grass, wild radish and others. The Conservancy has received a major grant for invasive-exotic control throughout the several estuaries in the area including San Elijo. However, ongoing control efforts are expected for the long-term. Both the rangers participate in planning eradication efforts using themselves and volunteers to hand pull or chop weeds. The County is prohibited from spraying, however, the Conservancy and the California Department of Fish and Game may do so. In fact, CDFG has six person crews at San Elijo for three days an average of four times a year. The program often consists of the rangers and volunteers doing initial removal with follow-up spraying or painting of stalks. Along with removal, some long-term revegetation is expected.

Planning for habitat maintenance presently includes hours spent planning for the major hydrological and invasive-exotic restoration projects for which grants are needed. For the long-term, hours for habitat maintenance planning are reduced. CDFG is involved in these planning activities.

Another aspect is brush management for fire control along borders with development. The goal is to maintain about 20 to 30 feet of cleared area plus another 50 feet of controlled area. Once this is done initially, the long-term maintenance task is assumed to involve California Conservation Corps crews once every five years.

As indicated above, major restoration including dredging is part of the short-term plan for Reserve.

Long-term, a level of dredging is needed to maintain water depths because of continued upstream erosion. This cost of long-term dredging is an estimate based on staff recommendations for annual maintenance.

Tidegates will need repair over time. Major restoration is estimated at \$50,000 to \$60,000 dollars every 30 years.

Water testing equipment is for hydrological work described above. A new YSI Model 600 XLM data logger with probes and cables is estimated at about \$7,000. Flow meters range in price from \$1,000 to \$10,000. An appropriate model may run \$5,000.

Public services are extensive at the Reserve. The two rangers and the Conservancy's Public Outreach position are largely devoted to the concerns of the public. The rangers spend a significant time patrolling, trail maintenance working with volunteer groups and interacting with visitors. In fact, as much as a quarter of their time may be the latter. One ranger's workload includes responding to nearby development proposals that affect Reserve.

The Conservancy's time is also spent on enlisting and training volunteers for work programs, preparing interpretive literature and community outreach to schools and clubs. Time is also allocated for outreach to the Conservancy's board and committees. Volunteers run visitor tours monthly and school field trips. They also help with fundraising and member appreciation activities.

Physical facilities include a ranger office and small visitor's center. About 3,600 square feet are under roof and about one-third of that is office and storage. The visitor's center itself is largely under roof but not enclosed. Costs per square feet assume that the office space is at full cost and that the remaining roofed area is valued at a lower level. The exhibits are largely posters. The budget estimates include costs for maintaining these facilities. The Conservancy also maintains an approximately 800 square-foot office.

Trash cleanup is conducted by the rangers and volunteers and involves an occasional dumpster and some materials.

Reporting is a significant factor consuming time at Reserve. The Conservancy maintains a database and GIS, as well as annual reports, work plans, maintenance reports, management plans and monitoring plans. The rangers also prepare significant number of procurement, incident, and inventory types of reports.

Office janitorial estimates combine the ranger and Conservancy offices and evaluates the roofed area of the visitor center at a lower level. Office equipment is based variously on the number of employees and having two separate offices. For instance, six computers plus a laptop are included for the total of 6 people and two fax machines and two copiers for the two offices.

Field equipment for the rangers includes a vehicle, various trimmers and miscellaneous tools (most of the latter are included in habitat maintenance costs). The Conservancy has a number of field and measuring instruments including GPS, night vision binoculars, weather station, zodiac and microscopes. Water related instruments are included under Water Management. The Conservancy also has a DR trimmer.

Operations contain a number of tasks including contracts, conferences, grantwriting, website maintenance and purchasing/filing for the two offices.

Habitat Management Cost Estimates

This analysis includes the costs of the rangers, DFG and the Conservancy. With more people, the Conservancy constitutes the largest part of the budget. DFG, though a large landowner is less involved although they contribute planning and coordination time and incidental spraying.

In addition, SELC is deeply involved in raising money for a massive restoration project. Since this report is focusing on long-term costs, we have included fundraising, monitoring and research work and long-term habitat maintenance work as typical for this project, but have not included the substantial number of hours (about 850 as estimated) for planning this large restoration project.

The resulting figure of about \$755,000 per year of management costs is thought to be representative once the restoration is completed. The majority of these costs are for public services at \$141,000 contributed by both the Conservancy and Rangers. Water Management is second at \$129,000 because of ongoing dredging requirements. Monitoring for water conditions is also a large part of the Biotic Survey category. Reporting and operations are the third and fourth largest categories.

The final figure for annual stewardship also includes a contingency of 10 percent as a default and an administrative rate of 16 percent. The Conservancy's rate is lower (12 percent) because virtually all of their San Elijo project costs are included,

however, the county's overhead is substantially higher. This hybrid rate is assumed to serve as the rate for the three organizations.

Endnotes

1. <http://www.sanelijo.org/index.htm>.
2. Doug Gibson, SELC, meeting at Reserve.
3. YSI, Whitney Equipment Company 425-486-9499.
4. Pers. Comm., Doug Gibson and Amy Kitchen of the San Elijo Lagoon Conservancy during the week of March 3, 2004.
5. Pers. Comm., Susan Welker and Katsula Workie of San Diego County during the week of February 16 and March 3, 2004.
6. Pers. Comm., Tim Dillingham of the California Department of Fish and Game, March 10, 2004.
7. San Elijo Lagoon Area Enhancement Plan, County of San Diego Parks and Recreation, April 1996.
8. Whitney Equipment Company, Bothell, WA, 425-486-9499.
9. Pers. Comm., MaryAnne Bache of the San Elijo Lagoon Conservancy, March 10, 2004.

PAR Budget Table—San Elijo Lagoon Ecological Reserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							1,640
Fence	Mixed Types Mtn.	Lin. Ft.	2,000.00	8.00	25	640	
Fence	Mixed Types Mtn.	L. Hours	50.00	10.00	1	500	
Gate	Maintenance	Item	1.00	500.00	1	500	
- BIOTIC SURVEYS							59,200
Project Management	Plan/Supervise (ED	L. Hours	100.00	50.00	1	5,000	
Project Management	Plan/Supervise (B	L. Hours	350.00	40.00	1	14,000	
Project Management	Hydrological Monitoring (ED	L. Hours	100.00	50.00	1	5,000	
Project Management	Hydrological Monitoring (B	L. Hours	150.00	40.00	1	6,000	
Wildlife Biologist	Research Coordination (ED	L. Hours	100.00	50.00	1	5,000	
Wildlife Biologist	Research Coordination (B	L. Hours	100.00	40.00	1	4,000	
Wildlife Biologist	Monitoring (ED	L. Hours	100.00	50.00	1	5,000	
Wildlife Biologist	Monitoring (B	L. Hours	380.00	40.00	1	15,200	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							60,856
Revegetation	Plant Installation (R	L. Hours	1,200.00	35.00	5	8,400	
Exotic Plant Control	Hand Removal, Labor (R	L. Hours	500.00	35.00	1	17,500	
Exotic Plant Control	Hand Removal, Labor (V	L. Hours	400.00	10.00	1	4,000	
Exotic Plant Control	Spraying (B	L. Hours	100.00	40.00	1	4,000	
Exotic Plant Control	Spraying (CDFG	L. Hours	576.00	15.00	1	8,640	
Exotic Plant Control	Herbicide 41% con.	Gal.	20.00	108.60	1	2,172	
Brush Management	Maintenance (Crew	C. Hours	864.00	18.00	5	3,110	
Brush Management	Maintenance Plan (R	L. Hours	20.00	35.00	5	140	
Mower, High Weed	Purchase 30" Mower	Item	1.00	650.00	6	108	
Other	Pulaski,shovel,pruner,hoe	Package	10.00	80.00	5	160	
Other	Planning (ED	L. Hours	100.00	50.00	1	5,000	
Other	Planning (B	L. Hours	75.00	40.00	1	3,000	
Other	Planning (A	L. Hours	25.00	25.00	1	625	
Other	Planning (CDFG	L. Hours	100.00	40.00	1	4,000	
- WATER MANAGEMENT							128,833
Siphons/Flapgate	Tidegate maintenance	Item	1.00	55,000.00	30	1,833	
Channel Dredging	Dredging	Item	1.00	125,000.00	1	125,000	
Water Testing	Testing equipment	Item	1.00	10,000.00	5	2,000	
- PUBLIC SERVICES							141,441
Nature Center	Construction/Maintenance	Sq. Ft.	2,500.00	30.00	20	3,750	
Patrolling	Drive/hike (R	L. Hours	1,000.00	35.00	1	35,000	
Parking Area	1/4 acre blacktop Sweep/ Repair	Day	0.50	1,500.00	1	750	
Trail	Weedwhack/Clean (PO	L. Hours	200.00	30.00	1	6,000	
Trail	DR Trimmer/Clean (R	L. Hours	40.00	35.00	1	1,400	
Sign	Plastic-Notice	Item	100.00	5.00	7	71	
Trail	Weedwhack/Clean (V	L. Hours	50.00	15.00	1	750	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Volunteer Coordinator	Enlisting volunteers (PO	L. Hours	200.00	30.00	1	6,000	
Volunteer Coordinator	Planning projects/super- vise (R	L. Hours	150.00	35.00	1	5,250	
Docent Training	Preparation/Meetings (PO	L. Hours	300.00	30.00	1	9,000	
Docent Training	Docent Appreciation (V	L. Hours	100.00	10.00	1	1,000	
Interpretive Literature	Design/Produce (PO	L. Hours	200.00	30.00	1	6,000	
Interpretive Literature	Copy	Page	5,000.00	0.02	1	100	
Exhibit	Flat Displays	Posters	20.00	40.00	5	160	
Community Outreach	Prepare/Meetings (PO	L. Hours	300.00	30.00	1	9,000	
Community Outreach	Board/Committee (ED	L. Hours	180.00	50.00	1	9,000	
Community Outreach	Board/Committee (ED	L. Hours	180.00	50.00	1	9,000	
Community Outreach	Neighbor Comments (R	L. Hours	36.00	35.00	1	1,260	
Community Outreach	Interpretive Walks (V	L. Hours	60.00	10.00	1	600	
Community Outreach	Membership appreciation (V	L. Hours	60.00	10.00	1	600	
Other	Demonstration Garden (R	L. Hours	50.00	35.00	1	1,750	
Other	Visitor Interaction (R	L. Hours	1,000.00	35.00	1	35,000	
- GENERAL MAINTENANCE							4,760
Project Management	Supervise/coordinate (R	L. Hours	40.00	35.00	1	1,400	
Sanitation Control	Collection and disposal (V	L. Hours	200.00	10.00	1	2,000	
Sanitation Control	Collection and disposal (R	L. Hours	100.00	10.00	1	1,000	
Dumpster, Rental	10 C.Y.	Week	1.00	237.00	1	237	
Trash Container	Plastic 30 Gal.	Item	5.00	13.00	5	13	
Trash Liners	Liners	Item	20.00	5.50	1	110	
- REPORTING							77,413
Database Management	Data Input (ED	L. Hours	50.00	50.00	1	2,500	
Database Management	Data Input (B	L. Hours	100.00	40.00	1	4,000	
Database Management	Data Input (A	L. Hours	25.00	40.00	1	1,000	
GIS/CAD Management	Data Management (ED	L. Hours	150.00	50.00	1	7,500	
GIS/CAD Management	Data Management (B	L. Hours	100.00	40.00	1	4,000	
Aerial Photo, 2 sets color	Standard 9"x 9"	Item	1.00	1,000.00	1	1,000	
Annual Reports	Research/Prepare (ED	L. Hours	100.00	25.00	1	2,500	
Annual Reports	Research/Prepare (A	L. Hours	100.00	50.00	1	5,000	
Annual Work Plan	Plan/Prepare (ED	L. Hours	100.00	50.00	1	5,000	
Annual Work Plan	Plan/Prepare (A	L. Hours	200.00	25.00	1	5,000	
Maintenance Report	Monthly Report (ED	L. Hours	50.00	50.00	1	2,500	
Agency Report	Bio/Status/Financial (ED	L. Hours	50.00	50.00	1	2,500	
Agency Report	Bio/Status/Financial (B	L. Hours	100.00	40.00	1	4,000	
Agency Report	Bio/Status/Financial (A	L. Hours	50.00	25.00	1	1,250	
Agency Report	Procurement/weekly/inci- dent (R	L. Hours	40.00	35.00	1	1,400	
Agency Report	Inventory (R	L. Hours	32.00	35.00	3	373	
Agency Report	Storm Water Compliance (R	L. Hours	12.00	35.00	3	140	
Management Plan	Annual Update (ED	L. Hours	100.00	50.00	1	5,000	
Management Plan	Annual Update (B	L. Hours	100.00	40.00	1	4,000	
Management Plan	Annual Update (A	L. Hours	50.00	25.00	1	1,250	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Fire Management Plan	Research/Prepare (ED)	L. Hours	50.00	50.00	1	2,500	
Monitoring Reports	Monitoring Documentation (ED)	L. Hours	50.00	50.00	1	2,500	
Monitoring Reports	Monitoring Documenta- tion (B)	L. Hours	100.00	40.00	1	4,000	
Monitoring Reports	Monitoring Documenta- tion (A)	L. Hours	50.00	25.00	1	1,250	
Report Production	Labor (ED)	L. Hours	40.00	50.00	1	2,000	
Report Production	Labor (B)	L. Hours	100.00	40.00	1	4,000	
Report Production	Labor (A)	L. Hours	50.00	25.00	1	1,250	
- OFFICE MAINTENANCE							38,742
Administrative	Phones/Filing (A)	L. Hours	500.00	25.00	1	12,500	
Administrative	Phones/Filing (V)	L. Hours	100.00	25.00	1	2,500	
Preserve Office	Janitorial (Both)	Sq. Ft.	1,900.00	0.20	30	13	
Preserve Office	Construction/Maintenance (R)	Sq. Ft.	1,100.00	85.00	40	2,338	
Preserve Office	Construction/Maintenance (C)	Sq. Ft.	800.00	85.00	40	1,700	
Nature Center	Janitorial	Sq. Ft.	2,500.00	0.05	30	4	
Utilities, Annual	Elec., Gas, Water (All)	Sq. Ft.	1,900.00	1.00	1	1,900	
Office Supplies, Year	Supplies	Persons	6.00	700.00	1	4,200	
Furniture	Desk	Item	6.00	250.00	10	150	
Furniture	Chair	Item	6.00	150.00	5	180	
Furniture	Bookcase, 3'x5'	Item	6.00	150.00	8	113	
Furniture	File cabinet	Item	6.00	400.00	10	240	
Copier	Copier, 15-18 ppm	Item	2.00	3,833.00	8	958	
Fax Machine	Standard	Item	2.00	400.00	5	160	
Telephone	Touch-tone	Item	6.00	95.00	5	114	
Answering Machine	Answering Machine	Item	2.00	100.00	5	40	
E-Mail	Services	Year	2.00	360.00	1	720	
Voice Mail	Voice Mail, Annual	Item	2.00	250.00	5	100	
Cellular Pager	Unit	Unit	4.00	120.00	5	96	
Cellular Pager	Services	Year	4.00	720.00	1	2,880	
Computer, PC Color	Laptop, Pentium	Item	1.00	2,250.00	4	563	
Computer, PC & Monitor	Pentium	Item	6.00	2,100.00	4	3,150	
Computer software	Microsoft Office Pkg	Item	6.00	450.00	4	675	
Computer software	Consulting	C. Hour	5.00	50.00	1	250	
Deskjet Printer	HP DeskJet	Item	3.00	399.00	6	200	
GIS ARC/INFO	GIS, PC based	Item	1.00	15,000.00	5	3,000	
- FIELD EQUIPMENT							8,189
GPS, Rover & Base Unit	GPS/Corrected	Item	1.00	3,500.00	5	700	
Vehicle	Small pickup	Item	1.00	26,000.00	8	3,250	
Vehicle	Maintenance etc	Item	1.00	2,000.00	1	2,000	
Camera 35mm/lens	Mid-range camera	Item	1.00	1,500.00	5	300	
Camera 35mm/lens	Digital camera	Item	1.00	520.00	5	104	
Binoculars	Binoculars Nightvision	Pair	1.00	1,800.00	5	360	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Binoculars	Binoculars, Low-end 10 X 50	Pair	25.00	160.00	5	800	
Spotting Scope 40X	Scope, High-end	Item	1.00	300.00	10	30	
Chemical Sprayer	5 Gallon, Classic	Item	5.00	107.00	5	107	
Other	Davis Weather Stations	Item	1.00	600.00	8	75	
Other	Zodiac and motor	Item	1.00	2,500.00	8	313	
Other	Microscope	Item	2.00	500.00	10	100	
Other	DR Trimmer	Item	1.00	400.00	8	50	
- OPERATIONS							70,900
Contracts	Produce contracts (ED	L. Hours	50.00	50.00	1	2,500	
Contracts	Produce contracts (A	L. Hours	300.00	25.00	1	7,500	
Supervisor Site Visit	Site visits (ED	L. Hours	50.00	50.00	1	2,500	
Employee Training	Classes (R	L. Hours	100.00	35.00	1	3,500	
Conferences	Conferences (ED	L. Hours	20.00	50.00	1	1,000	
Conferences	Conferences (A	L. Hours	10.00	25.00	1	250	
Other	Grantwriting (ED	L. Hours	140.00	50.00	1	7,000	
Other	Grantwriting (A	L. Hours	200.00	25.00	1	5,000	
Other	Grantwriting (PO	L. Hours	780.00	30.00	1	23,400	
Other	Grantcompliance (ED	L. Hours	20.00	50.00	1	1,000	
Other	Grantcompliance (A	L. Hours	100.00	25.00	1	2,500	
Other	Website Management (A	L. Hours	100.00	25.00	1	2,500	
Other	Purchasing/filing (R	L. Hours	350.00	35.00	1	12,250	
Subtotal						591,974	591,974
Contingency @ 10%						59,197	
Administration @ 16%						104,188	
Total						755,359	

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Skyline Ridge Open Space Preserve

Property Description

The Skyline Ridge Open Space Preserve (Preserve) is situated along the crest of the Santa Cruz Mountains in unincorporated San Mateo and Santa Clara Counties, California. The Preserve covers approximately 1,612 acres and is located immediately southwest of the intersection of Skyline Road and Alpine Road. The site is bordered on the north and east by Skyline Boulevard, on the west by Alpine Road, and on the south by private lands and Portola Redwoods State Park. Three inholdings, each with residences, are present within the Preserve. Neighboring private lands are relatively undisturbed, with widely scattered homes.

The Preserve is owned and managed by the Midpeninsula Regional Open Space District (MROSD). Development of the Preserve was assisted by funding from the California Park and Recreation Facilities Act of 1984 and the federal Land and

Water Conservation Fund. The Preserve is part of a network of 25 preserves operated by the MROSD. Three of these preserves abut the property: Long Ridge, Russian Ridge and Monte Bello Open Space Preserves and Portola Redwoods State Park.

Only the northern part of the Preserve is open to the public. The southwestern portion of the Preserve, the Big Dipper Ranch, covers approximately 750 acres, and is currently leased.

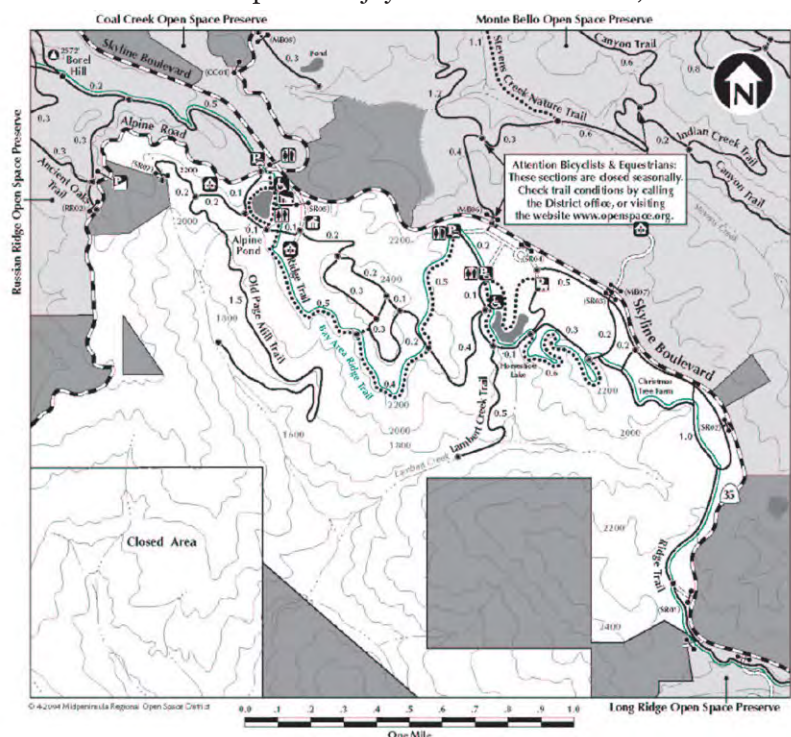
Project Goals

The Midpeninsula Open Space District is a special district form of governmental agency that works to acquire and Preserve lands on the San Francisco peninsula. Its mission statement is as follows: "To acquire a regional greenbelt of open space in perpetuity; protect and restore the integrity of the natural environment; and provide opportunities for public enjoyment and education, consistent



SKYLINE RIDGE
Open Space Preserve

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT



with ecological values.” The MROSD currently maintains over 49,450 acres of bay and foothill land Preserves between the San Francisco Bay and the Santa Cruz Mountains.

Visitation is encouraged to the Preserve. Approximately 10 miles of trails are maintained, including 2 miles with wheelchair access. Trails are open to hikers and equestrians, while use by mountain bikes is limited. A portion of the Bay Area Ridge Trail crosses the Preserve. Picnic tables are available at Horseshoe Lake.

The David C. Daniels Nature Center is situated on the Preserve, and a number of docent-led activities and environmental education programs are ongoing. Interpretive displays and information are developed and presented at the nature center.

Preserve Description

The Preserve sits near the summit of the Santa Cruz Mountains and supports a mosaic of native habitats, including coastal oak woodland, grassland, mixed evergreen forest, chaparral and willow riparian. Two artificial freshwater ponds, Horseshoe Lake and Alpine Pond, with associated marsh habitat, are present. The headwaters of Lambert Creek drain to the west.

Elevations on the Preserve range between 2493 feet at the crest of the ridge to 720 feet along Lambert Creek. Contours are moderate to steep. The portion of the Preserve that is open to the public is no longer grazed, while the Big Dipper Ranch continues to be grazed by cattle.

Numerous native species occur on the Preserve, including the federally threatened California red-legged frog (*Rana aurora draytonii*). Other sensitive species that have been observed on the Preserve include western pond turtle (*Actinemys marmorata*), Cooper’s hawk (*Accipiter cooperi*), golden eagle (*Aquila chrysaetos*), osprey (*Pandion haliaetus*) and tricolored blackbird (*Agelaius tricolor*). Large mammals include mountain lion (*Felis concolor*) and badger (*Taxidea taxus*).

Non-native plants, including French broom, yellow star thistle and non-native pines, are present on the Preserve. Control programs for these species are being implemented.

Habitat Management Organization

The staff at the Preserve is employed by the Midpeninsula Regional Open Space District. The

operations manager, John Maciel, oversees operations at all 25 MROSD Preserves. These Preserves are divided into two operational regions. THE Preserve is part of a complex of 15 Skyline Preserves that cover approximately 23,000 acres. The area supervisor, David Sanguinetti, oversees operations at this complex of Preserves. Nine rangers split their time between these Preserves, and so allocate approximately seven percent of their time to the Preserve. Similarly, nine operations and maintenance personnel split their time between these Preserves, allocating approximately seven percent of their time to the Preserve.

The administrative staff at MROSD is responsible for 25 Preserves and would allocate approximately four percent to the Preserve except that the visitor center increases that proportion. Therefore, seven percent was used for administrative staff also. Although the allocation of time and resources varies from year to year for any one Preserve, it is expected that over time the amount spent on each Preserve is roughly similar.

Much of the equipment used at the Preserve for maintenance operations, including tractors, trucks and backhoes, are also shared between the 15 Skyline Preserves. Other facilities and equipment are unique to the Preserve. The office which services the 15 Skyline Preserves is present on the Preserve. Volunteers assist in maintenance at all the MROSD Preserves, and it is estimated that 190 volunteer hours are spent at the Preserve annually.

A docent program is in place at the MROSD Preserves. Coordination and training of docents is ongoing. Volunteers staff the nature center, and spend approximately 1000 hours annually doing so. Volunteer-led hikes and activities specific to the Preserve account for 665 hours annually.

Habitat Management Tasks

The primary tasks at the Preserve involve providing access for visitors, including trails, parking lots and restrooms. Three parking lots are present off of Skyline Boulevard. Two picnic tables are present above Horseshoe Lake. Ten miles of trails with differing use restrictions are available. Three pedestrian bridges totaling 35 feet by 5 feet are also provided. Maintenance of these facilities is performed by both MROSD staff and volunteers.

Invasive plant control and restoration programs are ongoing at the Preserve. French broom is being controlled, particularly along trails. The property includes a former Christmas tree farm that is cur-

rently being restored to native habitats. Native seed collection is carried out to assist with this task. Monitoring programs are used to determine the success of restoration programs. Monitoring of the Preserve for sudden oak death syndrome is carried out on an annual basis. An ongoing feral pig control program is in place at all of the MROSD Preserves, including Skyline Ridge.

Two reservoirs, Alpine Lake and Horseshoe Lake, are situated on the Preserve. Each has a wheelchair accessible path leading around it. There are benches spaced around each pond. Alpine Lake also has a small floating observation deck. Horseshoe Lake has a pedestrian bridge along the perimeter trail. The two ponds onsite require annual maintenance to the levees. In addition, MROSD must pay an annual fee to a local water district. No swimming is allowed at these lakes, and patrolling is necessary to enforce this restriction.

The David C. Daniels Nature Center, offering a number of docent-led activities and environmental education programs is present at Skyline Ridge Preserve. Hikes focusing on different facets of the environment are available, as well as bike rides, equestrian rides, and night hikes. Between 15 and 20 activities a month are offered at MROSD Preserves, of which 2 to 3 are held at the Preserve.

The administrative office of the MROSD is in Los Altos. The Skyline Field Office, which services 15 Preserves, is present on the Preserve. All costs associated with the office are allocated across all the Preserves so that 7 percent of the whole is attributed to the Preserve. Two converted barns are used for equipment storage. Two smaller buildings are used for storage and temporary lodging. Two employee residences are also present. Maintenance of these structures is ongoing. Both the storage buildings and residences are also allocated across all 15 Preserves with 7 percent attributed to the Preserve.

Most of the equipment stored at the Skyline Ridge Preserve Facility is used at all of the MROSD Preserves. This includes a John Deere backhoe, a dumptruck, a chipper, 2 ORVs, a trail machine, 9 full-size pickup trucks, fire fighting equipment and hand tools. All equipment is allocated across the 15 Preserves with 7 percent allocated to the Preserve.

The Big Dipper Ranch is currently leased for cattle grazing. MROSD is responsible for fence maintenance of the barbed wire fencing along Alpine Road and for maintenance of the interior dirt roads. A 40-acre portion of the ranch along Skyline Boulevard is currently leased as a Christmas tree farm.

Habitat Management Cost Estimates

The figures included in the PAR are derived from interviews with Preserve personnel and estimates made by the MROSD and the Center. It is challenging to isolate the tasks associated with the Preserve because it is managed as a unit with 14 other Preserves. For facilities at the Preserve, MS-ROD made specific estimates for tasks. However, where indicated, it is assumed that management and maintenance tasks are split evenly among the 15 Preserves.

Cost estimates for labor were provided by staff. Volunteers are valued at \$14 an hour. Replacement cost figures for structures and equipment are estimated from similar products.

The long-term overhead for support staff for the MROSD as a whole is probably underestimated in this analysis. This includes accountants, planners and attorneys that work on district-wide issues. The labor costs include 22 percent of labor costs for benefits, as estimated by MROSD staff. There is also a 10 percent contingency included in the estimate.

It should also be noted that the following estimates account for ongoing management of current facilities, and do not account for any improvements or additions to these facilities. Also, unanticipated costs resulting from events such as fire, erosion and levee failure are not included.

The operation of the Skyline Ridge Open Space Preserve is approximately \$190,000 annually, or approximately \$118 per acre. The largest components are Public Services with \$66,000 and Habitat Maintenance with \$37,000. General Maintenance which largely relates to the amount of public visitation is third with nearly \$12,000.

Endnotes

Meeting and site visit with Operations Manager, John Maciel, Resource Management Specialist Cindy Roessler, Area Superintendent, David Sanguinetti, and Maintenance and Construction Supervisor Craig Beckman on March 2, 2004.

Site visit July 28, 2004.

Estimated operating costs, aerial photograph, vegetation map, organization chart provided by staff.

Use and Management Plan dated Nov. 1983.

Review of Use and Management Plan dated April 1992.

Website at www.openspace.org.

PAR Budget Table—Skyline Ridge Open Space Preserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							4,355
Roads	Paved	Mile	0.20	198,000.00	40	990	
Roads	Dirt Grading	Mile	2.50	5,280.00	15	880	
Roads	Big Dipper Ranch Roads	Mile	3.00	5,280.00	15	1,056	
Fencing	Split rail at entrance	Mile	0.20	79,200.00	25	634	
Fencing	5-strand barbed wire - Alpine Rd	Mile	1.50	15,840.00	35	679	
Gate	Bow Gate 10 feet	Item	1.00	334.00	35	10	
Pipegate	Alpine and Skyline road gates	Item	6.00	205.00	35	35	
Stiles	Hiking and equestrian	Item	3.00	600.00	25	72	
- BIOTIC SURVEYS							526
Plant Ecologist	Field Svy. & Reports	L. Hours	12.00	43.00	1	516	
Other	Sudden Oak Death Lab Sampling	Year	1.00	10.00	1	10	
- HABITAT MAINTENANCE							36,561
Site Analysis	Field Survey & Report	L. Hours	38.00	43.00	1	1,634	
Restoration Plan	Final Plan/Report	L. Hours	8.00	43.00	1	344	
Project Management	Supervise/coordinate	L. Hours	36.00	43.00	1	1,548	
Erosion Control	Slope Stabilization	L. Hours	193.00	25.62	1	4,945	
Seed Collection	Native seeds	L. Hours	48.00	25.62	1	1,230	
Revegetation	Seeding	L. Hours	12.00	25.62	1	307	
Revegetation	Plant Installation	L. Hours	230.00	25.62	1	5,893	
Feral Animal Control	Trap, Labor	L. Hours	71.00	33.55	1	2,382	
Tractor, Rental	Equipment rental for tree farm	Year	1.00	16,482.00	1	16,482	
Nest Box, Wood	9" x 12" X 24"	Item	2.00	30.00	1	60	
Exotic Plant Control	Backpack Spray	L. Hours	56.00	25.62	1	1,435	
Other	Pond Surveys	L. Hours	9.00	33.55	1	302	
- WATER MANAGEMENT							8,770
Levee Maintenance	Levee Maintenance	L. Hours	15.00	25.62	1	384	
Channel Clearing	Clear, Labor	L. Hours	10.00	25.62	1	256	
Water Testing	Water Treatment Materials	Item	1.00	400.00	1	400	
Water Testing	Water Treatment	L. Hours	48.00	25.62	1	1,230	
Other	Water District Fee	Item	1.00	6,500.00	1	6,500	
- PUBLIC SERVICES							66,470
Nature Center	Replacement	Sq. Ft.	650.00	95.00	35	1,764	
Nature Center	Maintenance	L. Hours	60.00	25.62	1	1,537	
Nature Center	Supplies	Item	1.00	4,587.00	1	4,587	
Nature Center	Janitorial	L. Hours	40.00	25.62	1	1,025	
Nature Center	Staffing	L. Hours	1,000.00	14.00	1	14,000	
Residence-Employee	Replacement (2)	Sq. Ft.	1,500.00	85.00	35	3,643	
Residence-Employee	Maintenance-40 hours.	L. Hour	28.00	25.62	1	717	
Residence-Employee	Supplies	Year	0.07	2,500.00	1	175	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Access Control	Enforcement	L. Hours	365.00	33.55	1	12,246	
Parking Area	3 lots, 1/4 ac each	L. Hours	110.00	25.62	1	2,818	
Trails	Paved Wheelchair Access	Miles	0.50	9,873.00	25	198	
Trails	Pedestrian bridge, 35x5	Sq. Ft.	175.00	60.00	25	420	
Trails	Maintenance	L. Hours	190.00	10.00	1	1,900	
Observation Deck	Size, wood 10x10'	Sq. Ft.	100.00	60.00	15	400	
Trail/Bridges	Maintenance 6.8 miles	L. Hours	80.00	25.62	1	2,050	
Trail/Bridges	Materials 6.8 miles	Year	1.00	200.00	1	200	
Picnic Tables	Wooden	Item	2.00	350.00	20	35	
Docent Training	Meetings	L. Hours	4.00	33.55	1	134	
Interpretive Literature	Labor	L. Hours	116.00	33.55	1	3,892	
Interpretive Literature	Printing	Copies	2,000.00	0.10	1	200	
Exhibit	Flat Displays	L. Hours	120.00	33.55	1	4,026	
Education	Hikes/education	L. Hours	665.00	14.00	1	9,310	
Community Outreach	Meetings	L. Hours	4.00	33.55	1	134	
Signs	Sign (24" x 18" metal)	Item	10.00	40.00	15	27	
Signs	Outdoor Display Cases	Item	4.00	1,500.00	15	400	
Benches	Wooden benches	Item	10.00	350.00	20	175	
Signs	Sign and Bench Maintenance	L. Hours	12.00	25.62	1	307	
Water fountain	Water Fountain?	Item	1.00	1,500.00	10	150	
- GENERAL MAINTENANCE							11,752
Project Management	Supervise/coordinate	L. Hours	135.00	25.62	1	3,459	
Sanitation Control	Collection and disposal	L. Hours	48.00	25.62	1	1,230	
Toilets, Permanent	Pit Toilets	Item	3.00	400.00	30	40	
Toilets, Permanent	Maintenance	L. Hours	104.00	25.62	1	2,665	
Septic Tanks	Pumping	L. Hours	14.00	25.62	1	359	
Other	General maintenance supplies	Year	1.00	3,500.00	1	3,500	
Other	Restroom maintenance supplies	Year	1.00	500.00	1	500	
- REPORTING							297
Aerial Photo, 2 sets b&w	Standard 9"x 9"	Year	1.00	66.00	1	66	
Annual Reports	Summary	L. Hours	1.00	25.62	1	26	
Maintenance Report	Monthly Report	L. Hours	7.00	25.62	1	179	
Fire Management Plan	Report	L. Hours	1.00	25.62	1	26	
- OFFICE MAINTENANCE							3,125
Administrative	Operations-80 hours	L. Hours	5.60	25.62	1	144	
Preserve Office	Replace/Maintain-1800 Sq. Ft.	Sq. Ft.	126.00	85.00	35	306	
Preserve Office	Operations-105 hours	L. Hours	7.35	25.62	1	188	
Preserve Office	Janitorial-208 hours	L. Hours	14.56	25.62	1	373	
Storage Barn	Replace/Maintain 3000 Sq. Ft.	Sq. Ft.	210.00	40.00	35	240	
Storage Barn	Replace/Maintain 1800 Sq. Ft.	Sq. Ft.	126.00	40.00	35	144	
Furniture	Desk, 3 chairs	Set	1.00	1,000.00	12	83	
Furniture	Filing cabinet, bookcase	Set	1.00	650.00	12	54	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Copier	15-18 ppm	Item	0.07	3,833.00	8	34	
Fax	Standard	Item	0.07	400.00	5	6	
Printer	HP Laser Jet	Item	0.07	500.00	5	7	
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	126.00	1.00	1	126	
Telephone Charges, Annual	Phone Charges	Year	0.07	4,000.00	1	280	
Insurance, Structural	Structure	Item	0.07	753.00	1	53	
Office Supplies, Year	Supplies	Year	0.07	1,000.00	1	70	
Computer, PC Color	Replace	Item	1.00	2,500.00	5	500	
Computer, PC Color	Computers, software, maint.	Year	0.07	3,200.00	1	224	
Other	Janitorial Supples	Year	0.07	4,200.00	1	294	
- FIELD EQUIPMENT							3,707
Vehicle	9 Full size pickup (.07*9)	Item	0.63	26,000.00	8	2,048	
Vehicle	Fuel-3610 gallons	Gallons	252.70	2.00	1	505	
Vehicle	Maintenance	Year	0.07	6,714.00	1	470	
Vehicle Insurance	Insurance	Year	0.07	540.00	1	38	
Binoculars	Binoculars 10 X 50-2	Pair	0.14	400.00	10	6	
Backhoe	John Deere midsize	Item	0.07	44,000.00	25	123	
Dumptruck	Light	Item	0.07	40,000.00	25	112	
Trail Machine	SWECO 480	Item	0.07	52,300.00	30	122	
Chipper	Medium	Item	0.07	1,580.00	10	11	
ORV	4 wheel drive mid range	Item	0.14	5,000.00	8	88	
Firefighting Equipment	Clothing, tools-10	Set	0.70	600.00	8	53	
Handtools	Shovels etc.-20 sets total	Set	1.40	250.00	6	58	
Camera	Digital 3 megapixel-3	Item	0.21	350.00	6	12	
Radio, Mobile Unit	Replacement-3 units	Item	0.21	180.00	6	6	
Radio, Mobile Unit	Radio maintenance and repair	Year	0.07	543.00	1	38	
Other	Camera supplies and film	Year	0.07	250.00	1	18	
- OPERATIONS							5,864
Contracts	Produce contracts	L. Hours	40.00	37.58	1	1,503	
Insurance	Liability	Acres	1,612.00	0.55	1	887	
Project accounting/budgets	Setup and maintain	L. Hours	40.00	25.62	1	1,025	
Employee Training	Classes	Year	1.00	2,449.00	1	2,449	
Subtotal						141,426	141,426
Contingency @ 10%						14,143	
Administratiion @ 22%						34,225	
Total						189,794	

Starr Ranch Sanctuary

Property Description

Starr Ranch Sanctuary (Sanctuary) is a 4,000-acre preserve owned and operated by the National Audubon Society (NAS). It is located in the foothills of the Santa Ana Mountains of southeastern Orange County, California, approximately 60 miles southeast of Los Angeles. The sanctuary encompasses Bell Canyon Creek which originates in the gorge at the base of Los Pinos Peak in the Cleveland National Forest. The elevation change within the sanctuary is about 1,100 feet from the valley to the top of the ridge.

The Sanctuary lies in unincorporated Orange County and is bordered by the Cleveland National Forest on the north and east, the Ronald W. Caspers Regional Park on the south and the golf course developments of Dove Canyon and Coto de Caza on the west. The larger community of Rancho Santa Margarita is 3 miles northwest of the Sanctuary, and the city of San Juan Capistrano is 10 miles to the southwest.

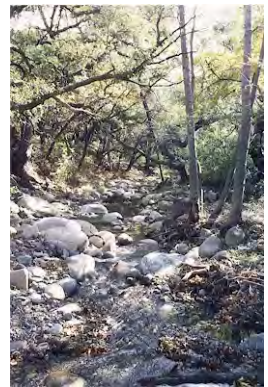
In May of 1973, 4,000 acres of the property were deeded to the NAS for preservation and research. Prior to NAS ownership, the Sanctuary was a small working cattle operation until 1963, when the owner, Eugene Starr, passed away. It also served as a vacation home/hunting lodge for Starr and his family. The site has a reserve manager's residence and office, storage facility, and bunkhouse and commons for visiting researchers.

Project Goals

NAS's goal is to "stimulate, coordinate, and perform scientific research on the

biology and conservation of the unusual mediterranean climate ecosystems at the Sanctuary and to extend our science to the local community in the form of unique natural history education programs and conservation activism."

To attain its goals, NAS offers numerous educational opportunities for all ages, coordinates with local universities for research purposes, has a "friends" group that helps with public outreach, manages a plant nursery and works closely with neighboring land owners and wildlife protection groups. Because of the many rare habitats at the Sanctuary, most activities other than research and monitoring are limited. No mountain bike riding, hunting, hiking, ORV or horseback riding is allowed.



Biological Description

Vegetation communities at the Sanctuary are typical of lower elevation southern California and include grassland, oak woodland, riparian woodland, coastal sage scrub, and chaparral. Wildlife species include 36 native mammals such as bobcat, mountain lion, mule deer, and five species of bats. The ringtail cat (*Bassariscus astutus*) has been identified here but has not been seen for many years. Over 130 species of native birds are observed on the Sanctuary including nearly 70 that have been confirmed as breeding. The listed threatened coastal California gnatcatcher is also found here. More than 30 species of reptiles and amphibians also inhabit the dry uplands and creek bottoms.

Arroyo chub (*Gila orcuttia*) and threespine stickleback (*Gasterosteus aculeatus microcephalus*) inhabit Bell Canyon Creek. There are about seven miles of creek frontage and riparian habitat within the sanctuary. Riparian plant life supports rushes to bigleaf maple. Among the almost 400 plants identified, there 312 native and 74 exotic species. The Sanctuary is one of the last remaining locations for large expanses of purple needle grass (*Nassella pulchra*) grassland. However, grasses also account for 15 of the exotics.

Most of the habitat at the preserve is of high quality. However, there are large stands of artichoke thistle; originally there were 700 acres. This number has been reduced to less than 5 percent cover on 340 acres through continuing non-chemical control mechanisms using techniques found effective though extensive experimentation. Grassland is also being restored over time and some 30 acres have been plugged and seeded.

Organizational Structure

The property is owned and managed by NAS with six full-time and various numbers of part-time staff members. Full-time staff includes the manager (M), director of research and education (R), biologist/educator-birds (BB), biologist/educator-general (BG), ranch maintenance supervisor (S), administrative assistant (A). The letters in parenthesis following the position are included in the PAR budget to designate the responsible staff. Part-time staff assists in maintenance of equipment. There are also numerous volunteers. Besides volunteers with the Friends of Starr Ranch Sanctuary, the Boy

and Girl Scouts and students conduct projects. A professional biologist also volunteers as a teacher operating an extensive classroom program in conjunction with staff educators.

A seasonal field crew (FC) and their leader (F) is working on artichoke thistle removal, replanting and control. They are using a brushcutter to remove plants and replanting. This staff is funded from a recent grant. In addition, a stream bioassessment accounts for two persons' efforts. Both of these efforts are expected to continue at much the same levels as is further explained below.

All together, over 20,000 hours are expected to be spent on long-term stewardship at the Sanctuary. The largest part is expected to be devoted to habitat maintenance followed closely by public services.

Habitat Management Tasks

Site construction includes maintenance of 20 miles of road at the Sanctuary. All are dirt and are anticipated to be graded minimally except at stream crossings after heavy rains. Only staff utilize the roads except that the site provides fire access to the national forest. Fencing has not used at the sanctuary as it is presently protected from trespass and ORV activities, however, additional development in the area may create the need for a fence along certain boundaries. About 2,000 feet of split rail cedar fence is included to meet this eventuality.

Biotic surveys are expected to absorb nearly 3,000 hours at the Sanctuary in the long-term. Bird surveys include locating raptor nests and banding chicks and well as a MAPS (Monitoring Avian Productivity and Survival) station for banding songbirds. Animal monitoring of larger predators uses scent stations and video. Plant transects are studied particularly in the sage scrub and grassland communities. Pit arrays survey for reptiles and amphibians. Planning and supervising these activities is part of the role of the director of research and education.

There is ongoing use of the property by local university ecology and biology classes as well as by researchers. Currently, the Sanctuary is a study site for twelve research projects, five of which focus on the endangered coastal sage scrub. Coordination with the universities is included in this category.

Presently the biostream monitoring is a two-year program measuring the effects of runoff from two neighboring projects. Although this runoff should be diverted within two years by pumping the water to a sewage district, it is anticipated that an ongoing water monitoring program will be needed to protect these streams. Hours for this work is reduced, therefore, below the current level (including reporting and other work) to one full-time person with 2,000 hours. Long-term monitoring of the stream will evaluate quality, quantity and vegetation and incorporate this element into the education program. Occasional water samples are tested outside but basic testing is conducted in the onsite lab.

Habitat management for the Sanctuary includes many aspects that may be considered habitat restoration for some projects; this is particularly true of the attempt to remove the invasive-exotic species, artichoke thistle, through non-chemical means. Some 700 acres were invaded of which about 300 acres remain. These are subject to site analysis, a conceptual plan, a restoration plan and method testing. About 30 acres per year are being treated using a brush cutter as seeding and plugs where needed. Staff hopes to have artichoke thistle under control by the year 2010 and begin working on other species. Because of the number of invasive species on the property and the significant research and planning needed for non-chemical control, the level of invasive control is anticipated to continue to be high for a long time. As a result, this activity is considered ongoing at the current level. In addition, the nursery that has been established to produce sage scrub habitat plugs is also included using staff labor.

Similarly, hoeing of other invasive plants is also occurring. Although potentially construed as a restoration project, the term is long enough to justify its inclusion as an ongoing task. The project's tractor, flail mower, tiller, and brush cutter are all used for habitat management purposes. These items are included in the field equipment category. More than 5,700 hours a year are devoted to the habitat maintenance category for the long-term.

The site is well known in the area even though public recreation is not allowed in these sensitive habitats. Instead, the majority of the public services effort is through ecology and conservation classes operated by the staff and volunteers. To this end there is a conference/classroom building, a bunkhouse and residence for visitors and a

residence for staff that must be maintained along with their grounds. Utilities are estimated at \$1.00 per square foot, however, the use of septic and wells may cause this to vary.

Activities include nature walks, seminars, and grade school educational classes conducted by staff. Hawk and owl banding occur twice yearly in spring and fall. More specifically, there are family nature workshops twice a year in spring and fall. In addition, volunteer Dave Bontrager conducts prized classes on "Field Natural History and Ecology," "Identification and Natural History of Birds," "Bird Banding," "Stream Ecology," and "Natural History of Plants." Natural History Day welcomes Audubon members with a variety of academics on a variety of habitats, plants and animals endemic to the region. Developing and presenting classes occupies over 3,600 hours and involves several staff members. These activities are part of NAS's mission and is considered as ongoing tasks for this project.

This category also includes furniture and equipment for the classes. The value of tables and chairs video equipment such as projectors, cameras and TV are estimated. Computers are included under the office maintenance category.

Staff is also active environmentally. The manager in particular is involved in promoting a conservation ethic and sound environmental planning at the public and community level. Total hours in the public services category are estimated at 6,000 for the long-term.

General maintenance includes picking up and disposing of trash, maintaining toilets and other public facilities, and maintaining the shop. Included in this category are unidentified bits of time provided by volunteers and other temporary employees that are not otherwise allocated. There are over 500 hours unallocated. Many of these hours are likely attributed to setup and takedown before and after public events.

Reporting includes annual reports on the project, management of databases and GIS mapping of the project, and database entry time. Database entry covers a variety of subjects: volunteers, donations, monitoring and accounting that could alternatively be placed directly into the applicable category.

Office maintenance includes the office itself, equipment and staff hours for its maintenance. The numbers are based on five staff members and visitors. However, there are sixteen or more

computers in the office and classrooms. Again some portion of equipment may be attributed to the public service category.

Field equipment includes vehicles and heavy equipment used in habitat management. There are six vehicles, a tractor and several tractor attachments including flail mowers and a brush cutter. The shop tool estimate is likely inadequate as an inventory was not taken. A set of hand tools for use in the field is assumed to include a pulaski, shovel, hoe, pruning shears and weed eaters.

Administrative costs include fundraising which is largely grantwriting, budgeting and accounting, insurance, and managing the project's endowment.

Habitat Management Cost Estimates

The total long-term stewardship costs of the Sanctuary totals \$854,000 on average per year. This figure includes a ten percent contingency which is the default in this survey. In addition, there is a 20 percent overhead fee that accounts for the services, legal, accounting, budgetary, fundraising, personnel and so on that is contributed by the NAS.

The largest amount is devoted to public services at \$214,000. Some equipment like computers may also be attributable to the public services category. At \$104,000, the next largest category is habitat maintenance because of the continuing invasive exotic control activities. If the field equipment used for invasive-exotic control were included in that category, habitat management would be a larger part of the whole. The third largest category is biotic surveying with \$86,000 with animal, plant, and stream monitoring. Operations is fourth at \$74,000, largely because of the extensive time spent grantwriting to support special projects on the site. Although no one of these special projects is long-term, the grantwriting endeavor may be considered so.

Endnotes

1. www.starranch.org
- 2.. Invasive Species Control and Habitat Restoration at Starr Ranch Sanctuary, Audubon of California, August 2003.
3. Peter DeSimone, Meeting and telephone follow-up. Allocation of staff time analysis.

PAR Budget Table—Starr Ranch Sanctuary Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							20,771
Road Maintenance	Grading Contract	Miles	20.00	80,000.00	100	16,000	
Road Planning	Survey/maintain/contract (M	L. Hours	10.00	45.00	1	450	
Road Repairs	Repair time (M	L. Hours	60.00	45.00	1	2,700	
Fence - Installed	Maintenance/Replaement	Lin. Ft.	2,000.00	12.05	15	1,607	
Gate	Rail Gate	Ite m	1.00	205.50	35	6	
Lock	Padlock	Item	1.00	15.99	2	8	
- BIOTIC SURVEYS							85,975
General Monitoring	Planning/Supervising (R	L. Hours	200.00	38.00	1	7,600	
General Monitoring	Field Input (F	L. Hours	30.00	20.00	1	600	
Raptor Surveys	Nest location/chick banding (M	L. Hours	20.00	45.00	1	900	
Special Surveys	University Coord. (R	L. Hours	20.00	38.00	1	760	
Plant Surveys	Transects (R	L. Hours	40.00	38.00	1	1,520	
Plant Surveys	Transects (F	L. Hours	45.00	20.00	1	900	
Plant Surveys	Transects (FC	L. Hours	60.00	15.00	1	900	
Stream Monitoring	Veg, quality, quantity (BS	L. Hours	1,700.00	25.00	1	42,500	
Animal Monitoring	Scent Stations/Video (BG	L. Hours	400.00	32.00	1	12,800	
Bird Surveys	MAPS, banding (BB	L. Hours	400.00	32.00	1	12,800	
Herp. Studies	Pit Arrays	L. Hours	60.00	32.00	1	1,920	
Survey Equipment	Stakes, bands, etc.	Set	5.00	150.00	2	375	
Water Testing	Chemicals and Metals	Unit	2.00	1,200.00	1	2,400	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							104,283
Invasive Removal	Planning/Removal (M	L. Hours	20.00	45.00	1	900	
Site Analysis	Thistle program (R	L. Hours	80.00	38.00	1	3,040	
Conceptual Plan	Thistle program (R	L. Hours	20.00	38.00	1	760	
Restoration Plan	Thistle program (R	L. Hours	150.00	38.00	1	5,700	
Restoration Plan	Thistle plan testing (R	L. Hours	150.00	38.00	1	5,700	
Invasive-Exotic Control	Hoeing all locations (F	L. Hours	600.00	20.00	1	12,000	
Invasive-Exotic Control	Hoeing all locations (FC	L. Hours	1,600.00	15.00	1	24,000	
Invasive-Exotic Control	Brushcutting (F	L. Hours	750.00	20.00	1	15,000	
Invasive-Exotic Control	Brushcutting (FC	L. Hours	2,000.00	15.00	1	30,000	
Planting	Plugs and Seeds (F	L. Hours	75.00	20.00	1	1,500	
Planting	Plugs and Seeds (FC	L. Hours	200.00	15.00	1	3,000	
Nursery	Structure	Sq. Ft.	500.00	25.00	15	833	
Nursery	Seed Collection, Managing (FC	L. Hours	100.00	15.00	1	1,500	
Nursery	Tools, fertilizer, soil	Unit	1.00	350.00	1	350	
- PUBLIC SERVICES							213,826
Visitor Center	Conference/Classroom	Sq. Ft.	900.00	85.00	35	2,186	
Laboratory	Testing/Sampling	Sq. Ft.	1,100.00	65.00	35	2,043	
Residence	Bunkhouse,staff cabin	Sq. Ft.	2,500.00	85.00	35	6,071	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Residence	Staff Residence	Sq. Ft.	800.00	85.00	35	1,943	
Buildings and utilities	Upgrade/Repair Planning (M	L. Hours	220.00	45.00	1	9,900	
Buildings and utilities	Repair/Janitorial (S	L. Hours	720.00	25.00	1	18,000	
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	5,300.00	1.00	1	5,300	
Furniture	Tables/6 chairs	Set	12.00	500.00	8	750	
Video Equipment	Cameras/Projectors/TV	Unit	10.00	800.00	6	1,333	
Building Grounds	Supervision (M	L. Hours	20.00	45.00	1	900	
Building Grounds	Maintenance (S	L. Hours	540.00	25.00	1	13,500	
Building Grounds	Maintenance (P	L. Hours	40.00	20.00	1	800	
Community Outreach	Meetings/Speaking (M	L. Hours	20.00	45.00	1	900	
Community Outreach	Meetings/Speaking (R	L. Hours	20.00	38.00	1	760	
Community Outreach	Meetings/Speaking (BB	L. Hours	20.00	32.00	1	640	
Community Outreach	Meetings/Speaking (BG	L. Hours	20.00	32.00	1	640	
Community Outreach	Volunteer Coordination (R	L. Hours	60.00	38.00	1	2,280	
Community Outreach	Volunteer Coordination (BB	L. Hours	20.00	32.00	1	640	
Community Outreach	Education Coordination (R	L. Hours	200.00	38.00	1	7,600	
Community Outreach	Education Coordination (BB	L. Hours	20.00	32.00	1	640	
Community Outreach	Education Coordination (BG	L. Hours	20.00	32.00	1	640	
Community Outreach	Education Programs (R	L. Hours	100.00	38.00	1	3,800	
Community Outreach	Education Programs (BB	L. Hours	1,400.00	32.00	1	44,800	
Community Outreach	Education Programs (BG	L. Hours	1,400.00	32.00	1	44,800	
Community Outreach	Education Programs (V	L. Hours	500.00	35.00	1	17,500	
Community Outreach	Events (R	L. Hours	50.00	38.00	1	1,900	
Community Outreach	Environmental Activism (M	L. Hours	200.00	45.00	1	9,000	
Community Outreach	Docent Training (R	L. Hours	40.00	38.00	1	1,520	
Community Outreach	Docent Training (BB	L. Hours	20.00	32.00	1	640	
Community Outreach	Docent Training (BG	L. Hours	20.00	32.00	1	640	
Community Outreach	Bird MAPS, Band Training (BB	L. Hours	100.00	32.00	1	3,200	
Interpretive Literature	Writing/Producing (R	L. Hours	60.00	38.00	1	2,280	
Interpretive Literature	Writing/Producing (BB	L. Hours	20.00	32.00	1	640	
Interpretive Literature	Writing/Producing (BG	L. Hours	20.00	32.00	1	640	
Newsletter	Writing/Producing (R	L. Hours	100.00	38.00	1	3,800	
Newsletter	Writing/Producing (A	L. Hours	60.00	20.00	1	1,200	
- GENERAL MAINTENANCE							21,300
Project Management	Planning/Repair	L. Hours	100.00	45.00	1	4,500	
Shop/Storage/Tackhouse	Replacement	Sq. Ft.	1,700.00	40.00	25	2,720	
Solar showers	Stationary	Unit	1.00	400.00	5	80	
Toilets	Clivus Multrum self composting	Unit	2.00	16,000.00	20	1,600	
Toilets Field	Maintenance (S	L. Hours	54.00	25.00	1	1,350	
Toilets	Maintenance (S	L. Hours	126.00	25.00	1	3,150	
Miscellaneous	Any and all (P	L. Hours	40.00	20.00	1	800	
Miscellaneous	Any and all (V	L. Hours	335.00	10.00	1	3,350	
Miscellaneous	Any and all (BS	L. Hours	150.00	25.00	1	3,750	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
- REPORTING							28,520
Database Management	Plan/Input (M	L. Hours	20.00	45.00	1	900	
Database Management	Plan/Input (R	L. Hours	20.00	38.00	1	760	
Database Management	Input (A	L. Hours	400.00	20.00	1	8,000	
GIS/CAD Management	Plan/Input (BG	L. Hours	60.00	32.00	1	1,920	
Annual Reports	Research/Write (M	L. Hours	10.00	45.00	1	450	
Annual Reports	Research/Write (R	L. Hours	100.00	38.00	1	3,800	
Internal Reports	Research/Write (M	L. Hours	20.00	45.00	1	900	
Internal Reports	Research/Write (R	L. Hours	40.00	38.00	1	1,520	
Monitoring Reports	Compile/Write (R	L. Hours	60.00	38.00	1	2,280	
Report Production	Edit/Copy/Distribute (R	L. Hours	10.00	38.00	1	380	
Report Production	Edit/Copy/Distribute (A	L. Hours	40.00	20.00	1	800	
Project Data	Evaluation/Entry (M	L. Hours	20.00	45.00	1	900	
Project Data	Evaluation/Entry (R	L. Hours	20.00	38.00	1	760	
Project Data	Evaluation/Entry (A	L. Hours	40.00	20.00	1	800	
Project Data	Evaluation/Entry (FC	L. Hours	40.00	15.00	1	600	
Project Data	Evalutation/Entry (BS	L. Hours	150.00	25.00	1	3,750	
- OFFICE MAINTENANCE							43,212
Preserve Office	Replacement	Sq. Ft.	2,000.00	85.00	35	4,857	
Preserve Office	Utility line maintenance (M	L. Hours	200.00	45.00	1	9,000	
Preserve Office	Building Repairs (M	L. Hours	20.00	45.00	1	900	
Utilities, Annual	Elec., Gas, Water	Per year	2,000.00	1.00	1	2,000	
Purchasing	Planning/Ordering (M	L. Hours	100.00	45.00	1	4,500	
Purchasing	Planning/Ordering (A	L. Hours	150.00	20.00	1	3,000	
Website	Planning/Maintenance (R	L. Hours	60.00	38.00	1	2,280	
Website	Maintenance (A	L. Hours	60.00	20.00	1	1,200	
Office Supplies, Year	Supplies	Person	7.00	192.00	1	1,344	
Chairs	Standard	Item	10.00	150.00	6	250	
Desks	Standard	Item	7.00	250.00	10	175	
Furniture	Bookcase, 3'x5'	Item	7.00	150.00	8	131	
Furniture	File cabinet	Item	7.00	300.00	10	210	
Copier	Copier, 15-18 ppm	Item	1.00	400.00	8	50	
Fax Machine	Standard	Item	1.00	250.00	5	50	
Telephone	Touch-tone	Item	7.00	50.00	5	70	
E-Mail	Services	Year	5.00	360.00	1	1,800	
Computer, PC & Monitor	Replacement	Item	16.00	2,100.00	5	6,720	
Computer software	Various	Item	7.00	250.00	1	1,750	
Deskjet Printer	HP DeskJet 895	Item	3.00	250.00	6	125	
Equipment	Maintain hardware/software (M	L. Hours	40.00	45.00	1	1,800	
Equipment	Maintain hardware/software (A	L. Hours	50.00	20.00	1	1,000	
- FIELD EQUIPMENT							55,047
GPS Rover and Base	GPS	Item	5.00	100.00	5	100	
Vehicle	2-wheel drive pickup	Item	2.00	24,000.00	8	6,000	
Vehicle	4-wheel drive pickup	Item	1.00	28,000.00	8	3,500	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Vehicle	4-wheel drive flat bed truck	Item	1.00	32,000.00	8	4,000	
Vehicle	4-wheel drive SUV	Item	2.00	28,000.00	8	7,000	
Vehicle	Tractor	Item	1.00	60,000.00	20	3,000	
Vehicle	Tractor	Item	1.00	15,000.00	15	1,000	
Vehicle Attachments	Flail Mower	Item	1.00	10,500.00	25	420	
Vehicle Attachments	Surface Tiller	Item	1.00	3,500.00	6	583	
Vehicle Attachments	Chipper	Item	1.00	11,000.00	15	733	
Vehicle Attachments	Brush Cutter	Item	1.00	11,000.00	5	2,200	
Vehicle	Maintenance (M	L. Hours	20.00	45.00	1	900	
Vehicle	Maintenance (S	L. Hours	360.00	25.00	1	9,000	
Vehicle	Maintenance (P	L. Hours	320.00	20.00	1	6,400	
Vehicle	Fuel	Gallons	250.00	2.00	1	500	
Vehicle	Maintenance (M	L. Hours	40.00	45.00	1	1,800	
Vehicle	ATV	Item	1.00	4,000.00	8	500	
Vehicle Insurance	Insurance	Year	6.00	1,100.00	1	6,600	
Other	First Aid Kit	Item	1.00	50.00	5	10	
Other	Shop tools	Set	1.00	2,500.00	5	500	
Other	Hand tools	Set	10.00	150.00	5	300	
- OPERATIONS							74,030
Fundraising	Grants/Network (M	L. Hours	1,000.00	45.00	1	45,000	
Accounting/Budget	Budget & reconcile (M	L. Hours	60.00	45.00	1	2,700	
Accounting/Budget	Budget & reconcile (A	L. Hours	1,200.00	20.00	1	24,000	
Insurance	Liability	Acre	4,000.00	0.55	1	2,200	
Endowment	Review/Redirect	L. Hours	2.00	60.00	1	120	
Property Tax Exemption	File and documents (A	L. Hours	0.50	20.00	1	10	
Subtotal						646,964	646,964
Contingency @ 10%						64,696	
Administration @ 20%						142,332	
Total						853,993	

Sycamore Canyon Reserve

Property Description

The Sycamore Canyon Reserve (Reserve) is located in the city of Riverside, Riverside County, California. The surrounding area is highly urbanized, and the Reserve is effectively isolated from other open space areas. The reserve is approximately 1500 acres, consisting primarily of non-native grasslands and early seral Riversidian sage scrub. The site is bounded to the north by Central Avenue, to the west by Canyon Crest Drive, to the south by Alessandro Boulevard, and to the east by an access road into a warehouse complex. Surrounding properties consist of a mix of high and medium density residential, light industrial, commercial and a golf course. A tenuous link is made to the south with the March Stephens' Kangaroo Rat Preserve (March Preserve), which is on the south side of Alessandro Boulevard. The property is owned by the city of Riverside and is managed by the Park and Recreation Department. Randy Solis is the senior park ranger.

Project Goals

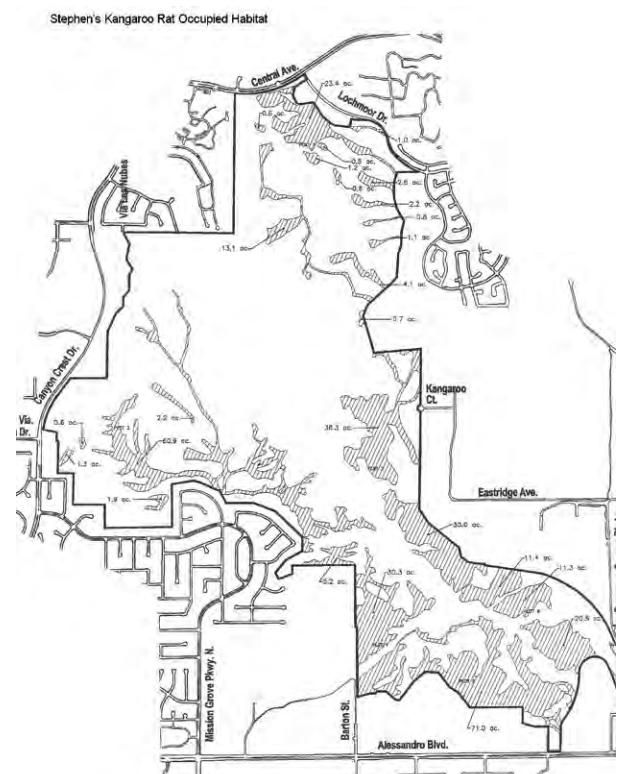
Being a part of the Park and Recreation Department, the Reserve has a significant public use component. The reserve is also a Core Reserve as defined within the Riverside County Stephens' Kangaroo Rat Habitat Conservation Plan (SKR HCP), and thus is committed to achieving the goals established in the SKR HCP. The SKR HCP was adopted by the county as the guide toward obtaining a Federal Endangered Species Act Section 10 permit for the Stephens' kangaroo rat. Under the SKR HCP, the Reserve is required to maintain and enhance the property to maximize habitat conditions for the Stephens' kangaroo rat.

Biological Description

The Reserve is maintained as unimproved open space but is accessible by trails. The dominant habitat feature is non-native grassland with large

patches of Riversidian sage scrub interspersed. Sycamore Creek bisects the reserve, and the channel is lined with cottonwood woodland and willow/mulefat scrub.

The open sage scrub and grasslands on the flatter portions of the reserve are occupied by Stephens' kangaroo rat (SKR) (*Dipodomys stephensi*), a federally listed endangered and state-listed threatened species. The riparian habitats along Sycamore Creek support a breeding population of the federally listed endangered least Bell's vireo (LBV) (*Vireo bellii pusillus*). Other sensitive species likely to occur on the reserve include burrowing owl (*Speotyto cunicularia hypugaea*), which is under review for listing in California. The Reserve is also an important overwintering site for many raptors.



The reserve is tenuously linked with the March Preserve, which is also part of the SKR HCP. The March Preserve is 1175 acres of similar habitat segregated from Sycamore Canyon Reserve by the 5-6 lane Alessandro Boulevard.

Habitat Management Organization

The reserve is maintained by a staff of park and recreation rangers that also maintain 50 other city parks. Randy Solis is the senior park ranger. Monitoring and research requirements under the SKR HCP are contracted. A quarterly meeting as a member of the Resource Managers' Coordinating Committee must be attended as required under the SKR HCP.

Habitat Management Tasks

The habitat management tasks are defined in the SKR HCP or are otherwise agreed upon by the managers of reserves within that HCP. These agreements stem from discussions in quarterly meetings of the Reserve Managers Coordinating Committee, which was established as part of the HCP. Other elements of the management tasks required were taken from the Conceptual Development Plan for the Sycamore Canyon Park, and from discussions with Randy Solis.

Management on the reserve is restricted by the city to patrolling and enforcing public use of the trail system and limiting encroachment of neighboring property improvements. Discussions between the county and U.S. Fish and Wildlife Service are ongoing, with the goal of removing Sycamore Canyon from the SKR HCP. With this future, the city has not funded any habitat management. Maintaining the open habitats used by SKR have been helped by periodic wildfires.

However, the site continues to have obligations to maintain SKR and LBV habitat under the HCP. Periodic mowing or burning of the non-native grasslands to maintain SKR habitat, monitoring the SKR population trends, monitoring vegetation cover in SKR-associated habitats to determine habitat manipulation needs, monitoring LBV, controlling tamarisk and arundo in riparian habitats, and removing cowbirds and African clawed frogs are tasks needing to be implemented as part of the management program.

Surveys of plants, SKR and LBV are included. Staff is assumed to plan these projects but they are implemented by contractors at local rates.

Mowing and firebreak maintenance are assumed to be conducted by hiring an operator with equipment to conduct the work. Rates are those used at nearby preserves. Burning hours are spent in planning the burn, applying for an air quality burn permit and working with the local fire department. The fire department conducts the burn without cost as a training exercise. About 150 to 300 acres are assumed to be burned each year. Cowbird trapping is conducted by contract as well.

Several dirt roads on the interior that are not associated with utility easements also require maintenance. Concrete bollards and fences are needed to deter entry in areas where trails and roads are not wanted.

Patrolling and access control are important aspects of the management of the site. While there is not a visitor center, cyclists and walkers access the area from surrounding streets. While some trails are being closed an estimated 14 miles of interlooping trails are maintained. Trails are maintained by volunteers with local mountain bike clubs or California Conservation Corps and this value was included in the estimate. Organizing volunteers is a cost of the project. In addition trails are expected to undergo reconstruction every 15 years.

One staff person is required to participate in quarterly meetings with the Reserve Managers' Coordinating Committee (RMCC) as stipulated under the SKR HCP. Substantial labor is also required for interaction with the public since the site is a public recreational facility as well as a habitat conservation area.

Office rent is based on needs for 400-500 square feet of work and storage space at typical rates in Riverside of \$1.25-1.50 per square foot; office equipment was budgeted for a single staff person as a contribution toward the support of three rangers and other supporting staff that participate in maintenance of city parks. Field equipment support 1.5 staff rangers, which is higher than office contributions, because Sycamore Canyon is the largest of the city parks and requires more on-site time than does any other park in the system.

Some administrative costs are included in the estimate including an audit, contracts, liability insurance, budgeting and accounting.

Habitat Management Cost Estimates

About 700 hours of labor are included in the cost estimate for the Reserve. In addition, several

contracts are let for biotic surveys, cowbird trapping, mowing and firebreak maintenance. These efforts are not part of current management. As a result habitat maintenance and biotic surveys are the most expensive elements totaling \$22,000 apiece. Further, public services has a smaller share than is perhaps intended by the management with \$16,000 in annual expenses.

Total ongoing management funding requirements were estimated at \$145,000 a year including a 10 percent contingency which is assumed by default and an administrative rate. The city provided an administrative rate of 25 percent which is used on some grants but may be more of a support cost rather than a true overhead figure.

Endnotes

Meeting with Randy Solis, 23 June 2003.

Conceptual Development Plan for Sycamore Canyon Park (Cardoza, Dillallo and Harrington 1988).

Habitat Conservation Plan for the Stephens' Kangaroo Rat in Western Riverside County. Riverside Habitat Conservation Authority, 1996.

PAR Budget Table—Sycamore Canyon Reserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							4,467
Project Planning	Supervise/coordinate	L. Hours	12.00	40.00	1	480	
Project Bid Documents	RFP	L. Hours	12.00	40.00	1	480	
Rough Grading	Rough Grade	C. Hours	45.00	125.00	5	1,125	
Fence - Installed	Chain Link 8'	Lin. Ft.	3,000.00	9.50	25	1,140	
Fence	Maintenance Labor	L. Hours	20.00	40.00	1	800	
Fence	Maintenance Materials	Item	1.00	250.00	1	250	
Gate, Bow Gate	Powder River, Bow	Item	3.00	925.00	20	139	
Lock	Padlock	Item	3.00	15.00	2	23	
Vehicle Barrier	Concrete Bollard	Item	8.00	95.00	25	30	
- BIOTIC SURVEYS							21,890
Project Management	Supervise/coordinate	L. Hours	16.00	40.00	1	640	
Plant Ecologist	Field Svy. & Reports	C. Hours	100.00	85.00	1	8,500	
Mammalogist	SKR	C. Hours	100.00	85.00	1	8,500	
Ornithologist	Bell's vireo	C. Hours	50.00	85.00	1	4,250	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							22,347
Exotic Plant Control	tamarisk, arundo	L. Hours	120.00	25.00	1	3,000	
Exotic Plant Control	Herbicide	Gal.	2.00	140.00	1	280	
Exotic Plant Control	Backpack Spray	L. Hours	40.00	25.00	1	1,000	
Exotic Plant Control	Operator/Tractor/Mower	C. Hours	40.00	125.00	1	5,000	
Exotic Animal Control	Trapping-Cowbird	Contract	1.00	25,000.00	15	1,667	
Exotic Animal Control	African clawed frog	L. Hours	24.00	25.00	1	600	
Controlled Burning	Burn Coordination	L. Hours	60.00	40.00	3	800	
Fire Breaks	Operator/Grader	C. Hours	80.00	125.00	1	10,000	
- WATER MANAGEMENT							
- PUBLIC SERVICES							15,611
Access Control	Enforcement	L. Hours	40.00	40.00	1	1,600	
Patrolling	Patrol	L. Hours	144.00	40.00	1	5,760	
Trail	Maintenance	L. Hours	100.00	15.00	5	300	
Trail	Dirt/Planning	L. Hours	12.00	40.00	10	48	
Trail	Dirt/Construct	Item	1.00	17,000.00	15	1,133	
Sign	All signs/materials	Item	1.00	10,000.00	10	1,000	
Sign	All signs/labor	L. Hours	30.00	30.00	10	90	
Kiosk, Redwood	4'x 3'	Item	2.00	1,200.00	10	240	
Volunteer Coordinator	Meetings	L. Hours	40.00	40.00	1	1,600	
Docent Training	Meetings	L. Hours	20.00	40.00	1	800	
Community Outreach	Meetings	L. Hours	40.00	40.00	1	1,600	
CRMP Coordination	RMCC meetings	L. Hours	36.00	40.00	1	1,440	
- GENERAL MAINTENANCE							1,197
Project Management	Supervise/coordinate	L. Hours	24.00	40.00	1	960	
Dumpster, Rental	10 C.Y.	Week	1.00	237.00	1	237	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- REPORTING							6,720
Database Management	Data Input	L. Hours	30.00	40.00	1	1,200	
GIS/CAD Management	Data Management	L. Hours	30.00	40.00	1	1,200	
Annual Work Plan	Plan and PAR Budget	L. Hours	40.00	40.00	1	1,600	
Agency Report	Annual Report	L. Hours	40.00	40.00	1	1,600	
Management Plan	Initial Report	L. Hours	40.00	40.00	5	320	
Fire Management Plan	Prescribed fire plan	L. Hours	20.00	40.00	1	800	
- OFFICE MAINTENANCE							13,445
Administrative	Operations	L. Hours	60.00	40.00	1	2,400	
Preserve Office	Rent/Maintenance	Month	12.00	600.00	1	7,200	
Telephone Charges, Annual	Phone Charges	Person	1.50	1,200.00	1	1,800	
Office Supplies, Year	Supplies	Person	1.50	192.00	1	288	
Copier	15-18 ppm	Item	0.10	3,833.00	1	383	
Fax Machine	Standard	Item	0.10	400.00	5	8	
Telephone	Touch-tone	Item	0.10	95.00	5	2	
Answering Machine	Answering Machine	Item	0.10	100.00	5	2	
E-Mail	Services	Year	1.00	500.00	1	500	
Computer, PC Color	Laptop, Pentium	Item	1.00	2,250.00	4	563	
Computer software	Initial	Item	1.00	375.00	4	94	
Computer software	Upgrades	Item	1.00	145.00	2	73	
Deskjet Printer	HP DeskJet 895	Item	1.00	399.00	3	133	
- FIELD EQUIPMENT							16,874
Vehicle	Pickup Police Prepared	Item	1.50	38,000.00	8	7,125	
Vehicle	Fuel	Gallons	1,000.00	1.85	1	1,850	
Vehicle	Maintenance	Year	1.50	900.00	1	1,350	
Vehicle	Equipment	Year	1.50	600.00	1	900	
Vehicle Insurance	Insurance	Year	1.50	3,000.00	1	4,500	
Radio, Mobile Unit	Radio, SP-50 UHF	Item	1.50	425.00	6	106	
Cellular Phone 3 watt	Phone unit	Item	1.50	150.00	2	113	
Cellular Phone	Phone,Monthly charge	Month	12.00	45.00	1	540	
Power Tools	Misc. Tools	Item	1.00	150.00	1	150	
Other	Patrol Bicycles	Item	1.50	800.00	5	240	
- OPERATIONS							2,940
Audit	CPA Audit	Acre	1,500.00	0.25	1	375	
Contracts	Produce contracts	L. Hours	16.00	60.00	1	960	
Insurance	Liability/Fee	Acres	1,500.00	0.37	1	555	
Budgeting	Budget & reconcile	L. Hours	5.00	30.00	1	150	
Project Accounting	Setup and maintain	L. Hours	30.00	30.00	1	900	
Subtotal						105,490	105,490
Contingency @ 10%						10,549	
Administration @ 25%						29,010	
Total						145,049	

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Agate Desert Preserve

Property Description

Agate Desert Preserve (Preserve) is a native Rogue River Valley grassland located approximately 7 miles north of Medford in southwestern Oregon. The 53-acre Preserve provides protection for unique vernal pool habitat, the vernal pool fairy shrimp and several species of rare plants. The flat, gravely outwash plain is abundant with prairie grasses and a showy display of spring wildflowers. Small depressions in the shallow soils overlaying an impermeable hardpan on the surface of Agate Desert create vernal, or seasonal, pools in an otherwise dry habitat. In late spring as the pools dry up, successive rings of wildflowers begin to bloom.

The rectangular shaped Preserve is bounded on two sides by busy roads. The area is zoned industrial and current uses around the Preserve include a wastewater treatment facility, railroad tracks, chemical plant and other heavy industrial uses as well as other undeveloped grasslands. The impacts of these uses on the vernal pool habitat and rare plant and animal species is minimal but the threat of a chemical spill and further habitat fragmentation remains.



The Nature Conservancy (TNC) acquired the Preserve in 1987. Prior to TNC's acquisition the site was used for grazing cattle. The preserve is minimally signed and there is no



official trail or parking area. The public is allowed on the site but visitation is low. The site is completely fenced.

Project Goals

The ecological goal for the Agate Desert Preserve is to restore and maintain a near pre-settlement condition example of the Rogue Valley Mounded Prairie. Objectives include:

- Maintain at least three subpopulations, and minimum of 40,000 individuals of *Lomatium cookii*.
- Allow *Limnanthes floccosa* ssp. *grandiflora* to recolonize all suitable vernal pool habitat across the site.
- Restore the Rogue Valley upland prairie to a

condition that resembles the presumed pre-settlement condition.

- Maintain or improve the current condition of the Rogue Valley vernal pool associations on the site.
- Reintroduce populations of *Navarretia heterandra*, and *Microseris acuminata*.

Biological Description

Vernal pools are a prominent feature of the Preserve landform in the Rogue Valley north of Medford. They provide an important link in the food chain for migrating waterfowl, shorebirds, birds of prey, frogs, toads, salamanders and pollinating insects. A Conservancy study suggests, however, that only 23 percent—about 4,700 acres—of original vernal pool habitat in the Agate Desert Preserve remains and, of that, only a fraction—250 acres protected on three Conservancy preserves—are effectively managed or conserved.

Rare plants include two Oregon state-listed endangered species, the large-flowered woolly meadow-foam and Agate Desert lomatium. Another species of concern is the rare American pillwort. The preserve’s seasonal wetlands offer critical habitat to migrating birds and aquatic species, including a recently discovered population of rare vernal pool fairy shrimp (*Branchinecta lynchi*). Federally listed as a threatened species, the freshwater shrimp was not previously known to exist north of Mt. Shasta in California.

The vernal pool fairy shrimp is a 3/4-inch, translucent crustacean with a one-year life cycle and a unique survival strategy. They feed and grow in the temporary pools. The adults mate and produce eggs, then perish. Their thick-shelled eggs lie dormant in the dry pond bottoms through summer, surviving to hatch when winter rains return.

Listed or rare species and habitats monitored.		
Common Name	Latin Name	Status
Plants		
Cook’s lomatium	<i>Lomatium cookii</i>	Endangered
	<i>Astragalus applegatei</i>	Endangered
	<i>Limnanthes floccose ssp. grandiflora</i>	Endangered
Animals		
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Threatened
Habitats		
Rogue Plains vernal pools		
Rogue Plains vernal pools/mounded prairie		

Target invasive non-native plant species are controlled on the Preserve. European grasses and forbs have come to dominate the prairie due to a long history of grazing. Invasive non-native plants that are monitored regularly include the following:

Yellow star-thistle	<i>Centaurea solstitialis</i>
Wild Oats	<i>Avena fatua</i>
Curly dock	<i>Rumex crispus</i>

The major habitat maintenance tool is fire. According to the Preliminary Conceptual Ecological Model developed by TNC, fire was a major force on the landscape prior to settlement. Fire served to increase the area of grassland where it burned with a return interval of 3-10 years or less. Burn areas are initially seeded with native seed to re-establish native grasses, and subsequent burns are allowed to regenerate naturally. Most of the Preserve exhibits mounded topography-upland prairie on the mounds and vernal pools in the depressions. European grasses and forbs have come to dominate the prairie due to a long history of grazing.

Organizational Structure

The Nature Conservancy owns (fee simple) 49 of the 53 acres. The remaining acreage is held in a conservation easement managed by TNC. There is no difference between the two areas in the management or monitoring of the Preserve. There are three staff members located in Medford that are involved in management to various degrees though the office covers a large region and the Agate Desert Preserve is a small portion of their total work. Support comes also from TNC staff in Portland who supply experimental design, fire management, biometrics and administration.

Habitat Management Tasks

The Agate Desert Preserve is carefully monitored and managers use fire to effectively keep costs and weeds low. There are no facilities on the site and public use is low.

Monitoring for rare species and habitats and invasive species account for the most hours, nearly 300 spent at Agate Desert, including volunteer hours. Habitat maintenance in the form of hand pulling weeds and conducting burns comes in second, although burn costs are calculated by the acre. Reporting and planning, public services and operations take between 75 and 100 hours each.

The Stewardship Ecologist and the Stewardship Coordinator are both paid for 35-hour weeks but they tend to work 40 hours. Therefore costs were calculated as if they worked 40 hours a week.

Monitoring is intensive on the site, accounting for 22 percent of all the monitoring done by the Medford TNC staff. However, overall, only 10 percent of the total hours expended by staff are conducted on Agate Desert. Therefore 22 percent of the field equipment was charged to Agate Desert, and only 10 percent of the office equipment was charged.

Habitat Management Cost Estimates

The on-going maintenance cost of Agate Desert Preserve is just over \$25,000 annually. The highest cost was \$5,400 per year for monitoring followed by reporting and planning at \$3,800. Operations cost \$2,700 followed by office maintenance, field equipment, habitat maintenance and public services all in the \$1,300 per year range.

The value estimate includes a contingency of 10% which is the default in the analysis. The administrative rate of 25% of the management cost is consistent with the organization's policy.

End Notes

Preliminary Site Conservation and Management Plan. The Nature Conservancy, April 1995.

Monitoring Project Time Estimates for 2004. The Nature Conservancy, August, 27, 2003.

Considering Management Costs and Endowment Need for Agate Desert Preserve, The Nature Conservancy, undated.

Darren Borgias, Southwest Oregon Stewardship Ecologist. Personal Contact, October 16, 2003.

Websites:

<http://nature.org/wherewework/northamerica/states/oregon/preserves/art6791.html>

<http://nature.org/wherewework/northamerica/states/oregon/science/art1587.html>

PAR Footnotes

1. Cost is PAR estimate.
2. Cost is estimated using Ben Meadows, internet or other resources.
3. Five-strand smooth wire fence includes 2 simple wire gates. The fence can be electrified if a grazing regime is instituted.
4. Species monitored: fairy shrimp, lomatium, li-manathes, astragalus. Habitats monitored: vernal pools/mounded prairie intercept and selected weeds.
5. Cost estimated.

6. Volunteer training for monitoring rare and invasive plants.
7. Community outreach consists of press contacts and other PR duties, interfacing with other agencies, meetings.
8. A burn at Agate Desert is estimated to cost \$2,500 including traffic control, engines, planning, permits, reporting, supervision and personnel. Burns are conducted every 3 years on average.
9. Survey plot supplies include pvc pipe, nail spikes, wood stakes, rebar, caps, flagging dipnets, thermometers etc.
10. Stewardship Ecologist conducts a wide variety of planning from regional to site specific.
11. The truck is used at Agate Desert an estimated 22 percent of the time therefore 22 percent of the replacement cost and the annual maintenance are charged to Agate Desert. The truck accumulates an estimated 10,000 miles annually; 22 percent for Agate Desert.
12. There are 3 Handspring Palmtop computers used for some monitoring. Replacement cost for Agate Desert was figured at 10 percent of the 3.
13. An estimated 20 percent of the office rent and utilities are charged to Agate Desert.
14. Communication charges include telephone charges, internet and email services, dsl connection and other communication charges. Ten percent was charged to Agate Desert.
15. Includes annual reports, monthly updates, writing management plan updates.

PAR Budget Table—Agate Desert Preserve Annual Average Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							538
Fence - Installed	Smooth wire, 5-strand (1(3	Lin. Ft.	6,276.00	3.00	35	538	
- BIOTIC SURVEYS							
Project Management	Supervise/coordinate	L. Hours	9.00	33.00	1	297	5,392
Plant Ecologist	Surveys: rare spp./habs (4	L. Hours	135.00	20.00	1	2,700	
Plant Ecologist	Surveys: invasives	L. Hours	10.00	20.00	1	200	
Other	Prep. work in office	L. Hours	10.00	20.00	1	200	
Other	Monitoring by volunteers	L. Hours	133.00	15.00	1	1,995	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							1,292
Exotic Plant Control	Hand Removal, volunteers	L. Hours	13.00	15.00	1	195	
Exotic Plant Control	Hand Removal, coordinator	L. Hours	12.00	22.00	1	264	
Controlled Burning	Burn 50 ac. every 3 yrs. (8	Acre	50.00	50.00	3	833	
- WATER MANAGEMENT							
- PUBLIC SERVICES							1,361
Sign, Aluminum	Aluminum 12" X 12" (1	Item	10.00	15.00	7	21	
Volunteer Coordinator	Recruit and train (6	L. Hours	30.00	22.00	1	660	
Interpretive Literature	Labor (5	L. Hours	20.00	45.00	5	180	
Interpretive Literature	Copy (5	Page	500.00	0.10	1	50	
Community Outreach	Various outreach (7	L. Hours	15.00	30.00	1	450	
- GENERAL MAINTENANCE							
- REPORTING							3,784
Annual Reports	Biol. Survey Reporting	L. Hours	11.00	20.00	1	220	
Annual Reports	General reporting (15	L. Hours	25.00	33.00	1	825	
Annual Work Plan	All Planning (10	L. Hours	83.00	33.00	1	2,739	
- OFFICE MAINTENANCE							1,682
Administrative	Operations	L. Hours	25.00	33.00	1	825	
Preserve Office	Rent, utilities (13	Item	0.10	610.00	1	61	
Telephone Charges, Annual	Communication Charges (14	Item	0.10	3,200.00	1	320	
Office Supplies, Year	Stationery/envelopes	Person	0.20	125.00	1	25	
Office Supplies, Year	Supplies	Person	0.30	192.00	1	58	
Furniture	Desk	Item	0.40	250.00	10	10	
Furniture	Chair	Item	0.60	150.00	5	18	
Furniture	Bookcase, 3'x5'	Item	0.40	150.00	8	8	
Furniture	File cabinet	Item	0.40	400.00	10	16	
Copier	Copier, 15-18 ppm	Item	0.10	3,833.00	8	48	
Fax Machine	Standard	Item	0.10	400.00	5	8	
Computer, PC & Monitor	133 MHz Pentium	Item	0.40	2,100.00	4	210	
Computer software	Microsoft Office Pkg	Item	0.40	450.00	4	45	
Laser Printer	HP LaserJet 5L	Item	0.20	500.00	4	25	
Other	Zip Drive	Item	0.10	80.00	4	2	
Other	Scanner	Item	0.10	80.00	4	2	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	CD Burner	Item	0.10	80.00	4	2	
- FIELD EQUIPMENT							1,611
Vehicle	Small pickup - Tacoma (1 (11	Item	0.22	16,000.00	8	440	
Vehicle	Mileage (11	Mile	2,200.00	0.39	1	858	
Vehicle	Maintenance (1 (11	Year	0.22	300.00	1	66	
Other	100 m measuring tape (2	Item	0.44	30.00	5	3	
Other	Misc. survey plot supplies (9	Item	1.00	150.00	1	150	
Other	Digital Camera (2	Item	0.22	400.00	5	18	
Other	Palm computer (2 (12	Item	0.66	350.00	3	77	
- OPERATIONS							2,697
Contracts	Grant writing/compliance	L. Hour	25.00	33.00	1	825	
Budgeting	Budget & reconcile	L. Hours	10.00	33.00	1	330	
Supervisor Site Visit	Site visits	L. Hours	24.00	33.00	1	792	
Travel	To site for all staff	L. Hours	30.00	25.00	1	750	
Sub Total						18,358	18,358
Contingency @ 10%						1,836	
Administration @ 25%						5,048	
Total						25,242	

Blind Slough Swamp Preserve

Property Description

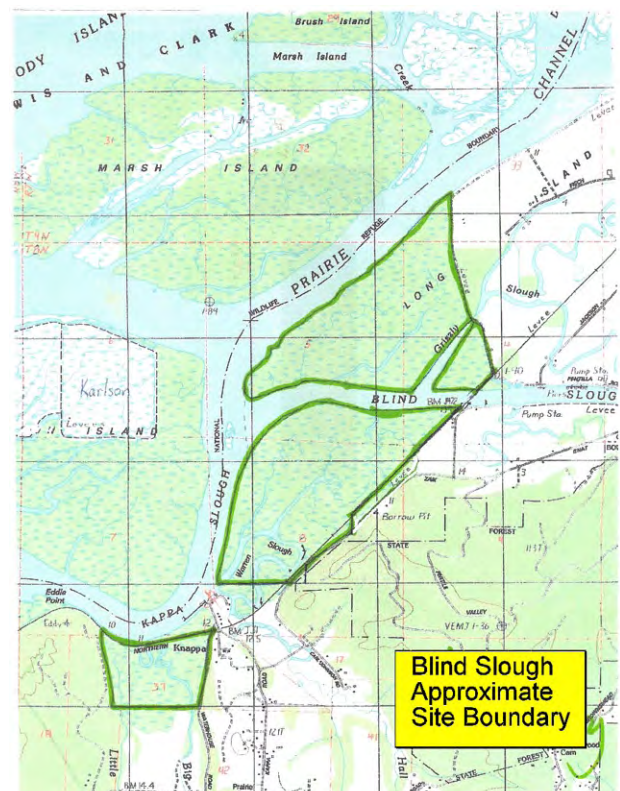
Blind Slough Swamp Preserve (Preserve) is located near the mouth of the Columbia River in the northwest corner of Oregon, near the town of Astoria in Clatsop County. The Preserve is the best example of a Sitka spruce swamp in Oregon. It is managed by The Nature Conservancy (TNC) to protect the Sitka spruce swamp community and habitat for bald eagles and Columbian white-tailed deer. The Preserve comprises 928 acres in three large parcels that are divided by sloughs owned by the state of Oregon (as waters of the state). The southernmost parcel is separated from the other two by less than a 1/4 mile of land.

The Preserve is comprised mostly of wetland, dominated by forest, shrub and sedge and dissected by a number of small channels and tidal creeks in addition to larger sloughs. Although the site experiences as much as 8 feet of daily tidal fluctuation, it is apparently not influenced by saltwater inundation. The Preserve is dominated by Sitka spruce, and, although they are not large trees, some are 400 or more years old. Younger western red cedar and western hemlock are also present. The channels are lined with dense thickets of coast willow, sitka willow, twinberry and nootka rose, with abundant sedges, wildflowers and bulrushes. The thick tangle of vegetation provides habitat for an abundance of birds, fish and other wildlife including bald eagles, osprey, river otter, beaver, coho salmon, nesting yellow warblers, olive-sided flycatchers and rufous hummingbirds.

The Preserve is bordered on the west and north by Columbia River sloughs and channels, and it adjoins the Lewis and Clark National Wildlife Refuge, which is located across a large slough to the northwest. The eastern boundary of the site is bordered by a raised railroad grade, a levee and a county road, none of which are currently posing management issues or concerns. There are about a half dozen houseboats permanently moored along the slough within the Preserve. They may or may

not be legal, but have been there a long time and apparently do not present management problems. There are some old pilings for log rafts in the slough along the northwest border of the Preserve which haven't been used in many years. Land use in the area to the south and east is primarily dairy farms and logging with some residential.

Most of the Preserve is zoned either Aquatic Natural or Aquatic Conservation. The purpose of the zone is to assure the preservation and protection of significant fish and wildlife habitats, continued biological productivity of the Columbia River estuarine resources, and scientific research and educational opportunities. Surrounding areas are zoned Exclusive Farm Use, Agriculture-Forestry, and Forestry. Potentially permitted uses under these zones that might impact the preserve include



surface or subsurface mining, oil, gas, and geothermal exploration and solid waste disposal.

Blind Slough Swamp is in an area known for birding, waterfowl hunting, canoeing and kayaking opportunities, however public use occurs in the waterways rather than on the site because of limited access due to dense vegetation. Although not posted, the Preserve is closed to the public in February and March, and again in July and August due to the presence of nesting and fledging bald eagles. There are no facilities on the site. A crude boat launch is located near the Preserve on county land. The Nature Conservancy hosts a limited number of tours on the site each year for selected audiences such as donors, scientists or educators.

The major management concerns at Blind Slough include invasive non-native species, changes to the hydrologic regime, degraded water quality and various recreational uses. Another potential concern is change in the hydrologic regime caused by the dams on the Columbia River and the proposed dredging of the channel.

Project Goals

The goals for Blind Slough Preserve are:

- 1) Maintain or improve the natural composition and structure of the Sitka spruce swamp community indefinitely.
- 2) Maintain suitable nesting and foraging habitat for bald eagles and Columbian white-tailed deer.
- 3) Maintain the natural condition of other native plant communities on the preserve.

The preserve is divided into four protection zones:

1) has the highest level of protection to conserve the major elements at the site; 2) is for off-site control of non-native species to prevent re-infestation of the preserve; 3) is an oil spill protection zone; and 4) is a water quality protection zone.

Weed control is part of the overall site restoration program. The focus is species and communities desired, rather than on simply eliminating weeds. An adaptive management strategy is employed. Some species-specific goals have been developed including:

- Eliminate purple loosestrife plants from the Preserve and prevent future infestations.
- Prevent the spread of *Rubus discolor* in undisturbed habitats on the preserve and reduce the number of currently established patches.

- Contain the current English ivy infestation and eventually reduce it to a level that is ecologically insignificant.

Biological Description

The Sitka spruce swamp community covers approximately 350-400 acres within the Preserve. The spruce are concentrated on natural levees formed along the edges of sloughs and tidal channels with shrub swamp and marsh in the interiors. The Preserve has a mosaic of different wetland community types. On slightly higher ground along the tidal creeks there is a Sitka spruce swamp community with a red-osier dogwood-Sitka willow understory. Large areas of intermediate elevation are dominated by a Pacific willow-Sitka willow community. Lowland areas mostly in the interiors of the preserve are freshwater marshes dominated by sedges, forbs and bulrush.

Protected species at Blind Slough Swamp.

Scientific Name	Common Name	Rank
<i>Picea sitchensis</i>	Sitka spruce swamp	G2S1
<i>Haliaeetus leucocephalus</i>	bald eagle	G3S3
<i>Odocoileus virginianus leucurus</i>	Columbian white-tailed deer	G5T2S2

The Preserve provides habitat for the Columbia white-tailed deer, but it is unknown if they are present on the site. There is a small population of *Myrica gale* (G5S1) on the site but they appear to be isolated occurrences. The site has secondary values as waterfowl habitat, a primary production area for fish and as a scenic wetland.

Invasive non-native plant species are of concern. The most extensive invader in the Sitka spruce swamp community is English ivy, *Hedera helix*. Purple loosestrife, *Lythrum salicaria* is just beginning to invade the preserve. The following table (Table 1) indicates the current area and the potential of each species in approximately 1995.

Table 1. Non-native plant species of concern

Species	Current Area (acres)	Potential Area (acres)	Rate of Spread
<i>Lythrum salicaria</i>	2	300	High
<i>Hedera helix</i>	30?	412	Moderate
<i>Phalaris arundinacea</i>	17	300	High
<i>Iris pseudacorus</i>	19	300	High
<i>Rubus discolor</i>	7	100	High
<i>Bamboo</i>	<1	300?	Low
<i>Cirsium arvense</i>	<1	100?	High
<i>Cytisus scoparius</i>	<1	40?	High

Most of the invasive non-native plant species are just getting established and, if control measures are instituted quickly, there is a good likelihood of eventual control.

Organizational Structure

The Preserve is managed by TNC. In 1992 the James River Corporation gave a 672-acre permanent conservation easement to TNC. In 1996 Hampton Affiliates increased the preserve with a gift of 135 acres. The remaining acreage was purchased by TNC. Rights granted to TNC in the conservation easement allow that portion of the Preserve to be managed in a manner very similar to parcels owned in fee.

Habitat Management Tasks

The largest task in terms of time spent on Blind Slough Swamp is hand control of non-native invasive plant species with over 500 hours. Second is travel, primarily by volunteers coming from Portland to conduct the weeding tasks. Monitoring for weeds, protected species and the aquatic ecosystem is a distant third.

A concerted and renewed effort will be made to bring the non-native plant species problems under control. Weed mapping and monitoring and monitoring the aquatic ecosystem tasks were added in the PAR because they are necessary to accomplish site goals.

Monitoring for bald eagle and Columbia white-tailed deer is conducted by partner agencies U.S. Fish and Wildlife Service and the Oregon Department of Fish and Wildlife. Both agencies are conducting surveys and monitoring activities on a regional basis for these species. Time is allocated in the PAR for the time it is estimated to take these agencies to conduct the work.

While Blind Slough probably ranks second of TNC's coastal reserves in visitor use due to canoeists and other boaters, there are no trail maintenance or other significant public involvement tasks. While there are no tasks relating to on-site public use, there are community outreach activities including staff attendance at the local Watershed Council meetings. There is a water trail proposed in the area and staff is currently spending time attending meetings about the trail. There are no anticipated increases in staff time needed for managing public use once the trail is designated, therefore, no additional time was allocated.

Tours and work parties with volunteers are organized from Portland. Time is allocated in the PAR for the Portland staff to recruit and organize these events. Additional time is allocated for the site steward to prepare for the visitors.

Habitat Management Cost Estimates

The cost of habitat maintenance at the Preserve is over \$27,000 annually. This low cost can be attributed the fact that there are no facilities and very limited access. The two largest cost categories (around \$6,800 each) are Habitat Maintenance, which accounts for hand-weeding by staff, volunteers and youth groups and Operations, which includes the travel budget. Travel is a relatively large cost at this site since volunteers come from Portland. There are an average of three work parties annually.

Biotic surveys account for nearly \$2,900 per year. However, over half of the costs are born by other agencies conducting the monitoring tasks. Most of the remaining costs are not currently incurred (but were counted in the PAR) because the work (weed mapping and aquatic ecosystem monitoring) is not being done at this time. These tasks will be performed on an on-going basis in the future.

Operations are far more expensive than the typical project because of the travel by volunteers and staff. Although travel hours exceed those hours spent on the Preserve this element is included because of the extensive assistance that volunteers provide.

It is estimated that management of the Preserve accounts for an average of approximately 10 percent of the combined time of the site steward, the supervisor and the staff in Portland. Therefore equipment and facilities were calculated as 10 percent of the total cost. The supervisor works from a home office.

The value estimate includes a contingency of 10 percent and an administrative rate of 25 percent of the management cost which is consistent with the organization's policy.

End Notes

Personal contact with Debbie Pickering, Oregon Coast Stewardship Ecologist

Personal contact with Tammy Lesh, North Coast Steward, November 6, 2003.

Weed Control Plan For Blind Slough Swamp Preserve, Knappa, Oregon For The Period: 1996-2006, Draft. Pre-

pared By: Debbie L. Pickering, Oregon Stewardship, The Nature Conservancy. January 1996.

Blind Slough Site Conservation Plan, The Nature Conservancy, January 1996.

Websites

<http://nature.org/wherewework/northamerica/states/oregon/preserves/art6792.html>

Footnotes from PAR

- 1 Cost is estimated.
- 2 Cost is PAR default.
- 3 The supervisor for the site lives 3 hours away and makes 1 site visit a year on average and conducts other supervisory duties over the phone.
- 4 There are approximately 3 tours of the Preserve annually. Tours are organized from the Portland office (their time is accounted for under community outreach).
- 5 Volunteers conducted weed removal tasks for 275 hours in 2002 during 3 work parties. This is considered average. The volunteers travel from Portland, their travel time is accounted for under Operations. Americorp provided an additional 240 hours (crew of 10 for 4 days working 6 hr. days.) The Steward attends the work parties and conducts additional weeding tasks throughout the year.
- 6 Preparation for work parties includes loading canoes, checking the tide and other duties on site. TNC staff in Portland recruit and organize the volunteers – their time is accounted for separately under community outreach.
- 7 Time for management planning is divided between the Supervisor and the Steward.
- 8 Steward spends time on site (during work parties, tours, and other site visits) qualitatively identifying and observing changes in site conditions, weeds and other management concerns.
- 9 Extensive weed monitoring is not done now. It is expected to be conducted under a new “Measures for Success” program. Forty hours every 4 years are allocated for fieldwork and an additional 8 hours is for making maps and reporting which is shown under the Reporting category.
- 10 The aquatic ecosystem has not been thoroughly inventoried or monitored. This task is necessary to accomplish the site goals.
- 11 Monitoring for bald eagle and Columbia white-tailed deer is conducted by U.S. Fish and Wildlife Service and Oregon Department of Fish and Wildlife. The time was estimated for these tasks.
- 12 Volunteers travel from Portland, accounting for 200 hours of travel time. The remaining hours include 6 for the supervisor; 24 for Portland staff (including ecologists doing new monitoring work; 10 for steward.
- 13 Mileage from Portland is 180 miles round-trip with an average of 9 trips per year (6 tours/work parties and 3 additional staff trips). Roundtrip mileage from Astoria is 34 miles with an average of 9 trips per year. Supervisor miles adds 262 miles a year.
- 14 Six life jackets are kept in Astoria, remaining come from Portland.
- 15 Hand tools include loppers, shovels, rakes, gloves, etc. for use by volunteers.
- 16 The six canoes are currently stored outdoors in a neighbor’s yard. A secure, covered storage area with room for tools, life vests, paddles and other equipment is desirable and would save time. A modest storage building is budgeted for in the PAR.
- 17 These items are not in the inventory for the Preserve, but are needed. Currently staff provides personal equipment.
- 18 Office rent includes utilities.
- 19 This reflects the time spent by the Portland staff recruiting and organizing both volunteers and tours.

PAR Budget Table—Blind Slough Swamp Preserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							
- BIOTIC SURVEYS							2,860
Project Management	Supervise/coordinate (3	L. Hours	8.00	35.00	1	280	
Plant Ecologist	Weed Mapping (9	L. Hours	40.00	30.00	4	300	
Wildlife Biologist	Eagle, Deer monitoring (11	L. Hours	40.00	45.00	1	1,800	
Other	Aquatic Ecosystem (10	L. Hours	16.00	30.00	1	480	
- HABITAT RESTORATION							198
Site Analysis	Site evaluation (8	L. Hours	9.00	22.00	1	198	
- HABITAT MAINTENANCE							
Exotic Plant Control	Hand Labor, Vols, Youth (5	L. Hours	515.00	12.00	1	6,180	6,774
Exotic Plant Control	Hand Labor, Steward (5	L. Hours	27.00	22.00	1	594	
- WATER MANAGEMENT							
- PUBLIC SERVICES							1,320
Volunteer Coordinator	Prep for Work Parties (6	L. Hours	9.00	22.00	1	198	
Community Outreach	Watershed Council Meetings	L. Hours	20.00	22.00	1	440	
Community Outreach	Tours (4	L. Hours	15.00	22.00	1	330	
Community Outreach	Organize tours, vols. (19	L. Hours	16.00	22.00	1	352	
- GENERAL MAINTENANCE							
- REPORTING							956
Database Management	Weed map making (9	L. Hours	8.00	30.00	4	60	
Management Plan	Update Mgt. Plan (7	L. Hours	160.00	28.00	5	896	
- OFFICE MAINTENANCE							458
Preserve Office	Rent (18	Annual	0.10	1,200.00	1	120	
Telephone Charges, Annual	Phone Charges (2	Person	0.10	1,200.00	1	120	
Office Supplies, Year	Stationery/envelopes (2	Person	0.10	125.00	1	13	
Office Supplies, Year	Supplies (2	Person	0.10	192.00	1	19	
Furniture	Desk (2	Item	0.10	250.00	10	3	
Furniture	Chair (2	Item	0.20	150.00	5	6	
Furniture	Bookcase, 3'x5' (2	Item	0.10	150.00	8	2	
Furniture	File cabinet (2	Item	0.10	400.00	10	4	
Copier	Copier (2	Item	0.10	3,833.00	8	48	
Fax Machine	Standard (2	Item	0.10	400.00	5	8	
E-Mail	Services (2	Year	0.10	360.00	1	36	
Computer, PC Color	Laptop (2	Item	0.10	2,250.00	4	56	
Computer software	Microsoft Office Pkg (2	Item	0.10	450.00	4	11	
Laser Printer	HP Laser (2	Item	0.10	500.00	4	13	
- FIELD EQUIPMENT							340
GPS, Rover & Base Unit	GPS - IPAC	Item	0.10	900.00	5	18	
Camera 35mm/lens	Digital (2,17	Item	0.10	520.00	5	10	
Binoculars	Binoculars 10 X 50 (2, 17	Pair	0.10	300.00	5	6	
Hip Waders	Knee boots (2, 17	Item	1.00	35.00	5	7	
Other	Canoes & paddles (1	Item	0.60	1,000.00	15	40	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	Boat motor, 6 HP (1	Item	0.10	1,000.00	10	10	
Other	Boat motor, 6 HP (1	Item	0.10	1,000.00	10	10	
Other	13' Aluminum Skiff (1	Item	0.10	1,200.00	15	8	
Other	Boat trailer (1	Item	0.10	1,000.00	15	7	
Other	Life jackets (1,14	Item	1.20	30.00	8	5	
Other	Misc. hand tools (15	Item	1.00	250.00	5	50	
Other	Storage area (16	Item	1.00	5,000.00	30	167	
Other	Measuring tape (1	Item	0.10	30.00	5	1	
Other	Dry bag (1,17	Item	0.30	35.00	5	2	
- OPERATIONS							6,890
Budgeting	Budget & reconcile	L. Hours	6.00	35.00	1	210	
Supervisor Site Visit	Site visits	L. Hours	6.00	35.00	1	210	
Travel	Mileage (13	Miles	2,262.00	0.36	1	814	
Travel	Van Rental	Day	6.00	50.00	1	300	
Travel	Time (12	L. Hours	240.00	20.00	1	4,800	
Property Tax Exemption	File	L. Hours	0.50	30.00	1	15	
Project Accounting	Setup and maintain	L. Hours	1.00	30.00	1	30	
Insurance	Liability/Fee	Acres	928.00	0.55	1	510	
Subtotal						19,796	19,796
Contingency @ 10%						1,980	
Administration @ 25%						5,444	
Total						27,219	

Camp Polk Meadow Preserve

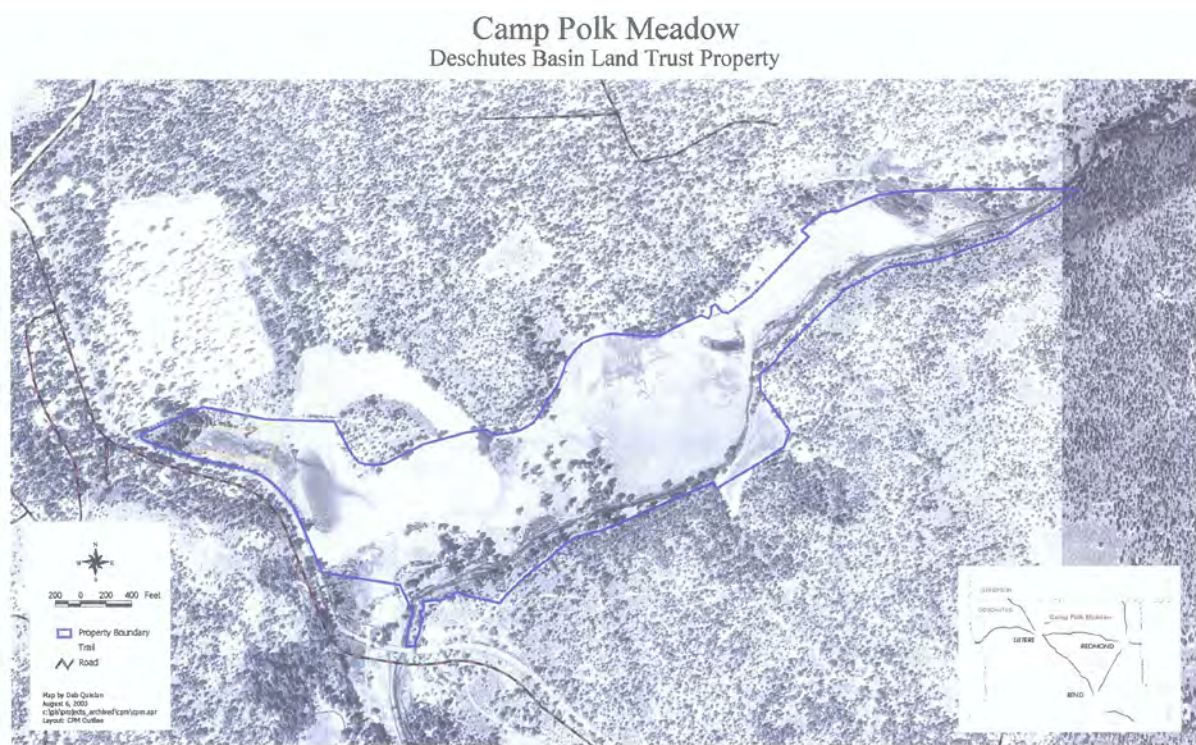
Property Description

Camp Polk Meadow Preserve is located 3 miles north of the town of Sisters, in central Oregon near the crest of the Cascade Mountains. The Preserve is a 148-acre meadow with wetlands, springs and 1.5 miles of Squaw Creek. The Preserve was acquired by the Deschutes Basin Land Trust with funding from Portland General Electric, related to the FERC relicensing of hydro-electric projects at Warm Springs, Oregon.

The Preserve has a long, winding shape as it follows the valley bottom. Camp Polk Road is adjacent to the west boundary and a long view of the Preserve is visible from the road. There are numerous springs on the west side of the Preserve. Old irrigation ponds provide wildlife habitat. Water from the springs flows freely across the west end of the Preserve creating wetlands. The middle of the

long Preserve is dryer, but along the north side, more springs provide sufficient water to an aspen grove and a thickly vegetated scrub-shrub wetland. The south side of the Preserve and the east end are dry with Ponderosa Pine and upland shrubs. Squaw Creek runs along the southern boundary. Riparian vegetation provides wildlife habitat along the stream. Moderately steep hillsides provide a topographical boundary to the Preserve as seen in the following figure.

The surrounding land use is primarily low-density residential. There are gravel or dirt roads running along the north and south lengths of the Preserve. One is owned by the Land Trust and the other is privately owned. An old cemetery is adjacent to the Preserve. It is still used today, with a public gathering on Memorial Day.



Squaw Creek has been heavily manipulated in the past. The creek was straightened and deepened in the 1950s to drain the meadows for agricultural use and to provide protection from flooding. Upstream from the Preserve the creek has been completely devoid of water in the past. A significant effort has been made in recent history to ensure there is water in the creek year around.

There are two federally threatened plants and four protected animals on the site. Creating habitat for the eventual return for protected fish species (anadromous fish and redband trout) is a goal of the site. Non-native invasive species are a concern on the Preserve. A weed management plan is being implemented to combat the numerous invading species.

Camp Polk has been identified by the Land Trust as a Community Preserve, appropriate for public educational opportunities. As a result, school groups visit the site regularly and there are numerous tours offered to the public. Visitors are welcome to park in a small lot on the Preserve and explore the Hindman Springs area via an interpretive trail. The public is invited to visit the rest of the Preserve on a docent tour or other guided tour. Facilities on-site include an access road, small parking lot, information kiosk, short interpretive trail, a few benches and bird boxes, a historic barn structure (no siding or roof) and boundary fencing.

Project Goals

The management goals for Camp Polk are:

- 1. To restore damaged or degraded habitat, with an emphasis on habitat restoration to facilitate reintroduction of steelhead trout.
- 2. To restore and maintain a functioning ecosystem that allows natural processes and disturbances to occur.
- 3. To restore and maintain the full range of natural biodiversity.
- 4. To engage the public by providing the opportunity to experience, understand and appreciate the value of healthy functioning ecosystems.

In addition to the above goals, Camp Polk is part of the Land Trust’s Community Preserve Program. Through this program, the Land Trust invites the community to use the property as an educational resource. Sites such as Camp Polk become a focal point for science and natural resource programs in local schools.

Biological Description

The Preserve includes approximately 1.5 miles of Squaw Creek and its associated riparian area, numerous springs that support perennial wet meadow, seasonally wet meadow and shrub wetland; aspen cottonwood, ponderosa pine, juniper and sagebrush-bunchgrass uplands.

Historically, Squaw Creek was a very important habitat for trout production with both steelhead and redband trout and other species using the creek. The diversion of creek water, damming and channeling have reduced the quality of the habitat for fish in terms of spawning gravels and vegetative habitat. In addition, fish barriers downstream of the Preserve have eliminated the opportunities for fish to return to the creek.

Grazing was discontinued about 3 years ago. Wild iris, camas and willow have begun to come back. Cougar, black bear, bob cat, deer, rattlesnake, coyote and other species are seen or expected to be using the Preserve. The creek will provide habitat to listed fish species once conditions allow them to return to the site. There are two listed plants and habitat for four protected bird species.

Plants

Peck’s Penstemon	<i>Penstemon peckii</i>	Federally threatened
Mustard	<i>Thelopodium howellii</i>	Federally threatened

Animals

Bald eagle	<i>Haliaeetus leucocephalus</i>	Federally threatened
Northern pygmy owl	<i>Glaucidium gnoma</i>	State critical
White-headed woodpecker	<i>Picoides albolarvatus</i>	Federal species of concern
Pygmy nuthatch	<i>Sitta pygmaea</i>	State critical/vulnerable

Non-native invasive plants are a concern. A weed management plan has identified 14 species requiring immediate action due to their potential to disrupt ecosystem structure, function and composition and they are easier to control than other species. Specific control plans have been developed for diffuse knapweed, spotted knapweed, Canada thistle, bull thistle, teasel, reed canarygrass, cheat grass, Russian thistle, medusahead wild rye and mullein. Weeds that have become well established include quack grass, tall fescue, tumble mustard and others.

Organizational Structure

The Deschutes Basin Land Trust owns 145 acres of Camp Polk meadow and holds a conservation easement on three additional acres. Potentially, a home could be built on the easement. Although the Preserve was acquired with funding from Portland General Electric, related to the dam relicensing, the Preserve has no restrictions.

The Land Trust is a 501 (c) 3 non-profit organization with a board of directors, executive director, several staff and numerous volunteers.

Habitat Management Tasks

The major task at Camp Polk is habitat maintenance and restoration. Approximately 800 hours are spent weeding, thinning, and maintaining the property. Close behind was the amount of time spent on public services, about 750 hours. These hours are allocated to maintaining safe access to the site, community outreach, and delivery of educational programs and tours.

Biotic surveys are conducted at Camp Polk and take approximately 100 hours. Items monitored include projects, weeds, the site overall, archaeological sites, birds, amphibians and other species. Volunteers often perform this work and the PAR accounted for their time.

Camp Polk has an extensive volunteer program. Volunteers provide hand labor for weeding and thinning trees, trail maintenance, general upkeep, fence repair. In addition, docents provide weekly tours to the public during the field season. The time volunteers spent was counted in the PAR.

Prescribed burns were included in the PAR even though they are not currently conducted as they would be useful in meeting the restoration goals of the site.

Although there may be an attempt to restore the Squaw Creek at some time, this effort would likely be considered a capital cost and would not be part of long-term management. Therefore, it is not included in the budget.

There is a planning effort underway that is exploring ways to restore Squaw Creek to its original channel. This cost was not included in the PAR as it is an unknown and is not an ongoing expense. However, depending on the course of action, ongoing maintenance costs could be increased. Similarly, there is a historic barn on the Preserve. Time was allocated for ongoing maintenance to the shell

of this old building. But in the long term something will be done with the barn, including restoration or removal of it. This cost was not counted in the PAR.

Habitat Management Cost Estimates

The total amount calculated for on-going habitat maintenance for Camp Polk Meadow Preserve is \$65,300. The cost is slightly higher than one might expect due to the management goal for public use and that the site is in the Community Preserve Program, which focuses on educational opportunities on the site.

As a result of an emphasis on public education, the total amount allocated in the PAR to public services was nearly \$17,000, making it the highest cost category. Within the public services category, community outreach and volunteer management came in at around \$5,000. Just over \$2,500 was allocated to instructors teaching in the Natural History series. These instructors typically charge a nominal fee or donate their time, but the cost was counted in the PAR as if they were paid. Another \$2,700 was allocated to staff for the program. It should be noted that this program charges a fee, which recovered some of the cost and because the instructors do donate their time, the program may actually make money.

Biotic surveys of various kinds cost about \$3,400 and are performed by both staff and volunteers.

Habitat maintenance cost just over \$11,000 with the highest cost being weed control and juniper thinning.

One-fifth of the office and field equipment was allocated to Camp Polk. The estimate includes a 10 percent contingency and a 22 percent administrative rate. The administrative rate is the PAR's default level.

End Notes

<http://www.deschuteslandtrust.org/CampPolkPreserve.htm>

Camp Polk Meadow Preserve, Conceptual Restoration Plan, Deschutes Basin Land Trust, Compiled by Ryan Crison, preliminary work by Karen Allen. 2001.

Weed Management Plan for Camp Polk Meadow Preserve, Deschutes Basin Land Trust 2001 – 2005.

Personal communication with Karen Allen, Site Steward, July 10, 2003.

Personal communication with Brad Chalfant, Executive Director, Deschutes Basin Land Trust

Personal communication, Jessica Rawlings, Office Manager.

Footnotes in PAR

1. Cost is PAR default.
2. Cost is estimated.
3. Crew of 3 for 3 hours a week for 12 weeks (108 hrs) plus 8 additional hours in Spring and in Fall (16 hrs); plus 4 weed pulling events with a crew of 6 for 4 hrs each – including travel time (96 hrs). In addition the Lead Volunteer conducts an additional 180 hrs. of weed pulling.
4. Site steward coordinates 40 hrs. annually with Lead Volunteer and other volunteers. In addition, an intern is supervised a total of 2 hrs per day for 12 weeks – with approx. 24 hours directly related to work at Camp Polk.
5. On average three supervisory site visits a year are conducted by the Site Steward and 2 by the Executive Director (in addition to other site visits with volunteers and others.) Site visits are calculated to be 6 hours long including travel.
6. Camp Polk docents conduct tours on-site. The Site Steward conducts their training and supervision. Time for the Steward includes: 4 hrs. preparation, 4 hrs on-site training the docents; 2 hr. debrief at the end of the season and 4 hrs. additional communication with the docents over the field season.
7. Steward spends 20 hrs. conducting research and analysis to plan an average of 3 restoration projects a year.
8. Steward spends 40 hrs. to update plan every 5 yrs. Exec. Director reviews for 5 hrs.
9. Steward spends an average of 70 hours conducting community outreach activities (approx. 6 hrs./month) including meetings with volunteers (supervising and training volunteers is counted separately,) writing newsletter articles, working with classes and groups wanting to volunteer, and taking phone calls from individual students and the public. Another 1/2 hr./week communicating via email (22 additional hrs.) The Lead Volunteer spends approx. 28 hrs. in contact with the public, working with other volunteers or staff.
10. Steward supervises an average of 3 restoration projects a year, 8 hrs. each.
11. Steward monitors an average of 3 projects annually for 20 hrs. each. Time includes site visit, monitoring, report writing, mapping, and photos.
12. Volunteers help monitor plants, weeds, archeological sites and other cultural resources.
13. A series of classes on natural history are conducted at Camp Polk. Four of the classes are taught by outside instructors who donate their time or charge a nominal fee. For the PAR the 4 instructors were allocated \$20/hr for the 8-hour class and another 8 hours of prep. and travel time. The Steward conducts one class and also coordinates the series. The Steward's hours include attendance at 5 classes x 8 hrs each (40 hrs); 4 hrs preparation and communication with instructors x 5 classes (20 hrs); and planning, advertising take an additional 30 hrs.
14. Compliance and enforcement of activities, neighbor agreements, trespass issues, theft and vandalism.
15. Grants support some of the projects and educational outreach efforts.
16. Volunteers spend an average of 80 hours implementing 3 discrete restoration projects each year. The projects include such things as willow planting and stream bank restoration. The projects are different every year, but are expected to be on-going.
17. Amount or number is estimated.
18. Seeds and cuttings are taken on-site by volunteers for on-going projects.
19. The interpretive trail surface is wood chips which come from the site. A sod cutter is used to keep grass and weeds at bay.
20. A simple path is mowed twice a year to allow limited public access to the middle of the Preserve.
21. Volunteers perform numerous duties to allow safe public access to the Preserve including, trail maintenance, fence and gate maintenance, sign upkeep, parking lot cleanup, road maintenance, ensuring safety of barn etc. Lead volunteer spends approx. 50 hrs. and other volunteers spend 80 hrs.
22. Volunteers perform a variety of habitat improvement tasks outside of larger projects. These projects include cleaning and installing bird boxes and planting plants for habitat.
23. Three docents conduct a total average of 10 tours per field season. The 90 hours includes training and preparation.
24. Staff conducts promotion, marketing, sign ups for programs, volunteer record keeping etc.
25. Executive Director spends approximately 10 hrs. maintaining relationships with neighboring property owners.
26. A summer intern coordinates 4 volunteer events each season with 2 hrs. per event spent on preparation and the remaining time spent attending events.
27. Summer intern conducts annual weed monitoring, supervised by Steward.
28. A wood chipper is assumed to be needed to chip wood for trails. Chips may also be donated.
29. Steward ensures that volunteer monitors follow rules, meet the goals of the site, monitoring protocols are followed, and data is properly recorded.
30. Prescribed burning does not currently occur, but is desired. The PAR accounts for a 5 acre burn every 5 years.
31. Younger juniper and other brush is removed as part of the overall goals of the site.
32. Outside contractor is used to develop interpretive literature for the kiosk, brochures and other handouts. Updated every 5 years. Number of copies is estimated.
33. The Preserve is 50 miles roundtrip from the Land Trust office. An estimated 50 trips were calculated. This is approximate due to the fact that volunteers come from as far as Sunriver and as close as Sisters to work on the site.

PAR Budget Table—Blind Slough Swamp Preserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							
- BIOTIC SURVEYS							2,860
Project Management	Supervise/coordinate (3	L. Hours	8.00	35.00	1	280	
Plant Ecologist	Weed Mapping (9	L. Hours	40.00	30.00	4	300	
Wildlife Biologist	Eagle, Deer monitoring (11	L. Hours	40.00	45.00	1	1,800	
Other	Aquatic Ecosystem (10	L. Hours	16.00	30.00	1	480	
- HABITAT RESTORATION							198
Site Analysis	Site evaluation (8	L. Hours	9.00	22.00	1	198	
- HABITAT MAINTENANCE							
Exotic Plant Control	Hand Labor, Vols, Youth (5	L. Hours	515.00	12.00	1	6,180	6,774
Exotic Plant Control	Hand Labor, Steward (5	L. Hours	27.00	22.00	1	594	
- WATER MANAGEMENT							
- PUBLIC SERVICES							1,320
Volunteer Coordinator	Prep for Work Parties (6	L. Hours	9.00	22.00	1	198	
Community Outreach	Watershed Council Meetings	L. Hours	20.00	22.00	1	440	
Community Outreach	Tours (4	L. Hours	15.00	22.00	1	330	
Community Outreach	Organize tours, vols. (19	L. Hours	16.00	22.00	1	352	
- GENERAL MAINTENANCE							
- REPORTING							956
Database Management	Weed map making (9	L. Hours	8.00	30.00	4	60	
Management Plan	Update Mgt. Plan (7	L. Hours	160.00	28.00	5	896	
- OFFICE MAINTENANCE							458
Preserve Office	Rent (18	Annual	0.10	1,200.00	1	120	
Telephone Charges, Annual	Phone Charges (2	Person	0.10	1,200.00	1	120	
Office Supplies, Year	Stationery/envelopes (2	Person	0.10	125.00	1	13	
Office Supplies, Year	Supplies (2	Person	0.10	192.00	1	19	
Furniture	Desk (2	Item	0.10	250.00	10	3	
Furniture	Chair (2	Item	0.20	150.00	5	6	
Furniture	Bookcase, 3'x5' (2	Item	0.10	150.00	8	2	
Furniture	File cabinet (2	Item	0.10	400.00	10	4	
Copier	Copier (2	Item	0.10	3,833.00	8	48	
Fax Machine	Standard (2	Item	0.10	400.00	5	8	
E-Mail	Services (2	Year	0.10	360.00	1	36	
Computer, PC Color	Laptop (2	Item	0.10	2,250.00	4	56	
Computer software	Microsoft Office Pkg (2	Item	0.10	450.00	4	11	
Laser Printer	HP Laser (2	Item	0.10	500.00	4	13	
- FIELD EQUIPMENT							340
GPS, Rover & Base Unit	GPS - IPAC	Item	0.10	900.00	5	18	
Camera 35mm/lens	Digital (2,17	Item	0.10	520.00	5	10	
Binoculars	Binoculars 10 X 50 (2, 17	Pair	0.10	300.00	5	6	
Hip Waders	Knee boots (2, 17	Item	1.00	35.00	5	7	
Other	Canoes & paddles (1	Item	0.60	1,000.00	15	40	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	Boat motor, 6 HP (1	Item	0.10	1,000.00	10	10	
Other	Boat motor, 6 HP (1	Item	0.10	1,000.00	10	10	
Other	13' Aluminum Skiff (1	Item	0.10	1,200.00	15	8	
Other	Boat trailer (1	Item	0.10	1,000.00	15	7	
Other	Life jackets (1,14	Item	1.20	30.00	8	5	
Other	Misc. hand tools (15	Item	1.00	250.00	5	50	
Other	Storage area (16	Item	1.00	5,000.00	30	167	
Other	Measuring tape (1	Item	0.10	30.00	5	1	
Other	Dry bag (1,17	Item	0.30	35.00	5	2	
- OPERATIONS							6,890
Budgeting	Budget & reconcile	L. Hours	6.00	35.00	1	210	
Supervisor Site Visit	Site visits	L. Hours	6.00	35.00	1	210	
Travel	Mileage (13	Miles	2,262.00	0.36	1	814	
Travel	Van Rental	Day	6.00	50.00	1	300	
Travel	Time (12	L. Hours	240.00	20.00	1	4,800	
Property Tax Exemption	File	L. Hours	0.50	30.00	1	15	
Project Accounting	Setup and maintain	L. Hours	1.00	30.00	1	30	
Insurance	Liability/Fee	Acres	928.00	0.55	1	510	
Subtotal						19,796	19,796
Contingency @ 10%						1,980	
Administration @ 25%						5,444	
Total						27,219	

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Denman Wildlife Area

Property Description

The Ken Denman Wildlife Area (DWA) encompasses 1,920 acres and is located seven miles north of Medford, just west of Highway 62 near the city of White City. Denman is located on two separate parcels about one half mile apart. The southernmost parcel is 620 acres and the other is 1,300 acres. The DWA is located in the Agate Desert, an arid grassland characterized by shallow soils overlaying an impermeable hardpan. There are wet bottomlands and marshes with thick stands of willow, oak and cottonwood.

Both of the DWA parcels are surrounded primarily by industrial and exclusive farm use zoning with some residential land use. The surrounding area is not completely developed yet, but is expected to be in the future. Management concerns include conflicts with new residents and businesses over hunting at Denman and increased runoff from new impervious surfaces and a resulting decrease in water quality.

The Rogue River and other perennial and intermittent streams traverse the site and provide open water and riparian habitat. Approximately 100 acres of the bottomland has been manipulated with dikes and ponds to attract waterfowl. Approximately 80 acres of the 620-acre area is

farmed for food for wildlife. A wide variety of birds and mammals use the area. Two dozen species of waterfowl, 81 species of songbirds and 17 species of raptors use Denman. Rare plants include two Oregon state-listed endangered species, the large-flowered woolly mead-

owfoam (*Limnanthes floccosa* ssp. *grandiflora*) and Cook's lomatium (*Lomatium cookii*). Another species of concern is a fern, the rare American pillwort (*Pilularia americana*). Rare vernal pool complexes provide habitat for fairy shrimp, which is federally threatened. Non-native invasive species include medusahead, star thistle, cheatgrass and bullfrogs. Well over 100 acres of woodland is invaded by Himalayan blackberry.

The primary focus at Denman is providing habitat to attract wildlife for hunting and viewing. Public use is high with over 40,000 visitor days with 60 percent of the users participating in non-consumptive uses. The remaining 40 percent are either fishing (primarily in the Rogue River) or hunting. The area features a self-guided interpretive trail. There is an annual 2-day educational youth hunt with several hundred participants learning or teaching hunting skills.

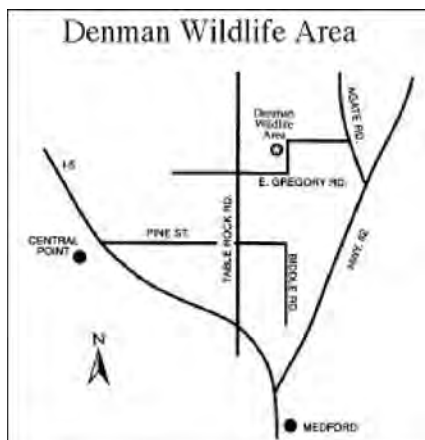
Project Goals

The Denman Wildlife Area was established in 1954 when 1,760 acres of the former Camp White Military Base was conveyed to the Oregon Game Commission under a restrictive deed. The deed specifies that the Area can only be used for wildlife management purposes. The federal government has retained reconveyance rights in the event of a national emergency.

An additional 160-acre area was acquired in 1956 and this is where management facilities and the Oregon Department of Fish and Wildlife (ODFW) offices are located today.

Biological Description

Denman Wildlife Area consists primarily of a dry terrace with shallow soils overlying impermeable hardpan. Smaller areas of



moderately deep clay soils are present in the bottomlands along streams and rivers. Bottomlands are characterized by thick stands of willow, oak, ash and cottonwood. Hundreds of acres of the woodlands have been heavily invaded by blackberry.

Approximately 1.5 miles of the Rogue River crosses the northwest corner of Denman and another 2.3 miles of perennial stream traverse Denman. In addition several intermittent streams cross the DWA. The streams have been heavily manipulated by dikes and dams designed to create ponds for wildlife use.

Farming of grain crops and other food crops are grown on Denman to provide food for wildlife. Other areas have been planted in non-native grasses.

There are a number of representative ecosystems on Denman including chaparral, vernal pool, oak savanna, marsh and riparian. Numerous wildlife species use Denman. Common species include black-tailed deer, quail, mallard ducks, muskrats, great blue herons and red-tailed hawks. Game birds are released for some hunts.

Listed or rare species are the same as those found at the nearby Nature Conservancy preserve, Agate Desert. They are:

Common Name	Latin Name	Status
<i>Plants</i>		
Cook's lomatium	<i>Lomatium cookii</i>	Endangered
	<i>Limnanthes floccose</i> <i>ssp. grandiflora</i>	Endangered
<i>Animals</i>		
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Threatened
<i>Habitats</i>		
Rogue Plains vernal pools		
Rogue Plains vernal pools/ mounded prairie		

Organizational Structure

The Denman Wildlife Area is owned and managed by the ODFW. Seventy-five percent of the funding for DWA comes from the federal Pitman-Roberts fund and is matched by the state revenue from hunting licenses and tags for the remaining 25 percent. Pitman-Roberts funding comes from a percentage of national gun and ammunition sales. Other organizations contribute to management here: The Nature Conservancy, the Oregon State Police, and the U.S. Fish and Wildlife Service as described below.

Habitat Management Tasks

Primary tasks at Denman are farming wildlife food crops, equipment maintenance, site planning, community outreach and public involvement. Management of exotic invasive plants is currently low enough that 550 hours were added in the PAR to provide minimal staffing for this task.

Three other organizations perform major on-going management tasks at Denman. The Nature Conservancy conducts the monitoring for rare habitats, plants and animal species. The Oregon State Police perform enforcement duties and the U.S. Fish and Wildlife Service supervised a mitigation project that included construction of vernal pools and controlled burning. The ongoing components of all of these costs have been included in the analysis.

There is no maintenance of dams and dikes built over 40 years ago and they are a management concern. Trees, shrubs and other vegetation have covered them. It is unknown what should be done for maintenance however, so no costs were calculated in the PAR. It was assumed that at this point any work would be a major capital cost.

As the area continues to grow, pressures (including habitat degradation from surrounding uses, domestic pets, trespass, use conflicts, increased visitation, etc.) are expected to rise on Denman.

Habitat Management Cost Estimates

The cost of on-going maintenance at Denman is \$226,000. The largest component is habitat management at \$45,000 a year. Other large components are office maintenance at \$34,000 and public services at \$32,000. Field equipment needs an average of \$18,000 a year.

There is currently a half-time Natural Resources Specialist 2 and a full-time Tech 2 staffing Denman. Management believes that if there were 2 full-time staff and a 4-month seasonal worker, the goals of Denman could be better accomplished. The PAR was therefore based on 2.3 full-time employees. Salaries were targeted for each position in the mid-range (including benefits) and volunteers were valued at \$10 an hour.

Total hours worked by staff and volunteers on Denman is approximately 5,300. An additional number contributed by the U.S. Fish and Wildlife Service, The Nature Conservancy and the Oregon State Police are estimated at about 300.

Minimal road and trail maintenance is included in the PAR. There are 14 miles of roads. In addition, basic GIS mapping was added to the PAR. Some funding was allocated to weed management and prescribed fire as well.

Staff with duties outside of managing Denman are housed at the ODFW office at Denman. The PAR assumes that 1/3 of the shared items, the copy machine for example, is charged to Denman unless management provided an exact number. A contingency of 10 percent is included in the costs. The administrative overhead cost at 23.6 percent was provided by management.

End Notes

Non-Expendable Property Inventory, Active Items as of June 14, 2003. Oregon Department of Fish and Wildlife. June, 14, 2003.

Budget for Denman Wildlife Area, Period July 1, 2003 – June 30, 2004. July 18, 2003.

Ken Denman Wildlife Area, Wildlife Area Review. Prepared by Casey Coleman. January 1990.

Denman Interpretive Trail, An Ecosystem Journey. Elizabeth Wasserman, Southern Oregon University, 2002.

Wildlife of Denman Wildlife Area. Oregon Department of Fish and Wildlife, undated brochure.

Kenneth Denman Wildlife Area, Oregon Department of Fish and Wildlife/ Undated brochure.

Personal Communication, Vince Oredson and Mark Varga, ODFW, October 17, 2003

Websites:

<http://www.dfw.state.or.us/ODFWhtml/InfoCntrWild/WildlifeAreas/Denman.html>

<http://oregonfwo.fws.gov/Oregon%20ES%20Field%20Offices/Roseburg/VernalPools/HabitatRest.htm>

Footnotes in PAR

1. Cost is from the “current value” from inventories supplied by ODFW management. Costs were rounded up.
2. Cost and number are estimates.
3. Natural Resource worker 2 is paid an average of \$26/hr; Tech 1 is paid \$22/hr and a seasonal worker would be paid approximately \$17/hr.
4. Chemical and mechanical methods are used to control weeds in and around the following facilities: roadsides, ditches, trails, parking lots and farm fields. Average treated annually is 10 dispersed acres.
5. There are numerous water control features, which require annual maintenance.
6. There are approximately 80 acres farmed each year to provide food for wildlife. The 2003-04 budget estimates \$2,500 for seed and supplies. Labor was calculated to take most of the Tech 1's time during the growing season.
7. Annual cost is for Denman's portion of the maintenance and utilities of the office and 3 outbuildings – provided by 2003-04 budget.
8. This work is not currently being performed, but is needed. Would be performed by new seasonal worker.
9. Supplies include parts and fuel for approx. 10 large pieces of equipment. Labor is time involved in maintenance and repairs.
10. The Nature Conservancy conducts all monitoring for rare habitats or species on Denman. Time is an estimate based on TNC's monitoring of their nearby Agate Desert Preserve. Time is allotted under supervise/coordinate for ODFW staff to review results and make planning decisions.
11. Maintenance of the 4 miles of irrigation ditches is expected to take 3 days. Cost of excavator provided by site management. Supplies are allocated in the PAR under Water Management.
12. There are 6 check stations with signs and an estimated 25 boundary signs that require annual maintenance.
13. Prescribed fire is one of the strategies used to assist in the recovery of native plant communities in and around vernal pool wetlands. U.S. Fish and Wildlife conducted a burn on 12-acres in 2003. The site is being re-established as compensatory mitigation for the recent runway extensions and safety upgrades at Rogue Valley International Airport. Costs were added to PAR to account for burning at the same rate as a nearby Nature Conservancy Preserve.
14. The Tech 1 spends 160 hours working on habitat improvement structures such as building bird boxes.
15. Denman interpretive materials include a 1-page map, a 10-page folded interpretive guide and 2 brochures for a total of 15 pages. All are in black and white. Based on 40,000 visitor days per year estimated 5,000 copies. This does not include state hunting regulation guides. It is estimated that the material would be updated every 8 years.
16. Hunting season runs 4.5 months. Hunters check-in and out at check stations. Tech 1 collects information 3 times a week during season. He spends an additional week (spread over time) recording and reporting the information gathered.
17. Volunteer equipment and supplies includes materials for building bird boxes and training materials.
18. An annual 2-day youth hunt takes about 180 hours to prepare and conduct. An additional 144 is spent working with visiting school classes.
19. Over 4,000 keys are cut and given to the public to access Denman.
20. There is a camp host that performs general maintenance duties (mowing, painting, sign posting, litter pick-up) 20 hours a week for 6 months a year (120 hours total.) Management estimates that additional volunteers spend an average of 1 day a week at Denman. One half that time is accounted for conducting general maintenance duties similar to the Camp Host. The other volunteer hours are accounted for under “trail maintenance.”

21. Current value on ODFW's inventory for the dump truck was too low for a replacement cost and a new cost was estimated.
 22. Shop tools including band saw, drills and hand tools were lumped together and cost was estimated.
 23. Management mentioned that fire insurance was required but figures were not located in the budget – cost is a per-acre estimate.
 24. Based on a projected 2.3 FTE's. Costs are PAR estimates.
 25. Denman's share of shared office equipment is estimated to be 1/3.
 26. According to the 1990 Wildlife Area Review there is 21 miles of barb-wire fencing. Current value on the Real Property Inventory is listed at 6,400 but it is not stated how much fencing is accounted for in that figure. The cost in the 2003-04 budget for maintaining supplies for 2 miles of boundary fence is \$300. This number was close to the \$6,400 figure if it were amortized so it was used in the PAR. If there is 21 miles of fencing a more accurate figure would be \$9,000 (at \$0.08 per foot.)
 27. Enforcement is conducted by Oregon State Police. Amount of time is an estimate.
 28. Approximately one mile fire break may be required annually by Fire Protection Services.
 29. There is an office and 3 outbuildings. Replacement of Denman's portion of the office is estimated at \$75,000; outbuildings \$25,000 each. Costs are estimated.
 30. There are 14 miles of road and 4 miles of trails noted in the 5-year work plan from 1990. There are 8 small, undeveloped parking areas. Management does not budget for the maintenance of either. The road is allowed to degrade as a management tool to slow traffic. The PAR estimated that a small amount of gravel would be needed on the road every 10 years.
1. There are 12 dams on Denman. They were installed in the late 50s and early 60s. There has been no maintenance to date. They are covered with shrubs and trees. Management estimates that 2 days per year of work with a backhoe should be done for annual maintenance.
 2. Federal required training largely safety and CPR.

PAR Budget Table—Denman Wildlife Area Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							1,504
Road Construction & Repair	Gravel Install (30	L. Hours	10.00	22.00	1	220	
Road Construction & Repair	Gravel Install (30	Sq. Yd.	2,500.00	3.00	10	750	
Fence	Barbed-wire (1 (26	Annual	1.00	300.00	1	300	
Fence	Labor	L. Hours	1.00	15.00	1	15	
Gate	Heavy duty steel, installed	Item	2.00	3,000.00	30	200	
Lock	Padlock	Item	2.00	19.00	2	19	
- BIOTIC SURVEYS							4,808
Project Management	Supervise/coordinate (10	L. Hours	104.00	27.00	1	2,808	
Plant Ecologist	Survey habitats/spp.(10	L. Hours	100.00	20.00	1	2,000	
- HABITAT RESTORATION							45,094
Planning Ongoing Restoration	Site Evaluation	L. Hours	480.00	27.00	1	12,960	
Heavy Equip. Rental	Excavator & operator (11	Day	3.00	640.00	1	1,920	
Revegetation	Farming supplies/seed (6	Item	1.00	2,500.00	1	2,500	
Revegetation	Farming labor (6	L. Hours	560.00	20.00	1	11,200	
Exotic Plant Control	Various control, supplies (4	Acre	10.00	50.00	1	500	
Exotic Plant Control	Labor for facilities (4	L. Hours	40.00	20.00	1	800	
Exotic Plant Control	Labor for habitat (8	L. Hours	554.00	16.00	1	8,864	
Controlled Burning	Planning, Labor, Permits (11	Acre	50.00	50.00	3	833	
Fire Breaks	Maintenance (28	L. Hours	40.00	20.00	1	800	
Fire Breaks	Supplies/equipment (28	Item	1.00	250.00	1	250	
Nest Box, Wood	Various (2	Item	100.00	8.00	3	267	
Other	Hab. Improve. Structures (14	L. Hours	160.00	20.00	1	3,200	
Other	Game bird pens (1	Item	2.00	17,500.00	35	1,000	
- WATER MANAGEMENT							6,330
Water Control	Supplies to maintain (5	Item	1.00	1,400.00	1	1,400	
Water Control	Labor to maintain (5	L. Hours	8.00	20.00	1	160	
Water Source	Fee for Water	Annual	1.00	4,500.00	1	4,500	
Water Delivery	Pump 3/4 hp (1	Item	1.00	2,100.00	30	70	
Channel Clearing	Maint. ditches - supplies (11	Miles	4.00	50.00	1	200	
- PUBLIC SERVICES							32,483
Access Control	Enforcement (27	L. Hours	40.00	45.00	1	1,800	
Patrolling	Collect @hunter stations (16	L. Hours	54.00	20.00	1	1,080	
Trail	Maintenance (20	L. Hours	208.00	10.00	1	2,080	
Sign, Aluminum	Misc. signage (12	Item	25.00	10.00	1	250	
Kiosk, Redwood	Wooden, painted (12	Item	6.00	800.00	10	480	
Volunteer Coordinator	Volunteer Supervision	L. Hours	104.00	27.00	1	2,808	
Docent Training	Supplies for vol. projects (17	Annual	1.00	580.00	1	580	
Docent Training	Training/Supervise Vols. (17	L. Hours	173.00	20.00	1	3,460	
Interpretive Literature	Update Labor (15	L. Hours	25.00	45.00	8	141	
Interpretive Literature	Copy (15	Page	75,000.00	0.06	1	4,500	
Community Outreach	Youth hunt, other (18	L. Hours	324.00	20.00	1	6,480	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Community Outreach	Key making/tracking (19	L. Hours	20.00	20.00	1	400	
Community Outreach	Community/neighbor/ agency	L. Hours	312.00	27.00	1	8,424	
- GENERAL MAINTENANCE							6,700
Sanitation Control	Dumping & litter pick-up	L. Hours	96.00	20.00	1	1,920	
Toilets, Portable	Rent	Monthly	12.00	125.00	1	1,500	
Other	General Maint., volunteer (20	L. Hours	328.00	10.00	1	3,280	
- REPORTING							6,956
GIS/CAD Management	Data Management	L. Hours	20.00	27.00	1	540	
Annual Reports	Hunting reporting (16	L. Hours	40.00	20.00	1	800	
Annual Reports	Annual, other reports	L. Hours	208.00	27.00	1	5,616	
- OFFICE MAINTENANCE							34,391
Administrative	Administrative duties (3	L. Hours	480.00	27.00	1	12,960	
Administrative	Administrative duties (3	L. Hours	24.00	20.00	1	480	
Preserve Office	Maintenance & Utilities (7	Annual	1.00	5,000.00	1	5,000	
Preserve Office	Replacement of buildings (29	Item	1.00	100,000.00	35	2,857	
Insurance, Fire	Wildland (23	Acre	1,920.00	5.00	1	9,600	
Office Supplies, Year	Stationery/envelopes (24	Person	2.30	125.00	1	288	
Office Supplies, Year	Supplies (24	Person	2.30	192.00	1	442	
Furniture	Desk (24	Item	2.30	250.00	10	58	
Furniture	Chair (24	Item	5.00	150.00	5	150	
Furniture	Bookcase, 3'x5' (24	Item	2.00	150.00	8	38	
Furniture	File cabinet (24	Item	2.00	400.00	10	80	
Copier	Copier, 15-18 ppm (25	Item	0.30	3,833.00	8	144	
Fax Machine	Standard (25	Item	0.30	400.00	5	24	
Telephone	Touch-tone (24	Item	2.30	95.00	5	44	
E-Mail	Services (24	Year	2.30	360.00	1	828	
Computer, PC & Monitor	133 MHz Pentium (24	Item	2.00	2,100.00	4	1,050	
Computer software	Microsoft Office Pkg (24	Item	2.00	450.00	4	225	
Laser Printer	HP LaserJet 5L (24	Item	1.00	500.00	4	125	
- FIELD EQUIPMENT							17,936
Quad Runners, 4WD	Honda 300cc (1	Item	1.00	5,000.00	8	625	
Vehicle	Tractor, J Deere 450C (1	Item	1.00	32,000.00	30	1,067	
Vehicle	Dump truck, GMC 5 yd (21	Item	1.00	15,000.00	30	500	
Vehicle	Tractor, J Deere 2040 (1	Item	1.00	11,000.00	30	367	
Vehicle	Loader, J Deere, 175 (1	Item	1.00	3,000.00	30	100	
Vehicle	Tractor Mass-Furq (1	Item	1.00	5,000.00	30	167	
Vehicle	Tractor/crawler/mower (21	Item	1.00	5,000.00	30	167	
Vehicle	Tractor front drive w/cab (1	Item	1.00	30,000.00	30	1,000	
Vehicle	Truck, 2.5 Ton (21	Item	1.00	20,000.00	8	2,500	
Spotting Scope	60 mm (1	Item	1.00	150.00	10	15	
Radio, Mobile Unit	GE MVS 16 ch. (1	Item	1.00	750.00	15	50	
Chemical Sprayer	Trailer w/tank & engine (1	Item	1.00	1,400.00	20	70	
Other	Equip maint/repair supplies (9	Item	10.00	350.00	1	3,500	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Other	Equip maint/repair labor (9	L. Hours	240.00	20.00	1	4,800	
Other	Equip maint/repair labor (9	L. Hours	139.00	16.00	1	2,224	
Other	Welder, 250 amp (1	Item	1.00	500.00	30	17	
Other	Arc Welder, 200 Le (1	Item	1.00	2,700.00	30	90	
Other	Chain Saw, 20" (1	Item	1.00	250.00	30	8	
Other	Chain Saw, 20" (1	Item	2.00	250.00	30	17	
Other	Grain drill 10 ft. (1	Item	1.00	4,500.00	30	150	
Other	Pressure washer, giant (1	Item	1.00	1,300.00	30	43	
Other	Bench Beam Scale (1	Item	1.00	600.00	15	40	
Other	Folding trailer 4'x8' (1	Item	1.00	300.00	30	10	
Other	Tilt trailer/homemade (1	Item	1.00	700.00	30	23	
Other	Tilt trailer 12 ton, 27' (1	Item	1.00	8,500.00	30	283	
Other	Portable hoist (1	Item	1.00	600.00	30	20	
Other	Shop Tools (22	Item	1.00	2,500.00	30	83	
- OPERATIONS							10,024
Budgeting	Budgeting, reporting (3	L. Hours	40.00	20.00	1	800	
Budgeting	Budgeting, reporting (3	L. Hours	250.00	27.00	1	6,750	
Employee Training	Required trainings (32	L. Hours	62.00	27.00	1	1,674	
Employee Training	Required trainings (32	L. Hours	40.00	20.00	1	800	
Subtotal						166,225	166,225
Contingency @ 10%						16,623	
Administration @ 23.6%						43,152	
Total						226,000	

Jackson-Frazier Wetland

Property Description

The Jackson-Frazier Wetland (JFW) is a 144.28-acre wetland located northeast of Corvallis in the Willamette Valley in western Oregon. The rectangular-shaped area is owned and managed as a county natural area. The site is composed of scrub-shrub wetlands, wetland prairie and uplands. The southeast corner of the site has been prepared for public use with a 0.6 mile boardwalk with viewpoints, benches and 8 interpretive signs. Three sides of the site are surrounded by farmland or undeveloped land. The remaining side is bordered by small wetland mitigation sites and a housing development. The zoning on the site provides adequate protection.

There are three federally listed plant species on the site: Bradshaw lomatium, Nelson sidalcea, and Kincaide lupine.

Cattle were removed from the site in the 1960s and shrubs and trees (especially rose, hawthorn and Oregon ash) have invaded the wetland and are replacing open prairie with dense woody vegetation and forest. Reed canary grass, a non-native invasive weed, is viewed as a serious management problem. Other potential invaders include purple loosestrife.

Project Goals

The goals of the site are highlighted in mission statement from the management plan.

“As a Benton County natural area, the mission of Jackson-Frazier Wetland is to protect and restore the wetland and its diverse plant communities and to provide the public with a resource for passive recreational and educational use and for research opportunities.

- Serve as a model for natural area protection and management including research, application of different management strategies, experimentation, and monitoring;

- Preferred public use will consist of nature-oriented activities including walking, nature study, bird watching, and photography;
- Opportunities will be available for classroom study and less formal learning about wetland processes, characteristics, functions and values;
- Opportunities for volunteers will continue by engaging the community in hands-on management activities.”

The managers at JFW are taking a very methodical and scientific approach to management of the site. They are completing an inventory of protected species and non-native invasive species prior to developing any management strategies. Once the strategies have been developed, they will be implemented. Based on the mission statement an experimental approach will be taken.

Biological Description

JFW supports several wetland types including palustrine emergent wetland (wet prairie), shrub-



scrub wetland, forested wetland, and emergent marsh (cattails). The wetland provides an important refuge for birds of which more than 70 species have been identified. Mallard, red-tailed hawk, Virginia rail, black-capped chickadee, and marsh wren are common residents.

Over a period of thousands of years the waters of Jackson and Frazier Creeks draining from McDonald State Forest have carried fine silts and clays depositing them over a coarser silt layer dating to glacial times. Ponding is common throughout the wetland from mid-November to mid-June. In some years the wetland dries out in May while in others it is still soggy in July.

Shrubs (especially rose and hawthorn) and trees (Oregon ash) have progressively invaded wetland prairie since cattle were removed from the wetland in the early 1960s. These invaders and reed canary grass pose serious management problems. The weeds are distributed throughout the wetland and their abundance varies with the plant community they are invading. It is estimated that there are a total of 4 acres of reed canary grass throughout the wetland.

In the past, fire and grazing held the shrubs and trees at bay. There are over 300 species of flowering plants, including several rare ones (above text edited from the Benton County website).

Three plant species are listed as follows:

Scientific Name	Common Name	Federal Status	State Status
<i>Lomatium bradshawii</i>	Bradshaw lomatium	Endangered	Endangered
<i>Sidalcea nelsoniana</i>	Nelson sidalcea	Threatened	Threatened
<i>Lupinus sulphureus</i> var. <i>kincaidii</i>	Kincaide lupine	Threatened	Threatened

There are no listed wildlife although many non-listed species including deer, fox, beaver, and raccoon use the site.

Organizational Structure

The JFW has been owned and managed by the Benton County Natural Areas and Parks Department with the assistance of the volunteer Jackson-Frazier Wetland Advisory Committee since 1992. The site was mandated for protection under an Oregon Land Conservation and Development Commission Order to develop and protect the Jackson-Frazier Wetland as a Significant Natural Area and Wetland under Goal 5 of Oregon's land use goals. The site management plan has been legislatively amended to the county's Comprehensive Plan and Development Code.

Habitat Management Tasks

Management of the ecosystem will consist primarily of protecting the three listed plant species and reducing non-native invasive weeds. The site managers have not yet determined the methods they will employ to manage the protected species or reduce weeds. They are committed to removing trees to maintain a 23-acre area to maintain open wetland or prairie areas.

According to the mission for the site, the JFW is committed to public use and there are numerous management tasks associated with that goal. The boardwalk, 8 interpretive signs, benches, sidewalk entry, fencing and parking lot make up the bulk of the items to be maintained over time.

Habitat Management Cost Estimates

It is very difficult to assign cost estimates for weed management and protected species management because the managers have not yet determined how they will accomplish these tasks. For example, they estimate annual monitoring of both weeds and protected species for 2-3 years, then the effects of the restoration techniques will determine monitoring. As for the weed control techniques, they will be varied and experimental over time. The volunteers working on JFW are knowledgeable and have the capacity to conduct sophisticated management strategies on an experimental basis. They anticipate using a combination of techniques including mowing, tilling, herbicide, burning and flooding. They do not plan to do any hand pulling. In order to accommodate this uncertainty and allow for flexibility, maintenance was divided into three parts; labor, equipment and supplies and an estimate made for each.

Like many other enterprising natural area managers, Benton County staff has found ways to capitalize on opportunities that come their way. This leads them to take advantage of cost-sharing programs, volunteers, low-cost youth corp programs and other opportunities. This makes it quite difficult to determine the actual cost of managing the site because some years they may have to get by on a shoestring and other years they benefit from a windfall.

In order to calculate the staff costs of managing JFW it was estimated that six percent of the following staff's time is spent on the maintenance and administration of the site.

Title	Total Hours	Rate/hr*	Tasks (In order of amount of time spent)
Director	125	\$49	Budgeting, site visits, community meetings, employee reports.
Project Coordinator	125	\$30	Volunteer management, site visits, community meetings, budgeting
Park Superintendent	125	\$36	Employee training, project management, budgeting, supervising biotic survey work
Administrative Assistant	125	\$22	Administrative operations, contracts
Office Assistant	62	\$13	Administrative operations, contracts
Maintenance Staff	250	\$25	Patrol, trash collection, general maintenance
Total	812		

*includes benefits

In addition to the 812 staff hours above, approximately 466 hours are spent on GIS work, annual workplans, management planning, monitoring, and interpretive literature development by outside contractors or volunteers. A portion of staff hours are devoted to supervising these tasks, however.

The total cost of management is estimated at \$141,000 which includes a contingency rate of 10 percent. The stated administrative overhead for JFW is 11 percent. This is fairly low, especially for a large county organization, however, the level of operations provided in the PAR probably is a sufficient adjustment.

Providing for the public was the highest cost element at over \$40,000 per year and some part of General Maintenance at \$10,000 could possibly be included as part of this element. The project's share of the motorpool is also a large contributor to the overall size of the budget.

Staff's review of this document felt that Benton County may not have undertaken this project if they would have had to pay the full cost. Instead, volunteers and grants have in the past and are expected to continue to account for the majority of management and stewardship activities and expenses.

End Notes

Benton County website: <http://www.co.benton.or.us/parks/jfraz.htm>

Personal contact: Jerry Davis, Director, Natural Areas and Parks, Benton County, June 18, 2003.

Personal contact: Dr. Robert Frenkel, professor emeritus, Department of Geography and Chair, Jackson-Frazier Wetland Advisory Committee, June 18, 2003.

Jackson-Frazier Wetland Management Plan Task Force. Jackson-Frazier Wetland Management Plan, September 30, 1992. Benton County Development Department, Corvallis OR.

Jackson-Frazier Wetland Management Plan Task Force. Jackson-Frazier Wetland Draft Management Plan, In-

roduction, June 13, 2003. Benton County Development Department, Corvallis OR.

Footnotes to PAR

1. Because the mission of the site includes experimental work, monitoring is presumed to be an important part of the on-going management of the site. The monitoring could be for the T & E species, weeds or another new, yet to be discovered concern.
2. Tree Removal: A 4-person crew will work for one week every other year to remove encroaching trees from a 23-acre area. Time estimate from Dr. Frenkel.
3. Site restoration labor: The methods of site restoration are unknown at this time but could include mowing, tilling, herbicide, burning, flooding or other methods. The PAR anticipates that after an initial pass at site restoration (2-4 years of work), that annual maintenance will be needed. A 4-person crew will work for one week annually to maintain the site (this is in addition to the tree removal crew that will work biennially and the weekly maintenance conducted by staff.)
4. Site restoration equipment: The methods of restoration are unknown (see footnote 3) but many of the anticipated methods require heavy equipment. The PAR provides for 20 hours of equipment usage at \$60 per hour annually. This could be a mower, grader, burning equipment or other equipment and should be interpreted as an average – it could be 40 hours at \$30 per hour or 15 hours at \$80 per hour.
5. Site restoration materials: In addition to equipment, some unknown materials may be necessary to conduct site restoration. This could include native seed (which could be collected on-site); plant material (either purchased or grown); plant protection supplies; herbicides; replacement supplies for volunteers such as gloves and tools or other. The cost is estimated at an annual cost of \$2,000. This may be very high or very low depending on the methods employed to restore the site.
6. The site is patrolled by 2 county employees once a week. Cost calculated at two hours times 52 weeks times 2 employees (includes travel time.)
7. The boardwalk is approximately 3520 feet long and 9 feet wide for a total of 31,680 square feet. The \$15 per square-foot replacement cost approximates the total cost of installing a new boardwalk and includes the 3 bridges.

8. The Community Project Coordinator's time is largely split between volunteer coordination and community outreach.
9. The city of Corvallis owns the parking lot, which is a large cul-de-sac. It is estimated that they conduct street cleaning four times a year.
10. Trash removal is estimated at 15 minutes each week for 2 maintenance workers (travel time is included in the weekly patrol.)
11. Removing brush from the sides of the boardwalk is done by a corrections crew 3 times a year at a rate of \$450 per day.
12. General site maintenance is conducted by 2 County maintenance workers and consists of litter pick-up, sweeping, and other tasks that they do outside of their patrols.
13. The concrete sidewalk at the entry is estimated at 200 feet long and 6 feet wide at \$4.00 a square foot. Costs are an annual estimate provided by the director.
14. This cost was provided by the director. It is unclear what it is for specifically or if the cost is already accounted for elsewhere.
15. Rent was calculated by taking 6 percent of rent allocated to staff working on the site. Rent amount provided by director.
16. Estimate.
17. Fence length is an estimate, cost is default provided by PAR.
18. Wooden welcome sign at entry. Size and cost are estimates.

PAR Budget Table—Jackson-Frazier Wetland Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							195
Fence - Installed	2/2x6 w/posts (18	Lin. Ft.	100.00	19.00	15	127	
Fence - Installed	Pig Wire 5' (18	Lin. Ft.	1,600.00	1.07	25	69	
- BIOTIC SURVEYS							2,520
Project Management	Park Superintendent	L. Hours	20.00	36.00	1	720	
Plant Ecologist	Monitoring & reporting (1	L. Hours	40.00	45.00	1	1,800	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							6,800
Other	Tree removal (2	L. Hours	160.00	15.00	2	1,200	
Other	Site Restoration labor (3	L. Hours	160.00	15.00	1	2,400	
Other	Site Restoration equip. (4	L. Hours	20.00	60.00	1	1,200	
Other	Site Restoration materials (5	Item	1.00	2,000.00	1	2,000	
- WATER MANAGEMENT							
- PUBLIC SERVICES							41,400
Patrolling	Patrol site once a week (6	L. Hours	208.00	25.00	1	5,200	
Parking Area	Sweep (9	Each	4.00	100.00	1	400	
Boardwalk	Replacement/Repair (7	Sq. Ft.	31,680.00	15.00	30	15,840	
Boardwalk	Brush removal from sides (11	L. Hours	3.00	450.00	1	1,350	
Trail	Replace concrete sidewalk (13	Sq. Ft.	1,200.00	4.00	25	192	
Sign, Aluminum	Aluminum 12» X 12»	Item	10.00	15.00	7	21	
Sign	Engraved wooden 5x3 (19	Item	1.00	800.00	10	80	
Sign, Redwood	Interp. embedded fiberglass	Item	8.00	1,500.00	15	800	
Bench	Replacement for wooden	Item	5.00	800.00	15	267	
Kiosk, Redwood	Fiberglass & wood	Item	1.00	2,500.00	10	250	
Volunteer Coordinator	Meetings & other tasks (8	L. Hours	40.00	30.00	1	1,200	
Interpretive Literature	Labor	L. Hours	30.00	60.00	3	600	
Interpretive Literature	Copy	Each	20,000.00	0.10	1	2,000	
Community Outreach	Project Coordinator	L. Hours	40.00	30.00	1	1,200	
Community Outreach	Director	L. Hours	20.00	30.00	1	600	
Other	Maintenance supplies (14	Item	1.00	5,000.00	1	5,000	
Other	Repairs and maintenance (14	Item	1.00	6,400.00	1	6,400	
- GENERAL MAINTENANCE							10,730
Project Management	Park Superintendent	L. Hours	40.00	36.00	1	1,440	
Sanitation Control	Collection and disposal (10	L. Hours	26.00	25.00	1	650	
Other	General site maintenance (12	L. Hours	16.00	25.00	1	400	
Other	Equipment Repair (14	Item	1.00	2,000.00	1	2,000	
Other	Contractual (15	Item	1.00	6,240.00	1	6,240	
- REPORTING							2,115
GIS/CAD Management	Data Management	L. Hours	25.00	45.00	1	1,125	
Annual Work Plan	Plan and Budget Comparison	L. Hours	10.00	45.00	1	450	
Management Plan	Update	L. Hours	40.00	60.00	10	240	
Monitoring Reports	Annual Summary	L. Hours	5.00	60.00	1	300	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- OFFICE MAINTENANCE							18,952
Administrative	Admin. Assist	L. Hours	100.00	22.00	1	2,200	
Administrative	Office Admin.	L. Hours	42.00	13.00	1	546	
Preserve Office	Rent (16	Item	1.00	900.00	1	900	
Utilities, Annual	Elec., Gas, Water (14	Item	1.00	8,500.00	1	8,500	
Telephone Charges, Annual	Phone Charges (14	Total	1.00	2,800.00	1	2,800	
Office Supplies, Year	Supplies (17	Total	1.00	300.00	1	300	
Furniture	Desk	Item	5.00	250.00	10	125	
Furniture	Chair	Item	6.00	150.00	5	180	
Furniture	Bookcase, 3'x5'	Item	5.00	150.00	8	94	
Furniture	File cabinet	Item	4.00	400.00	10	160	
Copier	Copier, 15-18 ppm	Item	0.50	3,833.00	8	240	
Fax Machine	Hard Copy	Item	0.06	525.00	5	6	
Telephone	Touch-tone	Item	5.00	95.00	5	95	
Computer, PC & Monitor	133 MHz Pentium	Item	4.00	2,100.00	4	2,100	
Computer software	Microsoft Office Pkg	Item	4.00	450.00	4	450	
Deskjet Printer	HP DeskJet 895	Item	0.60	399.00	6	40	
GIS ARC/INFO	GIS, PC based	Item	0.06	15,000.00	5	180	
Plotter	10 Color 24» X 36»	Item	0.06	3,000.00	5	36	
- FIELD EQUIPMENT							24,000
Vehicle	Motor Pool (14	Item	1.00	24,000.00	1	24,000	
- OPERATIONS							9,161
Audit	CPA Audit	Acre	145.00	0.25	1	36	
Contracts	Admin. Assist.	L. Hours	25.00	22.00	1	550	
Contracts	Office Admin.	L. Hours	13.00	20.00	1	260	
Budgeting	Project Manager	L. Hours	5.00	30.00	1	150	
Budgeting	Director	L. Hours	75.00	49.00	1	3,675	
Budgeting	Park Supervisor	L. Hours	25.00	36.00	1	900	
Supervisor Site Visit	Project Coordinator	L. Hours	20.00	30.00	1	600	
Supervisor Site Visit	Director	L. Hours	20.00	49.00	1	980	
Employee Training	Park Superintendent	L. Hours	40.00	36.00	1	1,440	
Employee Reports	Director	L. Hours	10.00	49.00	1	490	
Insurance	Liability/Fee	Acres	145.00	0.55	1	80	
Subtotal						115,873	115,873
Contingency @ 10%						11,587	
Administration @ 11%						14,021	
Total						141,481	

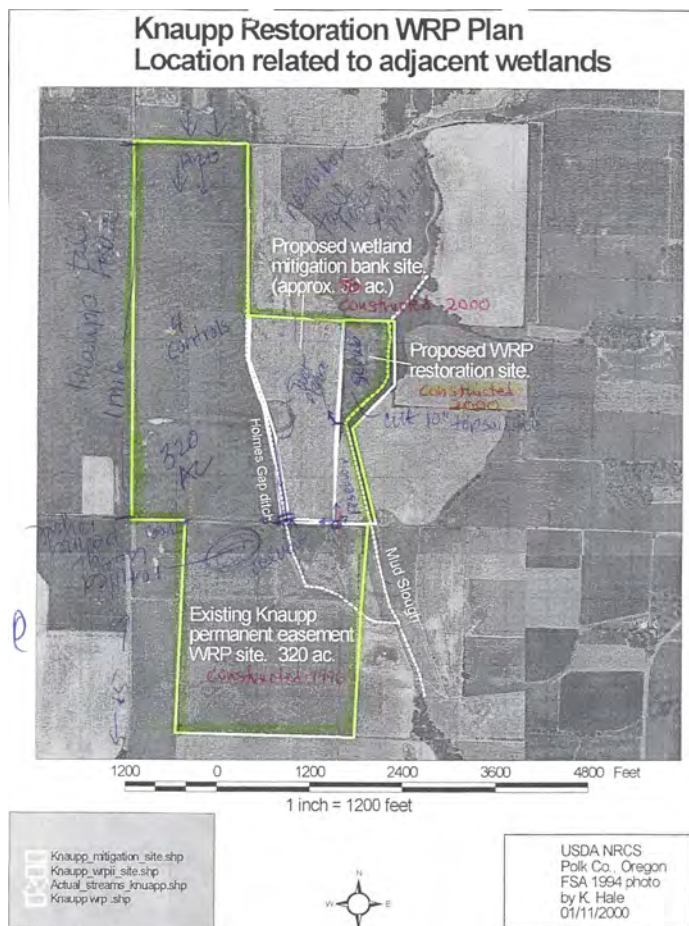
Mud Slough Mitigation Area

Property Description

Mud Slough Mitigation Area (Slough) is located about 6 miles west of Salem in Polk County, Oregon, near the town of Rickreall. After enrollment in the Wetland Reserve Program (WRP), the 320-acre Mud Slough was restored in 1996. It sits adjacent to a 56-acre Wetland Mitigation Bank (Bank) site that was restored in 2000. Another 20-acres was enrolled in the WRP and restored in 2000. The 56-acre Bank site is sandwiched between the two WRP sites. Although enrolled in different programs, the entire 396-acre site functions as a whole, relying on the same water system. A 7-acre reservoir was built recently to provide stability to the water supply during drought years.

The surrounding area is comprised of rural farmland with Exclusive Farm Use zoning. The primary crop at the present time and the foreseeable future is tall fescue, a perennial plant that is harvested in the fall. Railroad tracks run along one side of the site.

The selection of the site is outstanding because the soils are excellent for the development of wetlands, the hydrology is functioning well and the surrounding use is compatible with conservation. Surrounding lands provide a buffer and the Baskett Slough National Wildlife Refuge is approximately 3 miles away. This, combined with a philosophy of aggressive preventative management, has culminated in



a site that should prove over time to be very low maintenance and retain a very high quality.

Project Goals

Goals for the Wetland Mitigation Bank Site (56 total acres)

The primary goal of the Bank is to restore 56.25 acres to seasonally flooded saturated, inundated or ponded areas with only limited topographic relief. The area will become a system with seasonal surface flows spreading out and passing through a

wet marshy area with shallow, seasonal open water and interspersed, slightly higher wetland prairie as the wet season dissipates.

The upper areas of the Bank (perimeter, dikes, and islands) will be a mixture of scrub/shrub and emergent wetland. The seasonally ponded areas will be an emergent semi-permanently flooded wetland. This goal will provide intact hydrologic control, an increase in surface water retention and infiltration, wildlife habitat, enhanced aesthetics, functions and values similar to those found at the reference site, Jackson-Frazier Preserve in Corvallis (which is also a subject site in this survey).

In two growing seasons, the site has already exceeded the five-year performance standards: over 80 percent of the species richness of the reference site; wetland vegetation has covered more than 80 percent of the non-inundated water areas; no more than 15 percent of individual plants are non-native invasive species and no more than 50 percent of the individuals are of any one plant species. Monitoring for the future will be to detect areas of less than 25 percent cover.

The site has also met the hydrologic objective: to create areas below the average high water table and hold precipitation to create seasonal surface flows that spread through a wet marshy area. As the water dissipates the areas will become a combination of palustrine emergent wetland and saturated wet meadow.

Goals for the Wetland Reserve Program site (320 acres and 20 acres):

The 320-acre WRP site was constructed in 1996 and has very similar goals to the Bank site. There is an emphasis on habitat for waterfowl nesting and wintering habitat in the WRP site. Wintering goose habitat is the primary purpose of nearby Baskett Slough National Wildlife Refuge.

There are no written goals for the 20-acre WRP site that was constructed in 2000. It is assumed that the goals for the 20-acre WRP site are the same as for the 320 acre site. Construction consisted of creating open areas and blackberry removal. Regeneration has been good. This area is expected to expand over time.

Biological Description

Approximately 48 percent of the 396-acre Slough is currently wetland. The soils are high quality wetland soils (primarily Bashaw clay or silty clay),

which retain water. Water flows across the property from north to south and is controlled by 12 water structures.

The 320-acre WRP site is densely vegetated with large areas of tufted hairgrass (*Deschampsia cespitosa*) along with patches of dense native trees and shrubs and areas of open water. Maintaining a meadow foxtail (*Alopecurus pratensis*) area to provide goose habitat is part of the site goals. There are 12 species of native scrubs and trees and well over 60 native herbaceous species present across the 400 acres.

The 56-acre Bank site was initially graded in September 2000 and planting was completed in October 2001. Additional plantings were made in October 2002. There are 92 plant species on-site with 77 species being facultative or wetter. A total of 34 species were planted and there has been significant natural recruitment from the existing seed bank and the adjacent WRP site. Due to drought conditions (prior to construction of the reservoir) and extensive goose use, the tufted hair grass was difficult to establish initially. The 2002 monitoring report notes that of the 28 plots surveyed, facultative or wetter species covered 94 percent of the area. Only 1 percent was bare ground. Most notably non-native invasive species were not present in the Bank.

Due to the well-established 320-acre WRP site adjacent to the Bank, the BankWMB benefited greatly from natural recruitment of native plants from the WRP site.

The 20-acre WRP site consists primarily of a well-developed scrub-shrub wetland with Mud Slough running through it.

The site is not managed for any listed species, however, one-pound of seed for Nelson's check-ermallow (*Sidalcea nelsoniana*) was voluntarily planted in 2002 on the WMB site with great success. It is not known if this mallow was ever present at this site, but it is present at the reference site.

Invasive non-native plants controlled at the site include reed canary grass, penny royal, blackberry, velvet grass and bull thistle.

Organizational Structure

The site is managed by the owner who has a degree in wildlife science and a strong agricultural background. The owner/manager lives on-site and

grows tall fescue in the lands surrounding the Slough site. The owner/manager consults with the NRCS, U.S. Fish and Wildlife Service (USFWS) and Oregon Department of Fish and Wildlife (ODFW). He is assisted by his family, all of whom take a great interest in the site.

The NRCS is responsible for the maintenance of the WRP site but the owner/manager has conducted the majority of the maintenance at his own expense. He has heavy equipment available and has the knowledge to perform most of the maintenance tasks. He and his family will conduct all future monitoring and prepare the annual reports.

Habitat Management Tasks

Non-native invasive species control is by far the most time-consuming management task. Control is accomplished by regular spraying of individual plants. Approximately 400 hours is devoted to weed management annually.

The site has 12 water control structures, a pump and a ditch delivery system. Relatively little time or money is spent on maintaining the system.

Nutria (because they eat vegetation) and coyote (due to their nest predation) are controlled. Both are shot and there is an effort underway to trap individual coyote.

Annual monitoring and reporting is required for the mitigation bank site, which will be done in the future by the owner/manager.

There are few tasks associated with public use. Hunting is allowed in the WMB – up to 16 hours per week, although use is much less than anticipated. There is little or no other public use in the WMB. Compatible uses in the WRP site include trapping, seed harvesting, education and waterfowl hunting. The site is occasionally used by groups for education, but general public use is not allowed. Birders seeking to observe the abundant bird life use the adjacent railroad track to view the site. Hunting is allowed for members of a private hunting club and as many as 12 individuals a day hunt during waterfowl season.

Unique to this site is the presence and interest of the owner/manager. He is able to constantly observe the area for potential problems. This allows him to take early intervention measures on new weed infestations and other problems. He can also be much more effective when he and a crew are engaged in weed removal efforts because he is well aware of the problem areas.

Habitat Management Cost Estimates

Due to the outstanding location, low-impact surrounding land uses, excellent soils, water availability, on-site seed sources and the experience of the manager, this site will have extraordinarily low costs in exchange for an outstanding product.

The manager lives on-site and is the property owner. When he sells the property costs could go up and/or the site may slowly degrade unless he is replaced by a new manager with the same amount of dedication. An effort has been made in this report to capture the real cost of the site management by quantifying the volunteer time put in by the owner/manager. The field observation alone is hard to quantify but is estimated to be about 10 hours a month.

The water supply system, other than the pump is very simple and low-tech. There is little public use other than hunting which provides income. Weeds, which have been very aggressively managed, should remain under control with minimal to low effort in the future.

Assuming that management of the site is expected to occur in the long-term, an endowment is included. An audit and time for managing the investment of the endowment is, therefore, a task of the operation. Liability insurance is a standard cost. A contingency rate of 10 percent and general administrative rate of 5 percent is also included. The administrative rate is low because the owner of the property is also the operator and this relationship is assumed in perpetuity.

Total long-term annual average cost to maintain Mud Slough is estimated to be \$19,983.

End Notes

Knaupp, Mark and Debbie, 2002 Annual Monitoring Report, Mud Slough Wetland Mitigation Bank, November 2000.

Thompson, Patrick S., Mud Slough Wetland Mitigation Bank Management Plan, August 2000.

Summary of Wetland Reserve Plan of Operations for Mark Knaupp Easement Area, Contract No: WRP 66-0436-5-125, 1996.

Knaupp, Mark and Debbie, 2001 Annual Monitoring Report, Mud Slough Wetland Mitigation Bank, December 2001.

Knaupp, Mark and Debbie, personal contact, June 18, 2003.

Mud Slough PAR Footnotes

1. To direct coyote to trap.
2. Gravel for access road (very little use.)
3. Owner/manager will do limited surveys for annual report.
4. Will be done by owner/manager.
5. Site requires any bare areas to be reseeded if they are bare more than 2 seasons. This is estimated to be very minimal
6. Preparing for and directing weed eradication and other actions.
7. Roundup
8. Crossbow
9. 2,4-D
10. Surfactant.
11. For coyote.
12. To mow Meadow Foxtail area once a year.
13. 75 hours of field patrol/observation by owner/manager
14. Reports done by owner/manager.
15. 25 hours preparing for, arranging and meeting with NRCS annually.
16. Office is currently in owner/manager's home. Costs estimated as 50 percent of entire farm operation.
17. If endowment is established to provide permanent maintenance, an audit is recommended. Also time to manage endowment investment.
18. Liability insurance standard for landowner.

PAR Budget Table—Mud Slough Mitigation Area Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							257
Fence - Installed	Barbed-wire, 4 strd. (1)	Lin. Ft.	500.00	3.00	35	43	
Lock	Padlock	Item	1.00	19.00	2	10	
Other	Vehicle Barrier - cable	Each	1.00	50.00	10	5	
Other	Road Maintenance (2)	Each	1.00	1,000.00	5	200	
- BIOTIC SURVEYS							1,575
Project Management	Supervise/coordinate (3)	L. Hours	10.00	45.00	1	450	
Plant Ecologist	Field Svy. & Reports (4)	L. Hours	25.00	45.00	1	1,125	
- HABITAT MAINTENANCE							8,088
Seed Collection	Onsite native seed collection	Lb.	5.00	80.00	5	80	
Seeding	Hand seeding (5)	Acre	0.50	700.00	5	70	
Exotic Plant Control	Plan and Supervise (6)	L. Hours	25.00	45.00	1	1,125	
Exotic Plant Control	Herbicide (7)	Gal.	5.00	30.00	1	150	
Exotic Plant Control	Herbicide (8)	Gal.	2.50	40.00	1	100	
Exotic Plant Control	Herbicide (9)	Gal.	5.00	50.00	1	250	
Exotic Plant Control	Herbicide (10)	Gal.	5.00	15.00	1	75	
Exotic Plant Control	Backpack Spray	L. Hours	400.00	15.00	1	6,000	
Exotic Animal Control	Trap (11)	Item	1.00	500.00	5	100	
Brush Hog Tractor Mower	Rent Tractor/Mower (12)	Day	0.50	275.00	1	138	
- WATER MANAGEMENT							945
Water Control	Gate Maintenance	L. Hours	25.00	15.00	1	375	
Water Control	Electricity	Year	1.00	250.00	1	250	
Water Delivery	Pump	Item	1.00	3,000.00	15	200	
Water Delivery	Pipe, 10" Corrugated	Lin. Ft.	300.00	12.00	30	120	
- PUBLIC SERVICES							
- GENERAL MAINTENANCE							3,375
Project Management	Field patrol/observation (13)	L. Hours	75.00	45.00	1	3,375	
- REPORTING							1,894
Annual Reports	Summary (14)	L. Hours	40.00	45.00	1	1,800	
Maintenance Report	Prepare/meet with NRCS (15)	L. Hours	25.00	45.00	12	94	
- OFFICE MAINTENANCE							
Preserve Office	Rent (16)	Sq. Ft.	100.00	1.25	1	125	708
Office Supplies, Year	Stationery/envelopes	Person	0.50	125.00	1	63	
Furniture	Desk	Item	0.50	250.00	10	13	
Furniture	Chair	Item	0.50	150.00	10	8	
Fax Machine	Hard Copy	Item	0.50	300.00	5	30	
Telephone	Touch-tone	Item	0.50	95.00	5	10	
E-Mail	Services	Year	0.50	360.00	1	180	
Computer, PC & Monitor	133 MHz Pentium	Item	0.50	1,500.00	4	188	
Computer software	Microsoft Office Pkg	Item	0.50	450.00	4	56	
Laser Printer	HP LaserJet 5L	Item	0.50	300.00	4	38	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- FIELD EQUIPMENT							21
Chemical Sprayer	5 Gallon, Classic	Item	1.00	107.00	5	21	
- OPERATIONS							438
Audit	CPA Audit (17)	Acre	398.00	0.25	1	100	
Endowment	Process endowment (17)	L. Hours	4.00	30.00	1	120	
Insurance	Liability/Fee (18)	Acres	398.00	0.55	1	219	
Subtotal						17,302	17,302
Contingency @ 10%						1,730	
Administration @ 5%						952	
Total						19,983	

Roberts Island Preserve

Property Description

Robert's Island Preserve (Preserve) is a 20-acre preserve composed of two islands and a parcel on the mainland on the McKenzie River about one-half hour west of Eugene, Oregon. Two-thirds of the Preserve is on two islands – together they are called Robert's Island. The remaining one-third is located along the south bank of the McKenzie River, separated from the mainland by a small unnamed stream. There is a total of 4,000 feet of river frontage. The property is owned and managed by the McKenzie River Trust (MRT).

Robert's Island is mainly a riparian ecosystem, but it also contains wetland habitats. It is managed to protect side-channel habitat for spring Chinook salmon. The entire 20-acre site is heavily vegetated with native and non-native trees and shrubs. Over a third of the site is severely infested with non-native invasive species.

Surrounding land uses are primarily timber and farmland in the Exclusive Forest/Farm zoning. However, there is some rural residential zoning adjacent to the Preserve along the south bank of the McKenzie River above the side-channel. A 200-unit subdivision is within a short distance. There is a golf course upstream adjacent to the mainland portion of the Preserve. Just downstream of the site, the hillside is heavily wooded along on the south bank of the river. About half of this land is managed by the Bureau of Land Management as open space. Private individuals or timber companies own the rest.

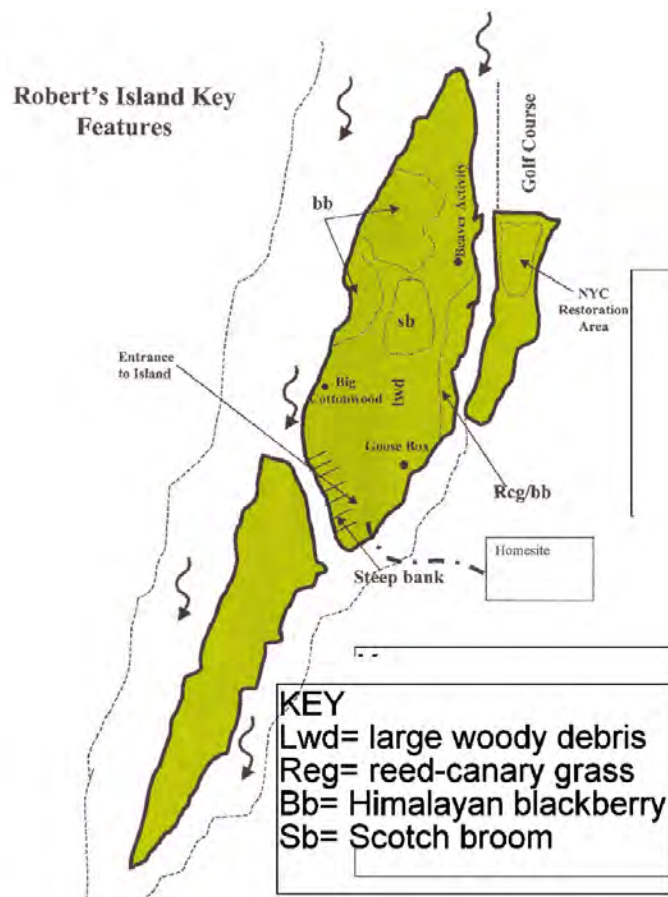
Access to the site is very difficult via a route behind a neighboring home (there may be an easement for access at this point). Crossing the side-channel can be difficult depending on the flow of the McKenzie River. The island farthest downstream is only accessible seasonally due to deep water, but could also be attained by boat. The MRT has posted a sign saying "No Trespassing" and the MRT has had very few problems with trespassers. There is

no risk of substantial use of this site due to poor access and protection by the MRT.

Project Goals

The Preserve is primarily managed and protected because of the rare side-channel habitat that provides over-wintering habitat for the wild-run of spring Chinook salmon.

The main ecological objective of the site is to restore it back to native vegetation primarily by removing invasive species such as Himalayan blackberry and Japanese knotweed. A goal of removing 75 percent of all invasive species on the island has been established.



Biological Description

The Preserve protects very valuable side-channel habitat; the limiting factor for spring Chinook salmon. The juvenile Chinook spend up to 18 months in the quiet, nutrient rich side-channels.

In addition to the Chinook, there have been two other state protected species sighted on the property: western pond turtle, and red-legged frog. There are no protected or sensitive plant species. The pond turtle requires the type of soft soils found on the islands to lay eggs. Habitat on the preserve for the red-legged frog is marginal. Migratory birds, deer, beaver and other species also utilize the site.

Non-native invasive plant species are a serious problem for the preserve. The three primary species are: Himalayan blackberry, Scotch broom and reed-canary grass. Recently Robert's geranium, Japanese knotweed and knapweed have been found on the site. The sheer biomass of the weeds that have been removed is impressive. Blackberry has caused large trees to bend over and reed-canary grass continually threatens to completely swamp newly planted coniferous trees.

The Preserve managers are employing several strategies to reduce the weed problem. First, they are removing biomass from the site. This should be completed this field season. Second they are planting trees in order to generate a more complete overstory in order to shade out invasive plants, most of which are not shade tolerant. Robert's geranium is shade tolerant however and another strategy is advised for its removal. Over the long-term, managers will need to consistently remove re-sprouting blackberry and Scotch broom. In some areas reed-canary grass is so prevalent in some areas that complete removal will not be attempted. Knapweed has been discovered in the flood plain. If the area is not consistently flooded on an annual or biennial basis, knapweed control will need to be started. Pulling of knapweed is included in the analysis.

Organizational Structure

Robert's Island Preserve is owned and managed by the McKenzie River Trust (MRT), a non-profit organization. There are three staff at the Trust and they manage about a dozen preserves in the McKenzie and other adjacent watersheds in Lane and Douglas Counties. The staff is supervised by a board of directors. The Preserve was acquired

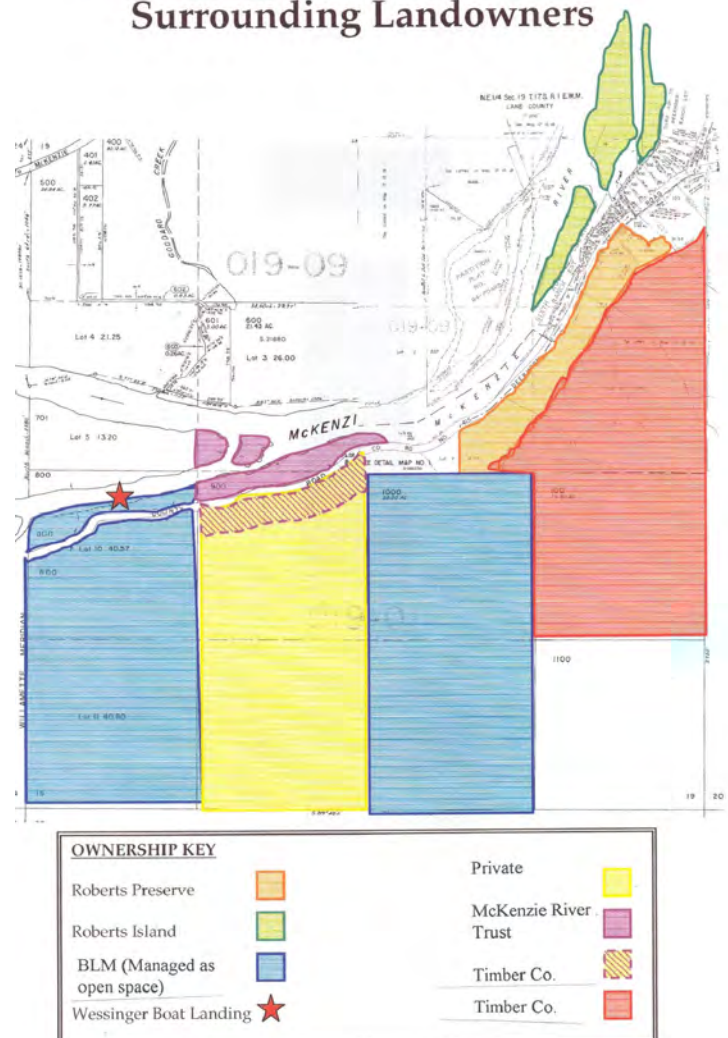
through a private landowner donation in 1996. The Trust did not receive a management endowment with this donation and is supporting maintenance through general fundraising.

Habitat Management Tasks

Non-native invasive species management is by far the major task on the Preserve. Extensive removal efforts have been undertaken in the past couple of years. The bulk of the weed removal and subsequent replanting will be completed by next spring. The management task for the future will include constant vigilance to prevent the weeds from taking over again. This will include annual monitoring and regular weed removal and replanting efforts.

The golf course and homes adjacent to the site have not presented any problems to the current managers although the potential for water quality

Exhibit A: Roberts Preserve and Surrounding Landowners



problems or accidental trespass is present. Public use is not viewed as an issue on this site. Minimal signage is all that has been necessary.

Habitat Management Cost Estimates

The habitat management cost for this site is \$3,650 annually, based on a 10 percent contingency and a 10 percent administrative overhead rate. The overhead rate is likely to rise as the McKenzie River Trust grows. The annual management cost of this site is quite low due to its inaccessibility, small size, and lack of public use. The MRT has chosen to reduce the non-native invasive species, which in turn requires monitoring and long-term maintenance, which are the primary costs on this site.

A significant amount of restoration is currently underway. The majority of weed removal and planting are expected to be complete within the next 4-5 years. The PAR is based on the maintenance expected after the restoration is complete. Long-term maintenance is expected to take a 4-person crew 3 working days annually – primarily consisting of pulling blackberry, Scotch broom sprouts and other weeds. The MRT may have volunteers or contract crews do this work, but either alternative is figured at \$15 an hour. A minimal amount of replanting of trees and shrubs is expected annually.

Due to the occurrence of new non-native invasive species appearing on the site in recent years, a biennial field survey by a botanist is figured into the management cost. This is seen as a preventive measure to identify new weed outbreaks.

Staff is expected to spend about 159 hours a year (including weed control) on Robert's Island which is estimated to be about 3 percent of the available person hours. Accordingly, all office and field equipment was calculated at 3 percent of the total. Alternatively, these fixed costs could have been spread equally across all twelve projects resulting in a proportion of 8 percent.

End Notes

Moore, Ryland. Managing Director, McKenzie River Trust. Personal communication, field visit, July 17, 2003.

McKenzie River Trust. Robert's Island Management Plan. May 11, 2003.

McKenzie River Trust. Stewardship Calculation for Endowment.

McKenzie River Trust. Robert's Island Restoration Plan & Timeline. June 24, 2003.

PAR Budget Table—Roberts Island Preserve Annual Average Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/MAINT							
- BIOTIC SURVEYS							165
Project Management	Supervise/coordinate	L. Hours	3.00	30.00	2	45	
Plant Ecologist	Field Svy. & Reports	L. Hours	8.00	30.00	2	120	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							1,470
Plant Procurement	Trees, shrubs	1 Gal.	10.00	3.00	1	30	
Exotic Plant Control	Hand Remove: 4crew/3 days	L. Hours	96.00	15.00	1	1,440	
- WATER MANAGEMENT							
- PUBLIC SERVICES							3
Sign, Aluminum	Aluminum 14" X 20"	Item	2.00	10.00	7	3	
- GENERAL MAINTENANCE							
- REPORTING							420
Photodocumentation	Supervise/volunteer coord.	L. Hours	3.00	30.00	1	90	
Photodocumentation	Field Survey- volunteer	L. Hours	6.00	10.00	1	60	
Annual Work Plan	Planning/staffing	L. Hours	3.00	30.00	1	90	
Agency Report	Annual Report	L. Hours	3.00	30.00	1	90	
Management Plan	Update	L. Hours	15.00	30.00	5	90	
- OFFICE MAINTENANCE							58
Preserve Office	Rent (1% of total)	Unit	1.00	5.00	1	5	
Furniture	Desk	Item	0.03	250.00	10	1	
Furniture	Chair	Item	0.03	150.00	5	1	
Furniture	Bookcase, 3'x5'	Item	0.03	150.00	8	1	
Furniture	File cabinet	Item	0.03	400.00	10	1	
Copier	Copier, 15-18 ppm	Item	0.03	3,833.00	8	14	
Fax Machine	Standard	Item	0.03	400.00	5	2	
Telephone	Touch-tone	Item	0.03	95.00	5	1	
E-Mail	Services	Year	0.03	360.00	1	11	
Computer, PC & Monitor	133 MHz Pentium	Item	0.03	2,100.00	4	16	
Computer software	Microsoft Office Pkg	Item	0.03	450.00	4	3	
Deskjet Printer	HP DeskJet 895	Item	0.03	399.00	6	2	
- FIELD EQUIPMENT							3
Camera	Digital, mediam	Item	0.03	350.00	5	2	
Hip Waders	Waders	Item	0.03	65.00	5	0	
- OPERATIONS							897
Contracts	Volunteers/Crew	L. Hours	10.00	30.00	1	300	
Budgeting	Budgets/Accounting	L. Hours	3.00	30.00	1	90	
Property Tax Exemption	File	L. Hours	0.50	30.00	1	15	
Supervisor Site Visit	Site visits (2 per yr)	L. Hours	8.00	45.00	1	360	
Travel	per site visit (crew+staff)	Trip	5.00	24.11	1	121	
Insurance	Liability/Fee	Acres	20.00	0.55	1	11	
Subtotal						3,015	3,015
Contingency @ 10%						302	
Administration @ 10%						332	
Total						3,648	

South Slough National Estuarine Research Reserve

Property Description

The South Slough National Estuarine Research Reserve (Reserve) is a 4,770-acre natural area encompassing over 600 acres of tidal marshes, mudflats and open water channels and over 4,000 acres of upland forest. The site is connected to the ocean through the Coos estuary, the largest estuary in Oregon, five miles south of the city of Charleston.

The South Slough inlet features a wide range of aquatic, terrestrial and intertidal habitats. Heron, osprey, eagles, brown pelicans, seal, sea lions, elephant seals, orca, perch, flounder and adult and juvenile anadromous fish use the South Slough. In addition, the South Slough is a major stop on the coastal flyway for migratory birds. Numerous federal and state protected species are found within the Reserve.

The Reserve was established in 1974 as the first in a system of coastal reserves across the United States and is managed by the Oregon Department of State Lands (DSL) in partnership with the National Oceanic and Atmospheric Administration (NOAA).

The Reserve is a special-use area that serves as a natural laboratory for long-term monitoring and research. Major activities include wetland restoration efforts; ecological research and monitoring; and toddler, K-12 through adult education. Managers estimate that approximately 30,000 people visit South Slough each year with 12,000 visitors

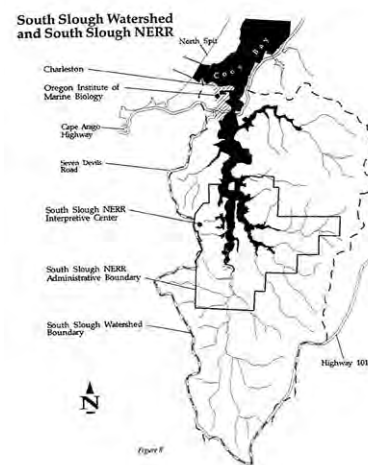


entering the interpretive center. An unknown number of paddlers also visit the Reserve.

The Reserve comprises one-quarter of the

19,000-acre South Slough watershed. Approximately 70 percent of the land in the watershed is managed for commercial timber production. The remaining 5 percent of the land is low density residential. The managers consider the entire watershed when making stewardship decisions. The watershed is generally characterized by steep forested hillsides and sandy bluffs. The largest tributary system entering the Reserve is Winchester Creek and there are numerous small streams draining the steep ridges. Logging was occurring adjacent to the northwestern corner of the Reserve during the site visit. High intensity logging on a rotation of 26 years has occurred and management of the timberlands includes the use of herbicides. There is a county landfill on a hillside on the east side of the Reserve that is actively being used for construction debris. It was used in the past as a regional (county-wide) landfill and is unlined. This could be a potential source of bacteria in the groundwater.

There is a 100-acre oyster farm operation within the Reserve with associated impacts including displacement of benthic communities during harvesting and impacts to eel grass. Energy leases for subsurface mining of coal and gas are currently being pursued by industry. The Reserve does not hold all of the subsurface rights and has limited say in the leasing process (the rights belong to the state of Oregon.) Even if managers deny surface access, the coal and gas resources could be extracted by coming in underground from outside the Reserve ownership. The impacts of this are unknown.



Project Goals

The Reserve is federally mandated as part of the National Estuarine Reserve System to provide opportunities for long-term research, education, and interpretation. The major goals of the reserve program are to ensure a stable environment for research through long-term protection of the Reserve resources, address coastal management issues identified as significant through research, enhance public awareness and education about estuarine areas and conduct and coordinate and make available estuarine research.

The overall goal of Reserve is to maintain the integrity of the South Slough estuarine ecosystem through research, education and stewardship. Research focuses on learning more about the complex interactions of physical and biological components that comprise the estuarine ecosystem. Education focuses on grades K-12, the general public, university students and researchers, and policy makers. For the past ten years, the focus of the stewardship program has been on the Winchester Tidelands Restoration Project where the aim is to restore altered tidal habitat and associated uplands within the Reserve. Extensive monitoring efforts track the success of the restoration efforts.

Biological Description

The Coos estuary is the sixth largest estuary along the Pacific coast of the contiguous United States and the largest estuary in Oregon. The Coos is a “drowned” river mouth estuary in which rain and floods result in discharge of high volumes of sediment in the estuary during the winter; seawater inflows dominate during the summer when stream flows are low.

Protected bird, animal and fish species within the Reserve include: bald eagle, peregrine falcon, brown pelican, western snowy plover, sea-run cutthroat trout and coho salmon. Protected plants include: pitcher plant, sea lavender and salt marsh bird’s beak. It is likely that more protected species are present.

Uplands make up three-fourths of the Reserve and are heavily forested with conifers: predominantly Sitka spruce, Douglas fir, western hemlock and Port Orford cedar. Pacific wax myrtle, red alder and willow are the most common deciduous trees and shrubs. All parts of the site have been logged at some point in time. The uplands feature insects, amphibians, reptiles, birds and mammals with a rich understory of ferns, shrubs, fungi and moss.

Common mammals include deer, elk, raccoon, beaver, porcupine, opossum and bats. Black bear, cougar and bobcat inhabit the more remote areas.

Freshwater habitats include perennial and intermittent streams, riparian zones, ground seeps, ponds, wetlands and marshes. There are numerous small perennial and intermittent streams that enter the estuary. Tidelands include saltmarshes, emergent islands, mudflats, channels, rocky bottomland and sand flats. Minimally represented habitats include coastal shrubland, dunes, ocean beach and rocky cliffs.

Restoration of estuarine wetlands in the Coos estuary is an essential part of a strategy to improve the overall health of the bay. Over 80 percent of the tidal wetlands in this ecosystem have been lost to diking, draining, fill and development.

Biological invasions pose a considerable threat to the ecological integrity of the Reserve. As of 1989 over 40 non-native marine and estuarine organisms have become established. However, some significant invasive species have not yet entered the Reserve including reed canary grass, and Spartina sp. Ensuring that these species do not become established in the Reserve is a high priority.

Port Orford cedar is an indigenous species found on the Reserve. This cedar species has a very limited geographical range and is suffering very high, range-wide mortality linked to non-native waterborne fungus that rapidly kills individual trees. Managers are monitoring the situation, but there is no known remedy.

Organizational Structure

The National Estuarine Research Reserves System is administered by NOAA and helps to fulfill their stewardship mission to sustain healthy coasts by improving the nation’s understanding and stewardship of estuaries. The reserve system is a network of 25 protected areas that represent different biogeographic regions of the United States. South Slough was the first area to be protected under the NERR system.

The reserve is administratively supported by the Oregon DSL and is guided by an eight-member management commission appointed by the governor to establish operating policies and administrative rules for the Reserve. Each member is appointed by the Governor as a representative of a specific institution, agency or other constituency. In addition to the commission, there are several

technical advisory committees that assist staff with issues facing the Reserve.

There are currently 14 permanent full-time staff members at the Reserve. They are employees of DSL. A partnership with the Oregon Institute of Marine Biology (OIMB) provides lab and office space on the OIMB campus for the reserve research staff.

The Friends of the South Slough Reserve, Inc. is a non-profit group supporting the reserve with funding and volunteer hours.

Habitat Management Tasks

Major management tasks include monitoring, habitat management, research, education, community outreach, facilities maintenance, and administration. Total hours spent working on the Reserve exceed 45,500 hours annually. Full-time employees account for over 31,000 hours. They include:

1. Manager
2. Office Manager
3. Office Assistant
4. Education Coordinator
5. Research Coordinator
6. Stewardship Coordinator
7. Monitoring Coordinator
8. Restoration Monitoring Coordinator
9. Coastal Training Coordinator
10. Public Service Representative
11. Public Involvement Coordinator
12. Education Assistant
13. Research Assistant
14. Maintenance Foreman
15. Maintenance Assistant

Part-time employees, contractors, student workers, and volunteers account for approximately 10,000 hours. Various seasonal youth corp crews work an additional 4,500 hours conducting maintenance tasks.

Hours for tasks were determined from job descriptions provided by the manager. Most of the job descriptions indicated a percent of time spent on a task. That was converted to hours worked based on 2,080 hours per year. A job description was not provided for the positions of coastal training coordinator or restoration monitoring coordinator so tasks completed by those individuals were allocated separately in the PAR. In addition percentages of hours were not provided for the education coordinator so they were estimated.

All professional staff was assumed to attend conferences or professional training 40 hours per year and all staff was assumed to be required to attend 8 hours of employee training annually. This could include safety trainings or updates in personnel issues.

Supervision and leadership work accounted for 1,685 hours. Although technically, there are only two supervisory positions at the Reserve (manager and office manager), most of the staff contribute leadership roles from time to time by overseeing volunteers and work crews. This was divided in Table 1 according to the job descriptions provided.

Table 1. Allocation of Hours in PAR Budget

Title	Total	How divided in PAR
	hours	
Manager	520	All in Office Maintenance under Administrative Supervision
Research Coordinator	229	76 hours were placed in each of the categories: Biotic Surveys, Habitat Maint., and Habitat Restoration
Office Manager	624	All in Office Maintenance under Office Supervision
Stewardship Coordinator	104	52 hours placed in each of the categories: Biotic Surveys and Habitat Maintenance. Note: an additional 624 hrs. were placed in Habitat Restoration, Project Management.
Education Coordinator	208	All placed in Public Services under Other, Supervise/coordinate.
Total	1685	

Community outreach in the case of South Slough included everything from community meetings about activities in the Reserve, reviewing and commenting on outside agency documents, graduate student advising, conducting field trips for visiting scholars and others, writing papers for journals and presenting papers at conferences. These activities account for approximately 2,205 hours and are done by most employees. Outreach conducted at the visitor's center is shown in Table 2 and separately in the PAR.

Table 2. Hours Spent in Outreach Activities Grouped by Position

Manager	437
Coordinators	
Education	104
Research	500
Stewardship	208
Monitoring	208
	1,020
Assistant Coordinator level staff	
Office Mgr.	104
Public Involvement	104
Restoration Monitoring	270
Educ. Assistant	166
Research Assistant	104
	748

In addition to community outreach, volunteer management and educational program development and delivery are a big focus with over 8,500 hours spent in this area.

Because the full-time staff is all employed by the Oregon DSL, numerous administrative duties occur off-site in Salem. These tasks include payroll, budget administration, accounting, audits, personnel record keeping, and contracting and grant administration. All of these costs are accounted for in the 22 percent overhead assumed in the PAR. On-site administrative duties occur and are accounted for in the PAR.

Research and monitoring is a significant activity in the Reserve, accounting for over 15 percent of the total staff and volunteer hours.

The upland forest is 4,000 acres and has not been actively managed. A plan will be developed in the next five years to initiate an active management program. A combination of management techniques will be used including thinning and possibly fire. The PAR estimates that 5 percent or 200 acres of the forest area will be treated every 5 years on an on-going basis. At that rate each 200-acre section of forest will be treated every 20 years. Although this assumption is used in this analysis, the actual rate of treatment will be dependent upon the level of grants to the project.

Maintenance of the grounds accounts for 1,768 hours (a portion of 2 full-time maintenance workers hours) not counting volunteers and youth corp. The full-time maintenance workers hours were divided into major tasks (Table 3).

Table 3. Full-time Maintenance Worker Hours by Tasks

Task	PAR Category	Hours
General landscape maint. (includes exotic control)	Habitat Maintenance	442
Maintenance of fences, gates, signs, canoe launches etc.	Site Construction/Maint.	221
Erosion control	Habitat Maintenance	221
Trail maintenance	Public Services	342
Patrolling	Public Services	100
Road & parking lot maintenance	Site Construction/Maint.	221
Fire control	Habitat Maintenance	221
Total		1768

There are numerous facilities associated with the Reserve including the Estuarine and Coastal Science Laboratory (ECOS), which is the headquarters for the research monitoring and stewardship activities in the Reserve. The visitor's center is the

headquarters for education, outreach and administrative staff. Other facilities include maintenance buildings, housing and storage buildings. Facility maintenance includes regular building cleaning, office equipment maintenance, computer, maintenance of educational displays, website upkeep and technical laboratory equipment maintenance. The Fredrickson house was not counted in the PAR since it is abandoned and no maintenance is planned for it at this time. In addition to the buildings, there are approximately 5 miles of trail, 1.5 miles of gravel road and .75 miles of paved road and a paved 15-car parking lot.

Habitat Management Cost Estimates

The estimated cost of on-going maintenance of South Slough NERR is just under \$2 million per year including a contingency rate of 10 percent and an administrative rate of 22 percent. Both of these assumptions are software defaults. The estimated cost can be accounted for by the 15 full-time employees and numerous volunteers and part-time workers as well as numerous facilities including a visitor's center; offices, maintenance buildings and housing. Unlike many natural areas, the focus at South Slough is on research, monitoring and public services with relatively little funding spent on habitat maintenance.

Table 4. Volunteer Hourly Rates. Salaries for non staff positions were estimated as if they were paid workers including taxes and benefits.

Graduate Students	\$20/hr
Commission Board	\$60/hr
Technical Assistance Volunteers	\$45/hr
Docents, Stewardship Volunteers, High school students	\$15/hr
Youth Corp crews	\$10/hr

Nearly \$494,000 (about 25 percent of the budget) is allocated to public services, which includes extensive community outreach and education. Office maintenance, including building replacement costs exceeds \$200,000 per year. Research and monitoring account for over \$215,000 annually. Another \$113,000 provides for habitat maintenance. Over \$123,000 is allocated to operations (grant management, budgeting, training) and on reporting which includes extensive data management and annual reporting.

End Notes

South Slough National Estuarine Research Reserve, Management Plan 2003-2008, Second Draft, June 9, 2003.

Facilities Master Plan for South Slough National Estuarine Research Reserve, September 30, 1991. GSA Partnership, P.C., Architecture, Urban Design, Planning, Portland, OR

Personal Communication, Mike Graybill, Reserve Manager, August 19, 2003.

Personal Communication, Craig Cornu, Stewardship Coordinator, August 19, 2003.

<http://www.southsloughestuary.org>

<http://www.ocrm.nos.noaa.gov/nerr/reserves/nerrssouthslough.html>

<http://nerrs.noaa.gov/SouthSlough/welcome.html>

http://mpa.gov/mpadescriptive/cs_slherr.html

Footnotes in PAR

Footnotes are indicated by a “(“ followed by a number in the PAR, for example (11).

Duplicated footnotes were eliminated for simplicity after the whole PAR was complete, therefore there are missing numbers. These are indicated by N/a below.

Costs for equipment were estimated using PAR default, current Ben Meadows catalogue and internet searches.

- 1 Because the upland forest has not been managed for fire, the Reserve is required to pay forest fire insurance. The figure from the DSL office is currently \$5,800 a year.
- 2 Estimated that a total 15,000 copies of various interpretive materials will be printed each year, including maps, brochures, papers. This is a rough estimate to include black and white or color copies. Staff believes that this estimate is high, however, the rate of production of new materials is expected to increase. See note 4 below.
- 3 There are 4000 acres of upland forest. To date there is no plan for management. It is estimated that on average 200 will be treated every 5 years by thinning, burning, replanting or other techniques. Cost is estimated.
- 4 Artist to layout, create new art for interpretive literature. Estimate 35 hours for each piece every year.
- 5 Estimate on size and cost.
- 6 Estimate on number and cost.
- 7 There are 21 computers (16 workstations plus a server/5 laptops.) There may be a site license, which would reduce this cost considerably.
- 8 The Reserve will spend \$260,000 to renovate the exhibits in the visitor's center. They intend to continue updating exhibits. PAR estimates that 10 percent of the exhibit will be updated every 5 years at a cost of \$26,000.
- 9 Estimated type and cost.
- 10 Square footage is based on those buildings with utilities (does not include storage sheds.) Cost per square foot is PAR estimate. Note that the Reserve operates 2 wells and 3 septic systems, which could significantly affect the cost.
- 11 Cost is estimated.
- 12 Travel is mostly by Reserve vehicle and some by personal vehicle, but 250 miles at \$.54 a mile was budgeted to each of 13 full-time employees.
- 13 N/a
- 14 N/a
- 15 N/a
- 16 Number of phones based on 15 full-time employees plus additional phones for visitor's center, volunteers, part-time staff. Cost estimated.
- 17 There are 6 cell phones. Cost is estimated – there are numerous packages ranging from free on up. Unknown which package is being used.
- 18 Number of desks estimated based on 15 full-time and 5 part-time employees, plus volunteers and work-desks. Cost is estimated.
- 19 Number of office chairs estimated based on 15 full-time and 5 part-time employees, plus volunteers and visitor chairs. Cost is PAR default.
- 20 There are 80 chairs in the visitor's center for classroom use. Cost is estimated.
- 21 Estimated number of bookcases based on number of employees. Cost is estimated.
- 22 Estimated number of file cabinets based on number of employees. Cost is estimated.
- 23 Cost estimate is based PAR default and number of full-time employees.
- 24 There are 10 6-foot folding tables in the visitor's center for classroom use. Cost is estimated.
- 25 There are 10 42-inch square tables with additional 62-inch round tabletops for use in visitor's center. Cost is estimated.
- 26 There is one flat file cabinet in the visitor's center. Cost estimated.
- 27 Based on connections to ECOS and the visitor's center.
- 28 Site Maintenance includes the maintenance of fences, gates, signs, grading canoe launches, painting etc.
- 29 There is a 1/4 mile entry road (31,680 sq.ft) plus another 1/4 mile segment presently being paved (63,360) and a 15-car parking lot (11,295 sq. ft.) that will require asphalt overlays every 20 years. Cost is PAR estimate.
- 30 The estimate to design and install all signs in the Reserve was \$110,000 in the 1991 Facilities Plan. It is unknown how many signs are involved so an annual replacement estimate of 5 percent of the capital cost was determined (\$5500.) Labor for sign upkeep was included in Site Construction/Maintenance.
- 31 The amphitheater consists of simple wooden bench seating for approximately 20 people and a podium. Replacement is estimated at every 15 years due to elements.

- 32 There are 1700 feet of wooden boardwalk about 4 feet wide (6800 sq. ft.) Plus a two story 1500 square foot observation deck (3000 sq. ft.) Cost of maintenance per sq.ft. is PAR estimate.
- 33 There are also 6 foot bridges ranging in length from 10 to 30 feet and from 6 to 8 feet wide (6x20x7). There is also a car bridge that will likely be closed instead of repaired when the time comes so it was not included.
- 34 Seed and plant products are required annually for on-going restoration and habitat maintenance. Manager thought less than \$5,000 a year. PAR operator used a cost of \$3500 per year.
- 35 Though job descriptions include fence maintenance, the Reserve is not preserving wire fencing or any other permanently installed fencing.
- 36 N/a
- 37 N/a
- 38 Includes entire shop worth of power and hand tools including band saw, drill press, torches, tablesaw, welders, files etc. Cost is estimate.
- 39 Data collector cost from Reserve staff.
- 40 Cost is PAR default and based on 5 vehicles. It is assumed most work is not done by NERR staff.
- 41 Replacement is based on 2,000 square feet estimated to be used by the Reserve staff housed at ECOS facility. Note that the Reserve does not pay for their use of the building due to a previous arrangement. The PAR accounts for their share of the building as if they did pay for it. The square-foot cost is an estimate based on median cost of similar buildings.
- 42 The manager indicates that the size of the visitor's center is 3,000 square feet. The cost of the 2001 renovation was \$900,000, which is \$300/sq. ft. Replacement estimate is \$90/sq.ft based on median structure cost of similar buildings. This is assuming the composting toilet in the replacement cost.
- 43 Maintenance buildings from the Facilities Master Plan include: maintenance operations building (est. 1500 sq. ft. Note: this may not be accurate as there was not a size in the Plan); remaining Kunz house outbuildings 1,000 sq. ft.; EST storage module; general storage shed 800 sq. ft.; storage barn 1,240 sq. ft. Replacement estimate is \$75/sq.ft based on median cost of similar buildings.
- 44 The Spruce Ranch housing. Replacement estimate is \$90/sq.ft based on median cost of similar buildings.
- 45 See details and staff breakdown above in written report.
- 46 Equipment maintenance includes upkeep on all machinery and other equipment as well as technical laboratory equipment maintenance.
- 47 Facility maintenance includes regular building cleaning, janitorial services, office equipment maintenance, computer, maintenance of educational displays, and website upkeep. A new part-time custodian will be hired in the near future so an additional 1,040 hours were added.
- 48 System wide monitoring consists of monitoring a wide variety of ecosystems and organisms. Hours were divided in the PAR as follows: 250 for research coordinator; 208 stewardship coordinator (total 458 hrs); 1040 for restoration monitoring coordinator; 936 graduate student work; 325 high school students.
- 49 Research hours include: 936 for research coordinator; 312 stewardship coordinator (total 1248 hrs.); 416 research assistant; 936 graduate student work; 325 high school students. Volunteers also contribute here which is itemized in 55 below.
- 50 Leading/supervising the crews accounts for 200 hours of the Steward's time and 50 hours of the research coordinator's time.
- 51 624 hours are the steward's; 76 are research coordinator.
- 52 Compliance monitoring includes monitoring activities in, adjacent to, or affecting the Reserve. The stewardship coordinator does the work.
- 53 A writer/editor is contracted to help with plan updates – approximately every 5 to 8 years.
- 54 There is an 8 member management commission appointed by the governor to oversee the NERR. They volunteer an estimated 4 hours a month for 12 months for a total 384 hours.
- 55 There are numerous technical committees and volunteers that assist in research and monitoring. They are an estimated 10 individuals working 2 hours a month for 12 months for a total of 240 hours.
- 56 There are volunteers, job training community service programs and Youth Corp crews assisting with maintenance activities. Volunteer hours are estimated at 10 people for 3 hours a month for 12 months for a total of 360 hours. The vocational training hours are estimated at .15 FTE or about 312 hours. This is a seasonal job where vocational trainees work 20 to 32 hours a week for six months. The YCC contributes 4440 hours. The total for each is divided in the PAR between Habitat Maintenance and Public Service.
- 57 Education programs are delivered by the education assistant and the coastal training coordinator (2600 hrs.) In addition, docents deliver education programs and help at visitor center. It is estimated that 20 volunteers provide 10 hours a month for 12 months for a total of 2400 hours.
- 58 Visitor center public assistance is performed by the public involvement coordinator, 811 hours; and the education coordinator, 42 hours (total 853 hours) and the public service representative, 208 hours. In addition there are vocational job trainees who in total contribute an estimated one quarter of a full-time employee or 520 hours.
- 59 The manager spends 312 hours working with the appointed management commission and the office manager assists for 62 hours.
- 60 Education programs are developed by the education coordinator, 1165 hrs.; and the coastal training coordinator, 624 hrs., and education assistant, 187 hrs. (811 hrs. total). Delivering the educational program through classes, walks, fairs, posters at scientific meetings, conferences is estimated at 2,400 hours. Management believes that this figure may not

be a sufficient reflection of the education program, however, we have not been able to calculate a reliable adjustment.

- 61 Annual reports include all types of reporting done by South Slough. The 4 coordinators spend 728 hours on reporting (208 hrs. each for research, stewardship and monitoring and 104 for education.) The assistant coordinator spend 270 hours (208 for the restoration monitor and 62 for the coastal training coordinator.)
- 62 Grant management accounts for 832 hours (104, manager; 520 total for coordinators (educ., 208; research 104; steward 208); 208 total for others: restoration monitoring coordinator, 104; coastal training coordinator 104. In addition, the office manager and public service representative spends a substantial amount of time up to half time on this task.
- 63 All employees attend trainings and conferences; an average salary of \$40/hr. was used.
1. Internet Access Service by satellite estimated at \$150 per month.

PAR Budget Table—South Slough National Estuarine Research Reserve Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT							43,525
Road Construction & Repair	Maintenance	L. Hours	221.00	25.00	1	5,525	
Road Construction & Repair	Gravel 1.5 miles road	Sq. Yd.	63,360.00	3.00	8	23,760	
Fence	Maintenance	L. Hours	221.00	25.00	1	5,525	
Road, Asphalt	Overlay-Entry Rd.+ (29	Sq. Ft.	106,335.00	0.60	20	3,190	
Other	Site Maintenance (28	L. Hours	221.00	25.00	1	5,525	
- BIOTIC SURVEYS							215,400
Project Management	Supervise/coordinate (50	L. Hours	128.00	45.00	1	5,760	
Project Management	Field logistics	L. Hours	1,040.00	30.00	1	31,200	
Other	Monitoring, Coordinators (48	L. Hours	458.00	45.00	1	20,610	
Other	Monitoring, Assistant (48	L. Hours	1,040.00	30.00	1	31,200	
Other	Monitoring, Grad Student (48	L. Hours	936.00	20.00	1	18,720	
Other	Monitoring, HS Student (48	L. Hours	325.00	15.00	1	4,875	
Other	Research, Coordinators (49	L. Hours	1,248.00	45.00	1	56,160	
Other	Research, Assistant (49	L. Hours	416.00	30.00	1	12,480	
Other	Research, Grad Student(49	L. Hours	936.00	20.00	1	18,720	
Other	Research, HS student (49	L. Hours	325.00	15.00	1	4,875	
Other	Assistance - committees (55	L. Hours	240.00	45.00	1	10,800	
- HABITAT MAINTENANCE							113,158
Restoration Plan	Plan dev., Coordinator	L. Hours	416.00	45.00	1	18,720	
Restoration Plan	Plan dev., Assistant	L. Hours	208.00	30.00	1	6,240	
Project Management	Supervise/coordinate (51	L. Hours	700.00	45.00	1	31,500	
Plant Procurement	Seeds & plants (34	Item	1.00	3,500.00	1	3,500	
Erosion Control	General	L. Hours	221.00	25.00	5	1,105	
Controlled Burning	Fire Control & Prescribed	L. Hours	221.00	25.00	10	553	
Other	Supervise/coordinate (50	L. Hours	250.00	45.00	1	11,250	
Other	General Landscape maint	L. Hours	442.00	25.00	1	11,050	
Other	Volunteer habitat maint (56	L. Hours	180.00	15.00	1	2,700	
Other	Vocational trainees (56	L. Hours	156.00	15.00	1	2,340	
Other	Youth crew habitat maint (56	L. Hours	2,220.00	10.00	1	22,200	
Other	Upland Forest Mgt (3	Acres	200.00	50.00	5	2,000	
- WATER MANAGEMENT							
- PUBLIC SERVICES							493,833
Patrolling	Patrol	L. Hours	100.00	25.00	1	2,500	
Boardwalk	Construction/Repair (32	Sq. Ft.	9,800.00	8.00	25	3,136	
Boardwalk	Bridge Maint. 4'x15' (33	Sq. Ft.	840.00	8.00	25	269	
Residences	Replace housing (44	Sq. Ft.	3,400.00	90.00	35	8,743	
Trail	Maintenance	L. Hours	342.00	25.00	1	8,550	
Trail	Volunteer Maint.(56	L. Hours	180.00	15.00	1	2,700	
Trail	Vocational trainees (56	L. Hours	156.00	15.00	1	2,340	
Trail	Youth Corp Maint.(56	L. Hours	2,220.00	10.00	1	22,200	
Sign, Aluminum	All signs; replace (30	Item	1.00	5,500.00	1	5,500	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Bench	Amphitheater (31	Item	1.00	3,000.00	15	200	
Volunteer Coordinator	Coordinate Volunteers	L. Hours	1,186.00	30.00	1	35,580	
Docent Training	Training vols., Coordinator	L. Hours	208.00	45.00	1	9,360	
Docent Training	Training vols., Assistant	L. Hours	208.00	30.00	1	6,240	
Interpretive Literature	Artist for 3 new (4	L. Hours	315.00	75.00	3	7,875	
Interpretive Literature	Printing (2	Each	15,000.00	0.10	1	1,500	
Exhibit	Update exhibits (8	Item	1.00	26,000.00	5	5,200	
Community Outreach	Manager (45	L. Hours	437.00	55.00	1	24,035	
Community Outreach	Coordinators (45	L. Hours	1,020.00	45.00	1	45,900	
Community Outreach	Assistants (45	L. Hours	748.00	30.00	1	22,440	
Public Assistance	Clerical (45	L. Hours	208.00	20.00	1	4,160	
Public Assistance	Visitor Center, Coord. (58	L. Hours	853.00	30.00	1	25,590	
Public Assistance	Visitor Center, Clerical (58	L. Hours	208.00	20.00	1	4,160	
Public Assistance	Vocational trainees (56	L. Hours	520.00	15.00	1	7,800	
Coordinated Management	Work w/Mgt. Commission (59	L. Hours	312.00	55.00	1	17,160	
Coordinated Management	Work w/Mgt Commission (59	L. Hours	62.00	30.00	1	1,860	
Other	Develop Educ. Prog. (60	L. Hours	1,165.00	45.00	1	52,425	
Other	Develop Educ. Prog. (60	L. Hours	811.00	30.00	1	24,330	
Other	Deliver Educ. Prog.(57	L. Hours	2,600.00	30.00	1	78,000	
Other	Deliver Ed. Prog. (57	L. Hours	2,400.00	15.00	1	36,000	
Other	Supervise/coordinate	L. Hours	208.00	45.00	1	9,360	
Other	Compliance monitoring (52	L. Hours	416.00	45.00	1	18,720	
- GENERAL MAINTENANCE							65,889
Other	Replace Maint. bldgs (43	Sq. Ft.	4,540.00	75.00	35	9,729	
Other	Facility Maintenance (47	L. Hours	2,808.00	20.00	1	56,160	
- REPORTING							134,460
GIS/CAD Management	Data Mgt., Coordinator	L. Hours	998.00	45.00	1	44,910	
GIS/CAD Management	Data Mgt. Assistant	L. Hours	500.00	30.00	1	15,000	
Annual Reports	Manager	L. Hours	208.00	55.00	1	11,440	
Annual Reports	Coordinators (61	L. Hours	728.00	45.00	1	32,760	
Annual Reports	Assist. Coordinators (61	L. Hours	270.00	30.00	1	8,100	
Report Production	Labor, Office Mgr.	L. Hours	83.00	30.00	1	2,490	
Report Production	Labor, Office Assist.	L. Hours	208.00	20.00	1	4,160	
Report Production	Writing & editing (53	L. Hours	2,080.00	45.00	6	15,600	
- OFFICE MAINTENANCE							208,075
Administrative	Reception duties	L. Hours	416.00	20.00	1	8,320	
Administrative	Clerical	L. Hours	1,643.00	20.00	1	32,860	
Administrative	Admin. Duties, Manager	L. Hours	104.00	55.00	1	5,720	
Administrative	Admin. Duties, Office Mgr	L. Hours	208.00	30.00	1	6,240	
Administrative	Admin. Duties, Assistant	L. Hours	1,206.00	20.00	1	24,120	
Administrative	Admin. Supervision; Mgr.	L. Hours	520.00	55.00	1	28,600	
Administrative	Mgt. Commission (54	L. Hours	384.00	60.00	1	23,040	
Administrative	Office Supervision; Office Mgr	L. Hours	624.00	30.00	1	18,720	
Administrative	Facilities Planning; Steward	L. Hours	63.00	45.00	1	2,835	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Preserve Office	Replace portion of ECOS (41	Sq. Ft	2,000.00	80.00	35	4,571	
Nature Center	Replacement (42	Sq. Ft.	3,000.00	90.00	35	7,714	
Utilities, Annual	Elec., Gas, Water (10	Sq. Ft.	12,100.00	1.00	1	12,100	
Telephone Charges, Annual	Phone Charges (16	Person	25.00	120.00	1	3,000	
Office Supplies, Year	Stationery/envelopes (23	Person	15.00	125.00	1	1,875	
Office Supplies, Year	Supplies (23	Person	15.00	192.00	1	2,880	
Furniture	Desk (18	Item	25.00	250.00	10	625	
Furniture	6 ft. wooden Tables (24	Item	10.00	200.00	10	200	
Furniture	Square/Round Tables (25	Item	10.00	350.00	10	350	
Furniture	Office Chair (19	Item	30.00	150.00	5	900	
Furniture	Classroom Chair (20	Item	80.00	40.00	5	640	
Furniture	Bookcase, 3'x5' (21	Item	15.00	150.00	8	281	
Furniture	File cabinet (22	Item	15.00	400.00	10	600	
Furniture	Flat File cabinet (26	Item	1.00	700.00	10	70	
Copier	Copy machines (9	Item	3.00	3,800.00	8	1,425	
Fax Machine	Hard Copy (11	Item	4.00	525.00	5	420	
Telephone	Touch-tone (16	Item	20.00	95.00	5	380	
E-Mail	Services (27	Year	2.00	360.00	1	720	
Computer, PC Color	Laptop, Pentium	Item	5.00	1,600.00	4	2,000	
Computer, PC & Monitor	133 MHz Pentium (9	Item	17.00	1,000.00	4	4,250	
Computer software	Microsoft Office Pkg (7	Item	21.00	450.00	4	2,363	
Computer software	Statistical packages (6	Item	3.00	600.00	4	450	
Laser Printer	HP LaserJet (6	Item	10.00	500.00	4	1,250	
GIS ARC/INFO	GIS, PC based	Item	2.00	11,500.00	5	4,600	
Plotter	42" (5	Item	1.00	3,000.00	10	300	
Other	Internet Access Service (64	Annual	1.00	1,800.00	1	1,800	
Other	Digitizing tablet 24"x36" (5	Item	1.00	1,500.00	5	300	
Other	Digital projector (11	Item	2.00	4,000.00	8	1,000	
Other	Flatbed Scanner (11	Item	3.00	125.00	5	75	
Other	35 mm transparent scanner (11	Item	2.00	450.00	5	180	
Other	Cell phone (17	Item	6.00	100.00	2	300	
- FIELD EQUIPMENT							60,715
GPS, Rover & Base Unit	GPS - consumer grade (11	Item	3.00	300.00	5	180	
Surveying Equip.	Misc. Equipment (11	Set	1.00	2,400.00	5	480	
Quad Runners, 4WD	Mid-range quality	Item	1.00	4,500.00	8	563	
Vehicle	Small pickup 4wd (11	Item	1.00	16,000.00	8	2,000	
Vehicle	Dump Truck (11	Item	1.00	30,000.00	8	3,750	
Vehicle	15 passenger van (5	Item	2.00	30,000.00	8	7,500	
Vehicle	Tractor+ mower (9	Item	1.00	30,000.00	8	3,750	
Vehicle	Trailer - tandem axel (11	Item	2.00	1,000.00	8	250	
Vehicle	Trailer - single axel (11	Item	1.00	500.00	8	63	
Vehicle	Kayak - plastic (11	Item	8.00	1,000.00	8	1,000	
Vehicle	16' alum. skiff w/trailer (11	Item	1.00	5,000.00	8	625	
Vehicle	18' alum. skiff w/trailer (11	Item	1.00	6,500.00	8	813	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Vehicle	50 hp motor (11	Item	1.00	2,000.00	8	250	
Vehicle	20 hp motor (11	Item	1.00	600.00	8	75	
Vehicle	Maintenance (40	Year	5.00	300.00	1	1,500	
Binoculars	Binoculars 10 X 50 (6	Pair	4.00	300.00	5	240	
Spotting Scope 40X	Scope (6	Item	1.00	500.00	10	50	
Radio, Mobile Unit	VHF (11	Item	12.00	425.00	8	638	
Radio, Mobile Unit	CB radio (11	Item	8.00	100.00	8	100	
Power Tools	Misc. Tools (38	Item	1.00	2,500.00	15	167	
Hip Waders	Waders (6	Item	20.00	65.00	5	260	
Other	Digital Camera (11	Item	3.00	400.00	5	240	
Other	12 KV generator (11	Item	1.00	1,500.00	8	188	
Other	Shovel (6	Item	20.00	20.00	8	50	
Other	Pulaski (6	Item	20.00	35.00	8	88	
Other	Wheelbarrow (6	Item	6.00	100.00	8	75	
Other	Gas brush grinder (11	Item	1.00	500.00	8	63	
Other	Gas leaf blower (11	Item	1.00	150.00	8	19	
Other	Weed cutters (11	Item	6.00	350.00	8	263	
Other	Data collector (39	Item	4.00	6,000.00	3	8,000	
Other	Equip. Maint; Mon. Coord (46	L. Hours	104.00	45.00	1	4,680	
Other	Equip. Maint.; (46	L. Hours	832.00	25.00	1	20,800	
Other	Weather Station replace (11	Item	1.00	10,000.00	5	2,000	
- OPERATIONS							123,295
Contracts	Grant mgt.; Manager (62	L. Hours	104.00	55.00	1	5,720	
Contracts	Grant mgt; Coordinators (62	L. Hours	520.00	45.00	1	23,400	
Contracts	Grant mgt. others (62	L. Hours	208.00	30.00	1	6,240	
Contracts	Grant mgt., Office Mgr (62	L. Hours	832.00	30.00	1	24,960	
Contracts	Grant mgt., Public Service (62	L. Hours	600.00	20.00	1	12,000	
Contracts	Produce grant docs; Off asst	L. Hours	208.00	20.00	1	4,160	
Budgeting	Budget/Audit	L. Hours	146.00	55.00	1	8,030	
Supervisor Site Visit	Site visits	L. Hours	250.00	55.00	1	13,750	
Travel	Mileage (12	Person	13.00	135.00	1	1,755	
Employee Training	Training & Conferences (63	L. Hours	437.00	40.00	1	17,480	
Other	Forest Fire Insurance (1	Item	1.00	5,800.00	1	5,800	
Subtotal						1,458,349	1,458,349
Contingency @ 10%						145,835	
Administration @ 22%						352,920	
Total						1,957,104	

Umatilla National Wildlife Refuge

Property Description

In 1969 the Umatilla National Wildlife Refuge (Refuge) was designated in 1969 as a part of the 50,000-acre Mid-Columbia River National Wildlife Refuge Complex. The 26,715-acre Refuge straddles the Columbia River and is located 5 miles west of the town of Umatilla in Morrow County, Oregon and Benton County, Washington.

The Refuge was established as mitigation for wildlife habitat lost through flooding of natural habitat caused by the construction of the John Day Dam. It is the largest Refuge in the Mid-Columbia Complex of refuges.

The Refuge is divided into six units and includes both Oregon and Washington. Approximately 40 percent of the Refuge is open water (the Columbia River) and 45 percent shrub-steppe habitat. The Refuge is characterized by gently rolling topography and a few steep basalt cliffs along the river on the Washington shoreline. The Washington portion of the Refuge is a narrow strip along the Columbia River. The remaining acreage is a varied mix of slough shallow marsh, cropland and island habitats. The Refuge boundary is not contiguous. The soils are primarily sandy.

The Refuge is heavily used by waterfowl, bald eagles, colonial nesting birds, and other migratory and resident wildlife. Public use on the Refuge is



high with over 100,000 visitors participating in fishing, hunting, hiking, bird and wildlife watching and other outdoor activities. Most of the amenities that accompany these uses (boat launches, campgrounds and day use areas) are located outside the Refuge. However, there are approximately 20 miles of gravel roads and nearly 20 parking lots providing ample public access to the Refuge. Enforcement is a large task with 207 citations issued in 2001, primarily for fishing violations. Crops are grown on 5 percent of the Refuge to provide forage and shelter for birds and wildlife.

Rail lines run adjacent to and occasionally through the Refuge. Trains are the primary cause of wildfires on the Refuge. In the past 10 years there has been an average of 9 wildfires each year, burning an average of 520 acres annually. Highway 84 on the Oregon side and Highway 14 run adjacent and in one case through the Refuge. The Refuge is actually between the east and westbound lanes of Highway 84 in one area. The small town of Irrigon borders the east boundary of the Refuge providing management challenges in the form of trespass and predation and disturbance by domestic pets.

Project Goals

The Refuge is dually governed by the National Wildlife Refuge System Administration Act and the National Wildlife Refuge System Improvement Act. These legislative acts govern the allowed and prohibited uses on the Refuge. In addition the Improvement Act establishes planning requirements for each refuge, and clarifies the standards and process used to regulate recreational and commercial uses. It requires the Secretary of the Interior to ensure that the “biological integrity, diversity and environmental health of the system is maintained for the benefit of present and future generations of Americans.” The Act requires monitoring of the status and trends of wildlife populations in all refuges, discourages nonwildlife-related commercial and recreational activities in refuges, such as jet skiing and boating. Further, it promotes uses that focus on wildlife, such as bird watching, environmental education, hunting and fishing, requires that conservation threats be identified and addressed in individual refuges, and requires that fish and wildlife populations be inventoried during development of plans for individual refuges.

On the Refuge, the goal of Russian olive tree removal is to allow willows and cottonwoods to regenerate, yet leave scattered woodlots throughout the Refuge to provide deer, passerine and other wildlife habitat.

Biological Description

The open water of the Columbia River and shrub-steppe uplands account for 85 percent of the habitat on the Umatilla Refuge. Most of the native vegetation has been severely altered by historical land use such as intensive grazing, burning and cultivation. The majority of the non-irrigated lands are dominated by a grey rabbitbrush-cheatgrass association. In some of the more stable areas bitterbrush, big sage, and Sandberg’s bluegrass are mixed with a lichen and moss layer.

Riparian edges and sloughs are vegetated with bulrush, cattail, cottonwood, willow and exotic trees such as Russian olive and locust. Average rainfall is about 7-8 inches.

Management is working to restore former agricultural fields to shrub-steppe habitat. The shrub layer is absent in much of the site due to prior land use and flooding. Invasive species include Russian olive tree, skeleton weed, tamarisk trees, camelt-horn, purple loosestrife, and yellow starthistle. Control includes burning, spraying, mechanical and hand control and the release of biological agents such as beetles.

There are 33 listed state (both Oregon and Washington) or federally protected species of birds. Bald eagle are the only federally threatened species on the Refuge. Federal species of concern are peregrine falcon, burrowing owl, Oregon vesper sparrow and Lewis’ woodpecker. Several stocks of Chinook and sockeye salmon found in or passing through the Refuge have been listed at threatened or endangered including the Snake River spring/summer and fall Chinook, Upper Columbia River spring-run Chinook, and the Snake River sockeye. The Mid-Columbia River steelhead is federally listed. Bull trout, which are also federally listed as threatened, also use the area. Washington ground squirrels are a Federal Candidate species and are reported to occur in the area. No plant species were reported as federally listed.

Organizational Structure

The Refuge is managed by the U.S. Fish and Wildlife Service. The Refuge is located in two states and two counties and coordinates with and abides by the regulations of each. The main administrative office is located in Washington, about 45 minutes from the Refuge. An onsite refuge manager and maintenance and fire management staff work from a branch office located on the Refuge near Irrigon.

Habitat Management Tasks

According to a Refuge report for fiscal year 2003, there was 14,720 staff hours devoted to Umatilla management. Staff considered this to be a low estimate and suggested that a full-time enforcement officer and one additional maintenance staff be added in the PAR to reflect the true need. This brings the total hours expended to over 18,500. This equals approximately 9 employees with 5 full-time at the Refuge site and the equivalent of 4 full-time employees fulfilling jobs including management, biologists, fire ecologists, administration and clerical.

Over 10,000 hours are spent conducting habitat maintenance, restoration and site maintenance. Approximately 3,500 hours of that time was spent fighting wildfires. Since 1992 there have been 54 wildfires on the Refuge for a total of 5,240 acres burned. This is an average of 5.4 wildfires and 524 acres burned per year.

In 1995 the prescribed burning program was initiated. Nine prescribed fires burned an average of 520 acres per year (not counting the first year when there were only 2). The remaining habitat maintenance hours were divided into other tasks including wetland and upland restoration, mowing, invasive plant management, road grading and conducting prescribed burns.

An average of 600 volunteer hours (10 percent of the entire Refuge complex total) is focused on exotic weed control, hunting management, education and recreation outreach.

Public service was allocated over 3,200 hours, which includes enforcement, patrols, community outreach, and providing visitor services. Administrative duties on the Refuge account for fifteen percent of the total hours spent and include supervisory duties, contracts and contract compliance, budgeting, training, travel, janitorial service, receptionist and office duties.

Conducting biotic surveys accounted for over 350 hours, as did water management tasks such as maintaining water levels and moist soil management. In the winter managers pump water once a week from a nearby hatchery to flood artificial wetlands.

The amount of equipment is extensive and is included to capture replacement costs. Equipment maintenance accounts for over 650 hours.

Interagency coordination accounts for nearly 500 hours and includes contact with other agencies regarding a number of subjects including weed control, mosquito management, enforcement, trail issues and fire. Numerous mutual aid agreements, management coordination and other contracts are maintained with several cities and counties, two states and several national agencies.

Habitat Management Cost Estimates

The total cost of on-going maintenance at the Refuge is just under \$1,194,000. The largest portion of the total is spent on habitat maintenance (\$259,000) and site construction (\$145,000). Field equipment accounts for approximately \$144,000 and public services for \$107,000. Other large costs include operations, office maintenance, water management and general maintenance all with \$40,000 - \$70,000 allocated to each. The Refuge spans the Columbia River and includes management costs for the entire area.

Equipment lists at the Refuge do not track items under \$5,000 unless they are personal equipment like guns and computers. The PAR attempts to account for items under \$5,000 through observation during the site visit and where necessary estimates.

The Refuge has many pieces of large equipment including a fire engine, an airboat and a variety of tractors, backhoes, excavators and trucks. Facilities include several small buildings, housing units, weather stations, filling stations and irrigation equipment. For most of the items, the manager provided replacement costs for equipment and facilities.

The replacement costs were used in the PAR and amortized over an estimated life. For example, the replacement cost for the weather station is \$220,000 and it is estimated that it needs to be replaced every 5 years for an annual average cost of \$44,004.

Because of the high cost of many of the items, the life is very important to the result. In addition to the replacement costs, the PAR also accounted for annual maintenance of the equipment and facilities as labor costs.

The default rates including a 10 percent contingency and a 22 percent administrative rate are part of the calculation.

End Notes

U.S. Fish and Wildlife Service. Annual Narrative Report. Mid-Columbia River National Wildlife Refuge Complex, Pasco, Washington, 2001.

Refuge Comprehensive Accomplishment Report, FY 2003, Umatilla National Wildlife Refuge.

U.S. Fish and Wildlife Service Controlled Property Annual Report. March 3, 2001.

U.S. Fish and Wildlife Service Real Property Inventory. Undated.

Personal Contact with Gary Hagedorn, September 17-18, 2003.

Personal Contact with Dave Linehan, September 17-18, 2003.

Personal contact with Brian Allen, Refuge Manager, September 17-18, 2003.

Umatilla National Wildlife Refuge brochures.

Website for National Wildlife Refuge System Act:

<http://ipl.unm.edu/cwl/fedbook/nwrsact.html>.

Footnotes for PAR

1. PAR default estimate.
2. Provided by site management.
3. Cost estimated by PAR operator.
4. Fencing experiences high maintenance due to vandalism, wind erosion, other. Replacement every 15 yrs. instead of PAR default of 30 yrs. Barbed wire fence costs provided by management varied widely. They were averaged in the PAR.
5. For an existing 1200-acre area. Seasonal flooding for habitat for waterfowl and other migratory birds.
6. Umatilla NWR farms 1400 acres to provide forage for waterfowl, threatened and endangered species and other migratory birds. 90 percent of the acreage is cooperatively farmed.
7. There is an average of 1,000 acres burned on the Refuge on an annual basis. Half are prescribed burns and half are wildfires.
8. Private land activities include 120 acres owned by 2 neighbors where 80% of the effort is spent on wetlands.
9. Education outreach activities include group presentations and special events.
10. Recreation outreach includes media contacts and special events.
11. Approximately fifteen percent (about 2000 hours) of the total staff hours were allocated to administrative costs including supervisory duties, contracts and contract compliance, reporting, budgeting, training, travel, receptionist and office duties.
12. Cost reflects the replacement cost provided by management. The replacement year was estimated by the PAR operator. The PAR calculates the annual cost of the replacement of the item. Labor is assumed in the replacement cost.
13. Staff training, classes, staff meeting were estimated at 30 hrs./yr for 9 employees. Salaries were averaged.
14. Road grading and rock raking was estimated by staff to take approximately 210 hours annually (5 weeks grading @ 6 hrs/day; 2 weeks rock raking @ 6 hrs/day).
15. Umatilla benefits from approximately 600 volunteer hours annually. One hundred twenty hours were distributed into each of the tasks of recreation outreach, education outreach, and visitor services – hunting. The remaining 240 hours was placed in exotic weed control – physical removal. Sixty hours (10 percent of total volunteer hours) was added for the task of volunteer coordination. The Check Station is staffed approximately 23 days per year. Hourly rate is an average of staff wages and volunteer time (estimated worth of \$15/hr.)
16. Update interpretive materials.
17. Concrete block buildings – assume a longer replacement than other buildings.
18. Building has restroom.
19. Both overlooks include concrete handicapped parking, concrete sidewalks, suspended wooden boardwalks and decking. Kathy's Pond includes a wood gazebo.
20. Replacement cost for the road is assumed to be graveling all 20 miles of road. Road width is assumed to be 20 feet. The cost shown is PAR default of \$3/sq. yd. for gravel. Size of the 2 boat launches was estimated at 500 sq. yds. each. Replacement costs provided by management for parking areas, roads and boat launches were considerably higher but they were not used because the areas do not have to be completely rebuilt, just re-graveled occasionally.
21. Cost is estimated and is replacement for existing signs, not the creation of new signs. Signs are replaced every 5 years on average due to UV damage.
22. Square footage is for 2 offices at the Refuge and 1000 square feet of the main office.
23. General maintenance includes installing signs, painting, repairs, lawn mowing, sweeping.
24. Most spraying is conducted by a certified applicator.
25. This is management of artificially controlled wetland units. Native moist soil plants are produced through soil/water manipulation (timed moist soil conditions). This is a separate activity from Water Level Management.
26. Seed is purchased or collected. The figure of 10 lbs. per acre was used and was based on past rehabilitation projects. It was estimated that 1/4 (250 acres) of the total burned area (1000 acres) would be reseeded each year. The price of \$7 a pound reflects a range of \$4 to \$10 a pound provided by staff.
27. Trees and shrubs are planted annually. Number and cost is estimated.
28. Herbicides are used. Amount and cost is estimated.
29. Based on 9 employees.

PAR Budget Table—Umatilla National Wildlife Refuge Annual Average Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							145,138
Road Construction & Repair	Replace gravel-roads (20	Mile	20.62	35,200.00	20	36,291	
Road Construction & Repair	Replace gravel-parking (20	Sq. Yd.	18,160.00	3.00	20	2,724	
Road Construction & Repair	Maint. Rds & parking (14	L. Hours	210.00	22.00	1	4,620	
Fence - Installed	Split-rail, wood 8' (1	Lin. Ft.	240.00	19.00	15	304	
Fence - Installed	Chain Link 8' (4(12	Lin. Ft.	500.00	66.06	15	2,202	
Fence - Installed	Barbwire, 4 strd. (4 (12	Item	295,520.00	5.00	15	98,507	
Gate, Cattle	5' X 12' gate	Item	1.00	695.00	30	23	
Gate	Electronic gates (12	Item	2.00	3,500.00	15	467	
- BIOTIC SURVEYS							10,890
Project Management	Supervise/coordinate (11	L. Hours	170.00	30.00	1	5,100	
Other	Monitor T & E species	L. Hours	20.00	30.00	1	600	
Other	Monitor waterfowl species	L. Hours	153.00	30.00	1	4,590	
Other	Monitor other migratory birds	L. Hours	20.00	30.00	1	600	
- HABITAT MAINTENANCE							259,400
Site Analysis	Field Survey & Report (11	L. Hours	160.00	30.00	1	4,800	
Restoration Plan	Planning & reporting (11	L. Hours	200.00	30.00	1	6,000	
Construction Scheduling	Coordinate w/contractors (11	L. Hours	200.00	30.00	1	6,000	
Seed Procurement	Buy or collect native seed (26	Lb	2,500.00	7.00	1	17,500	
Plant Procurement	Trees, shrubs (27	Item	250.00	5.00	1	1,250	
Brush Management	Grinder/rototiller (12	Item	1.00	28,215.00	10	2,822	
Other	15 ft. cutting arm, rotary (12	Item	1.00	9,622.00	15	642	
Other	Wetland restoration - 80 ac	L. Hours	1,065.00	22.00	1	23,430	
Other	Upland restoration - 160 ac	L. Hours	1,180.00	22.00	1	25,960	
Exotic Plant Control	Herbicide (28	Gal.	50.00	25.00	1	1,250	
Exotic Plant Control	Backpack Spray (24	L. Hours	1,040.00	22.00	1	22,880	
Exotic Plant Control	Mechanical/hand removal (15	L. Hours	745.00	22.00	1	16,390	
Exotic Plant Control	Mow	L. Hours	950.00	22.00	1	20,900	
Controlled Burning	Prescribed burns (7	L. Hours	256.00	22.00	1	5,632	
Mower, Tractor	Rotary mower (12	Item	1.00	12,685.00	10	1,269	
Mower, Tractor	Fisher 135HP (12	Item	1.00	74,800.00	15	4,987	
Mower, Tractor	Caterpillar w/rops (12	Item	1.00	35,914.00	15	2,394	
Mower, Tractor	55 PTO, 2WD, Deere (12	Item	1.00	23,331.00	15	1,555	
Other	Farming (6	L. Hours	248.00	30.00	1	7,440	
Other	Coord. w/contractors (11	L. Hours	150.00	30.00	1	4,500	
Other	Fire Admini/training (11	L. Hours	160.00	30.00	1	4,800	
Other	Wildfire fighting (7	L. Hours	3,500.00	22.00	1	77,000	
- WATER MANAGEMENT							42,662
Water Control	Water Level Management (5	L. Hours	288.00	22.00	1	6,336	
Water Control	Moist Soil Mgt. (25	L. Hours	320.00	22.00	1	7,040	
Water Delivery	Pump, 4 stage w/100hp	Item	2.00	10,105.00	30	674	
Other	Irrigation Supply System	Lin. Ft.	7,130.00	12.35	30	2,935	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Other	Irrigation Pump Plant & System	Item	1.00	440,400.00	30	14,680	
Other	Irrigation Distibution lines	Lin. Ft.	60,000.00	1.65	30	3,300	
Other	Levee Replacement (12	Lin. Ft.	3,740.00	85.37	70	4,561	
Other	H2o control structure-riser	Item	1.00	16,515.00	30	551	
Other	H2o control struct.- diversion	Item	1.00	11,010.00	30	367	
Other	Culvert 36"x40' , gate	Item	1.00	66,547.00	30	2,218	
- PUBLIC SERVICES							107,043
Preserve Office	Replacement - Headqtrs. (12	Sq. Ft.	378.00	81.25	35	878	
Preserve Office	Replace Maint. office (17(18	Sq. Ft.	360.00	260.06	50	1,872	
Other	Bunkhouse (12	Sq. Ft	1,600.00	88.08	35	4,027	
Other	Mobile Home (12	Sq. Ft	938.00	70.95	30	2,218	
Other	Residence (12	Sq. Ft	1,336.00	10.71	35	409	
Other	Residence - Whitcomb (12	Sq. Ft	1,200.00	128.45	35	4,404	
Access Control	Enforcement	L. Hours	1,000.00	22.00	1	22,000	
Patrolling	Patrol	L. Hours	1,000.00	22.00	1	22,000	
Blinds	Hunting blinds (3	Item	29.00	400.00	20	580	
Trail, Asphalt	Overlay (3	Sq. Ft.	109,824.00	0.60	20	3,295	
Sign, Aluminum	Boundary signs 10" X 12" (1	Item	50.00	15.00	5	150	
Sign, Aluminum	Large Directional (21	Item	24.00	40.00	5	192	
Sign, Aluminum	Small regulatory signs (21	Item	50.00	25.00	5	250	
Sign	Interpretive (21	Item	6.00	1,500.00	5	1,800	
Sign	Wooden Entry (21	Item	4.00	150.00	5	120	
Kiosk, Redwood	Public Info Kiosks (21	Item	8.00	1,200.00	5	1,920	
Volunteer Coordinator	Meetings (15	L. Hours	60.00	30.00	1	1,800	
Interpretive Literature	Labor (16,3	L. Hours	30.00	45.00	5	270	
Interpretive Literature	3 Color brochures (3	Item	5,000.00	0.50	1	2,500	
Community Outreach	Education Outreach (9	L. Hours	188.00	30.00	1	5,640	
Community Outreach	Recreation Outreach (10	L. Hours	188.00	30.00	1	5,640	
Other	Bridge - 90 ft. (12	Item	1.00	513,583.00	50	10,272	
Other	Hunter Check Station (17	Sq. Ft	350.00	95.30	50	667	
Other	Overlook - Kathys Pond (19	Item	1.00	35,196.00	25	1,408	
Other	Overlook - Callows (19	Item	1.00	31,056.00	25	1,242	
Other	Boat Launch (20	Sq. Yd.	1,000.00	3.00	20	150	
Other	Visitor Service-hunt (15	L. Hours	286.00	18.00	1	5,148	
Other	Check Station-hunt (15	L. Hours	184.00	18.00	1	3,312	
Other	Visit Service-wildlife (15	L. Hours	80.00	18.00	1	1,440	
Other	Visitor Service-fishing (15	L. Hours	80.00	18.00	1	1,440	
- GENERAL MAINTENANCE							53,990
Toilets, Permanent	Maintenance	Month	12.00	125.00	1	1,500	
Toilets, Permanent	Replacement (vault) (12	Sq. Ft.	500.00	57.97	35	828	
Other	Fuel Tanks (12	Item	2.00	30,838.00	25	2,467	
Other	Garage (12	Sq. Ft.	576.00	66.90	35	1,101	
Other	Grainery (storage) (12	Sq. Ft.	44.00	127.61	35	160	
Other	3 Buildings - sheds (12	Sq. Ft.	158.00	31.65	35	143	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Other	Shed - pump house (17 (12	Sq. Ft.	65.00	85.38	50	111	
Other	Shed - sign/equip. storage (12	Sq. Ft.	720.00	35.55	35	731	
Other	Shed-pesticide storage (17 (12	Sq. Ft.	367.00	84.00	50	617	
Other	Shed - maintenance (12	Sq. Ft.	2,030.00	108.47	35	6,291	
Other	Shed - Quonset w/ shed (12	Sq. Ft.	1,116.00	187.45	35	5,977	
Other	Well, pump, residence (12	Item	1.00	38,535.00	30	1,285	
Other	Well, pump, shop (12	Item	1.00	42,939.00	30	1,431	
Other	Gen. Maint. (3 (23	L. Hours	667.00	22.00	1	14,674	
Other	Maint. Youth Corp. (3 (23	L. Hours	200.00	10.00	1	2,000	
Other	Equip. Maint. (3	L. Hours	667.00	22.00	1	14,674	
- REPORTING							9,330
Annual Reports	Summary	L. Hours	100.00	52.00	1	5,200	
Annual Work Plan	Planning	L. Hours	80.00	30.00	1	2,400	
Maintenance Report	Monthly Reporting	L. Hours	80.00	30.00	12	200	
Management Plan	Ecosystem Planning	L. Hours	135.00	30.00	5	810	
Management Plan	Recreation Planning	L. Hours	90.00	30.00	5	540	
Report Production	Labor	L. Hours	10.00	18.00	1	180	
- OFFICE MAINTENANCE							48,494
Administrative	Operations (11	L. Hours	998.00	18.00	1	17,964	
Preserve Office	Janitorial (1 (22	Sq. Ft.	1,700.00	0.20	1	340	
Utilities, Annual	Elec., Gas, Water (1(22	Sq. Ft.	1,700.00	2.00	1	3,400	
Telephone Charges, Annual	Phone Charges (1(29	Person	9.00	1,200.00	1	10,800	
Insurance, Fire	Wildland fire (3	\$1000 Valu	144.00	0.04	1	6	
Office Supplies, Year	Stationery/envelopes (1(29	Person	9.00	125.00	1	1,125	
Office Supplies, Year	Supplies (1(29	Person	9.00	192.00	1	1,728	
Furniture	Desk (1(29	Item	9.00	250.00	10	225	
Furniture	Chair (1(29	Item	18.00	150.00	5	540	
Furniture	Bookcase, 3'x5' (1(29	Item	9.00	150.00	8	169	
Furniture	File cabinet (1(29	Item	9.00	400.00	10	360	
Copier	Copier, 15-18 ppm (1	Item	1.00	3,833.00	8	479	
Fax Machine	Standard (1	Item	2.00	400.00	5	160	
Telephone	Touch-tone (1(29	Item	9.00	95.00	5	171	
E-Mail	Services (1(29	Year	9.00	360.00	1	3,240	
Computer, PC Color	Laptop, Pentium (1	Item	2.00	2,250.00	4	1,125	
Computer, PC & Monitor	133 MHz Pentium (1(29	Item	5.00	2,100.00	4	2,625	
Computer software	Microsoft Office Pkg (1(29	Item	7.00	450.00	4	788	
Laser Printer	HP LaserJet 5L (1	Item	2.00	500.00	4	250	
GIS ARC/INFO	GIS, PC based (1	Item	1.00	15,000.00	5	3,000	
- FIELD EQUIPMENT							142,630
Quad Runners, 4WD	Mid-range quality (12	Item	3.00	6,500.00	8	2,438	
Vehicle	3/4 ton truck (12	Item	1.00	14,468.00	8	1,809	
Vehicle	Dump truck (3	Item	1.00	30,000.00	25	1,200	
Vehicle	Truck-tank, GMC (12	Item	1.00	49,019.00	8	6,127	
Vehicle	Pickup truck (12	Item	1.00	20,743.00	8	2,593	
Vehicle	Maintenance (1	Year	7.00	300.00	1	2,100	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ON-YEARS	ON-COST	CATEGORY TOTAL
Vehicle	Truck- 6x4 8 cyl, Mack (12	Item	1.00	81,227.00	8	10,153	
Vehicle	Truck, 6x4 8 ton, Ford (12	Item	1.00	64,107.00	8	8,013	
Vehicle	Pickup truck 4x4, Chevy (12	Item	1.00	32,997.00	8	4,125	
Vehicle	Fire truck, 1.5 ton, Ford (12	Item	1.00	89,985.00	10	8,999	
Grader, Purchase	Grader, John Deere (12	Item	1.00	155,892.00	15	10,393	
Grader, Purchase	Backhoe/front end loader (12	Item	1.00	29,988.00	15	1,999	
Other	Excavator (12	Item	1.00	136,470.00	15	9,098	
Other	Fire Weather Station (12	Item	1.00	10,992.00	5	2,198	
Other	Weather Station (12	Item	1.00	220,020.00	5	44,004	
Other	Fire Fill Station (12	Item	1.00	7,764.00	35	222	
Other	Fire Cache (12	Sq. Ft.	1,620.00	54.22	35	2,510	
Other	Backhoe, John Deere (12	Item	1.00	64,674.00	15	4,312	
Other	Crawler, John Deere (12	Item	1.00	229,618.00	15	15,308	
Other	Pistol semi-auto 40 calib. (12	Item	1.00	504.00	10	50	
Other	Shotgun - Remington (12	Item	1.00	300.00	10	30	
Other	12 gauge shotgun (12	Item	1.00	400.00	10	40	
Other	Airboat (12	Item	1.00	21,367.00	15	1,425	
Other	18 ft. boat (12	Item	1.00	11,300.00	15	753	
Other	Trailer 7x18 ft. (12	Item	1.00	6,000.00	15	400	
Other	Trailer x 28' flatbed (12	Item	1.00	7,510.00	15	501	
Other	Gas Engine, 6 cyl (12	Item	1.00	3,000.00	15	200	
Other	Wajax Pumper 250 gal. (12	Item	1.00	8,721.00	15	581	
Other	shop tools (3	Item	1.00	1,500.00	15	100	
Other	14' aluminum boat (3	Item	2.00	3,000.00	15	400	
Other	Canoe (3	Item	4.00	1,500.00	15	400	
Other	Generator (3	Item	1.00	1,500.00	15	100	
Other	Air compressor (3	Item	1.00	750.00	15	50	
- OPERATIONS							70,068
Contracts	Produce contracts (11	L. Hours	80.00	52.00	1	4,160	
Budgeting	Budget & reconcile (11	L. Hours	160.00	52.00	1	8,320	
Supervisor Site Visit	Site visits (11	L. Hours	162.00	52.00	1	8,424	
Travel	Time: 45 min from office (11	L Hours	100.00	30.00	1	3,000	
Employee Training	Classes, mtgs, training(11 (13	L. Hours	270.00	30.00	1	8,100	
Other	Interagency Coord./ Salmon(11	L. Hours	172.00	52.00	1	8,944	
Other	Interagency Coord./Admin (11	L. Hours	100.00	52.00	1	5,200	
Other	Interagcy Coord./Waterfowl (11	L. Hours	69.00	52.00	1	3,588	
Other	Interagcy Coord./T & E spp.(11	L. Hours	103.00	52.00	1	5,356	
Other	Tribal Coordination (11	L. Hours	48.00	52.00	1	2,496	
Other	Private Land Activities (8	L. Hours	416.00	30.00	1	12,480	
Subtotal						889,645	889,645
Contingency @ 10%						88,965	
Administration @ 22%						215,294	
Total						1,193,903	

Weathers' Wetland Mitigation Bank Site

Property Description

The Weathers' Wetland Mitigation Bank site (the Bank Site) is located north of Keizer, Oregon, approximately two miles west of Interstate 5 and two miles east of the Willamette River. The Bank Site consists of a rectangular-shaped 13.69 acres of restored and created wetland.

The location of the Bank Site is ideal hydrologically. The entire site is within either the 100 or 500-year floodway. Some of the site is converted croplands, which were drained in the past by field tiling of the adjacent lands and agricultural use. The tiles have since been removed. Natural seeps, springs, and high groundwater levels surround the area and no artificial water management is required with the exception of a ditch adjacent to the Bank Site that drains agricultural runoff away from the site. There is a concrete spillway on the Hubbard Lake side for high water to prevent flooding on adjacent property. However, in normal years, the water is retained onsite.

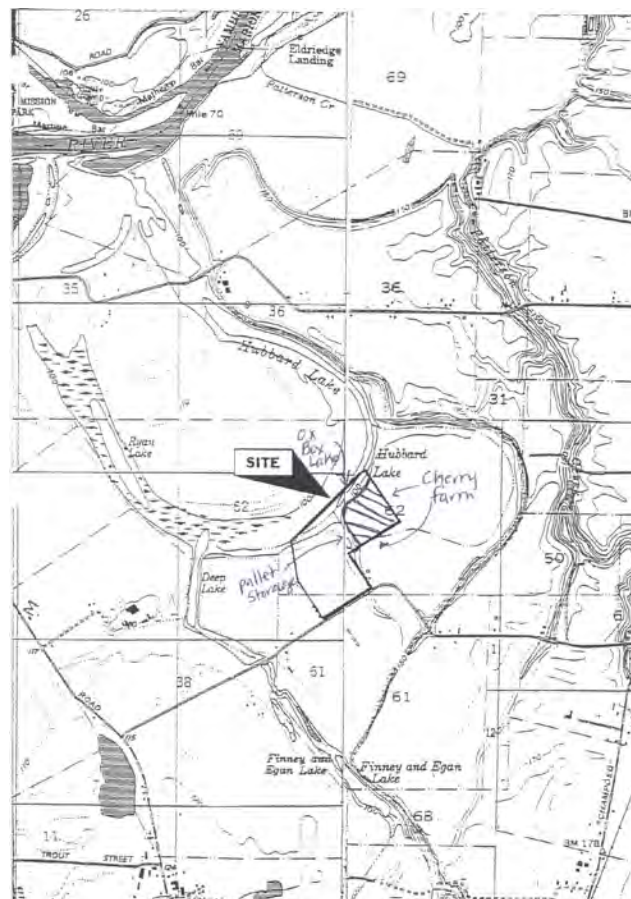
One goal of the Bank Site was to create habitat for the western pond turtle. This resulted in hummocks throughout the site and a south-facing bank site of the type of soils the turtle prefer. No monitoring has been conducted to determine if the turtles are using the site.

The Bank Site is located within a large, privately owned hop and cherry farming operation. The location is within an agricultural area that is zoned EFU (Exclusive Farm Use), as are all of the adjacent properties. The zoning and comprehensive plans for this area provide for the necessary buffer and long term hydrologic protection.

A maraschino cherry farming operation surrounds the Bank Site on two sides, a hazelnut orchard on one side and a 22-acre oxbow lake on the fourth side. The lake is an old oxbow of the Willamette River and is separated from the Bank Site by a dike with a road on it. For the most part, the orchards and a pallet storage area immediately abut the

site. However, a ditch to prevent runoff from the orchard into the Bank Site separates the site from one of the orchards. Another side has a silt fence along it, to prevent orchard erosion from entering the Bank Site. Topographically, this side of the farm is about 2-3 feet higher than the Bank Site. There is some concern about impacts to the Bank Site from the cherry farming and processing which involves the use of chemicals.

Although there are no "no trespassing" signs because public use is not expected. The site is not signed or fenced (with the exception of a silt fence along one side.) Although hunting is an allowed use, the area is very small and due to its location



on the interior of a large parcel of private property, this use is anticipated to be very low.

Project Goals

The primary goal of the Bank Site is to restore seasonally flooded wetlands. This was accomplished by excavating to create ponding during the wet season, which becomes a seasonally flooded meandering swale as the wet season dissipates. Ultimately, the upper areas and around the perimeter of the Bank Site will be a mixture of saturated wet meadow, palustrine scrub/shrub, and palustrine forested wetland.

The swale area will be a palustrine emergent seasonally flooded wetland. The seasonal ponded area will be a palustrine emergent seasonally flooded wetland. This goal will provide intact hydrologic control; an increase in water quality and wildlife habitat; and enhanced aesthetics, functions, and values similar to those found at the reference site.

The over story and scrub/shrub layer was initially planted to meet or exceed 90 percent of the species richness of the reference site (excluding exotic or noxious species). There was also a performance standard for the herbaceous layer. No more than 15 percent of individuals will be noxious, undesirable species.

Biological Description

The Bank Site is located in a large section of the Willamette River flood plain known as Mission Bottom. Mission Bottom is characterized by low gradient streams with large variations in flow, many oxbow lakes and meander scars, and abandoned stream channels that contain water only seasonally.

All surface water derived from precipitation is captured within the swale and ponded areas, at depths that intercept groundwater flows during periods of high water tables. The hydric soils maintain the hydrology for a significant period of time to support the wetland plants prescribed for these areas.

Hubbard Lake, which borders the northern portion of the Bank Site, is a 22-acre natural oxbow lake in a former meander scar of the Willamette River. Hubbard Lake and its associated undeveloped margins provide a variety of wildlife habitat. It is part of an extensive wildlife corridor extending southwestward over one and one-half miles to the Willamette River.

Species utilizing the site include mink, muskrat, raccoon, skunk, opossum, black tailed deer, cottontail rabbit, red-tailed fox, coyote, various voles, shrews and mice, river otter, beaver, nutria, turtles, Canada geese, osprey, great blue heron, turkey vulture, ring-neck pheasants, various resident and migratory songbirds, waterfowl and raptors. Hubbard Lake and its associated lowlands connect to two other open water lakes, Ryan and Deep Lakes. This entire oxbow system provides for a wide variety of wildlife habitat and travel corridors.

Reed canary grass is the non-native invasive weed that management is focused upon. It is currently found in patches interspersed across the site.

There are no listed protected species on the Weather's Mitigation Bank Site. There is created habitat for the western pond turtle, a globally listed species and state species of concern. It is unknown if the turtles are using the habitat.

Organizational Structure

The Bank Site was originated by a landowner who has since sold the bank property and the surrounding farmland. The old owner will hold the bank property until all the credits have been sold and then turn the bank property over to the new owner. The new owner will continue farming and, at this time appears to have a thriving cherry farming business.

While the Bank Site is active, the old owner, new owner, a hired consulting firm and the Division of State Lands are all actively involved in management of the site. Within the next 10-15 years all of the credits for the Bank Site will be sold. Five years after the final credits are sold, there will be a thorough monitoring and then, no additional monitoring is legally required. Although the Bank Site will be protected in perpetuity through a conservation easement, it is unclear if there will be any oversight of the easement.

Habitat Management Tasks

For this exercise, the PAR has been calculated to ensure site protection and that goals will be met in perpetuity. Therefore the tasks shown are similar to what is being done now on the site and includes future monitoring and supervisory site visits. It should be noted that this work is not actually required after the final monitoring of the site occurs which is five years after the final credits have been sold.

Because this site is quite small, easy to access, and relatively uncomplicated, only about 100 hours per year are needed to protect and maintain the Bank Site. The bulk of the hours (40) are spent conducting tasks related to habitat maintenance primarily focused on removing non-native invasive weeds, reseeding areas and maintaining the silt fence. Time spent traveling to the site amounts to approximately 20 hours and 16 hours are allocated to community outreach including setting up meetings and coordination. Annual monitoring is expected to take 16 hours including report writing.

Habitat Management Cost Estimates

On-going maintenance of the Bank Site is valued at about \$5,000. Approximately 5 percent of one FTE is what is necessary to maintain and protect the Bank Site, recognizing that the time is spread across a number of individuals with different types of expertise. Accordingly, office and field equipment was calculated at a rate of 5 percent.

Salaries used are PAR default.

At about \$250 each, mileage to the site and the replacement of the silt fence every 5 years were the two highest costs other than labor.

There are two levels of management for this project. The owner of the bank and ultimately the owner of the land is expected to provide onsite management. In addition, the holder of the conservation easement will provide compliance checks and reporting. Assuming that management of the site is expected to occur in the long-term, an endowment is included. An audit and time for managing the investment of the endowment is, therefore, a task of the operation. Liability insurance is a standard cost for a nonpublic owner. A contingency rate of 10 percent is also included. The administrative rate is lower than typical because there is no organization behind the managing entity at 12 percent.

End Notes

Update to the 2000 Annual Monitoring Report, Memo to Weathers Mitigation Bank Site Team Members, from Carla Cudmore and Pat Thompson, June 2001.

Personal communication with Pat Thompson, November 19, 2003.

Weather's Mitigation Bank Site Management Plan, Ridgeline Resource Planning and Patrick S. Thompson, July 1998, updated January 2002.

2002 Annual Monitoring Report, Weather's Wetland Mitigation Bank Site, Patrick S. Thompson Consulting, Ridgeline Resource Planning, December 2002.

Footnotes in PAR

1. Cost is PAR default.
2. Cost is estimated.
3. Annual monitoring to ensure site goals continue to be met. Includes one site visit and a report.
4. Estimated that 4 short site visits per year are necessary to ensure site is protected and maintained (silt fence is maintained, no encroachment etc.)
5. Current supervisors and biologists live several hours from site. Future staff may live closer, so cost is an estimate.
6. Coordinating supervisor site visits; discussions with the landowner, regulatory agencies, conservation easement holder and others; coordinating and attending tours. This accounts for everyone's time (landowner, contractor, easement holder, etc.)
7. Silt fence lines one side of the Bank Site. Heavy erosion will require frequent, regular maintenance during the year and replacement every 5 years. Replacement cost includes stakes and labor.
8. Currently about 10 lbs. of seed is spread by tractor annually. Managers anticipate that the site will be self-sustaining. However, 10 lbs. of seed is included for use every 5 years for on-going maintenance. Cost of \$18 per pound was provided by manager. It is considerably lower than the PAR default cost of \$85 lb.
9. Currently staff spends 64 hours per year weeding. This number is reduced for on-going maintenance because the site is surrounded by agricultural farming where weeds are controlled, reducing new seed sources. Both spraying and hand control are used.
10. There is 500-foot ditch with 4 small check dams adjacent to the Bank Site. Maintenance is expected to be necessary only every 25 years. Cost includes 1/2 day of a backhoe and operator and 1/2 day of a dump truck. It is assumed that the soil would be used on adjacent farmland, so no dump fees were assessed.
11. Monitoring supplies and equipment including stakes and flagging. All the supplies are used and are replaced every 5 years.
12. Field and office equipment are only used 5 percent of the time to work on the Bank Site, so only .05 of an item was allocated to the Bank Site.

PAR Budget Table—Weather's Wetland Mitigation Bank Site Average Annual Ongoing Costs

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
- ACQUISITION							
- SITE CONSTRUCTION/ MAINT.							
- BIOTIC SURVEYS							720
Wetland Specialist	Monitor site & write report (3	L. Hours	16.00	45.00	1	720	
- HABITAT RESTORATION							
- HABITAT MAINTENANCE							1,070
Erosion Control	Silt Fence maint. (1,7	L. Hours.	8.00	22.00	1	176	
Erosion Control	Silt Fence replacement (1,7	Lin. Ft.	1,300.00	1.00	5	260	
Seed Procurement	Native seed (8	Lb	10.00	18.00	5	36	
Seeding	Tractor (8	L. Hours	3.00	30.00	5	18	
Exotic Plant Control	Hand Removal/spray (9	L. Hours	30.00	15.00	1	450	
Exotic Plant Control	Herbicide - Rodeo	Gal.	1.00	30.00	1	30	
Mower, Tractor	W/attachments (12	Item	0.05	30,000.00	15	100	
- WATER MANAGEMENT							24
Channel Dredging	Dredge ditch (2,10	L. Hours	8.00	75.00	25	24	
- PUBLIC SERVICES							720
Community Outreach	Meetings/tours/coord (6	L. Hours	16.00	45.00	1	720	
- GENERAL MAINTENANCE							
- REPORTING							90
Annual Reports	Summary	L. Hours	2.00	45.00	1	90	
- OFFICE MAINTENANCE							169
Telephone Charges, Annual	Phone Charges (1,12)	Person	0.05	1,200.00	1	60	
Office Supplies, Year	Stationery/envelopes (1,12)	Person	0.05	125.00	1	6	
Office Supplies, Year	Supplies (1,12)	Person	0.05	192.00	1	10	
Furniture	Desk (1,12)	Item	0.05	250.00	10	1	
Furniture	Chair (1,12)	Item	0.05	150.00	5	2	
Furniture	Bookcase (1,12)	Item	0.05	150.00	8	1	
Furniture	File cabinet (1, 12)	Item	0.05	400.00	10	2	
Copier	Copier (1,12)	Item	0.05	3,833.00	8	24	
Fax Machine	Standard (1,12)	Item	0.05	400.00	5	4	
Telephone	Touch-tone (1, 12)	Item	0.05	95.00	5	1	
E-Mail	Services (1, 12)	Year	0.05	360.00	1	18	
Voice Mail	Voice Mail, Annual (1,12)	Item	0.05	250.00	5	3	
Computer, PC & Monitor	133 MHz Pentium (1,12)	Item	0.05	2,100.00	4	26	
Computer software	Microsoft Office Pkg (1,12)	Item	0.05	450.00	4	6	
Laser Printer	HP LaserJet (1,12)	Item	0.05	500.00	4	6	
- FIELD EQUIPMENT							27
Surveying Equip.	Monitoring equip. (11	Set	1.00	100.00	5	20	
Camera 35mm/lens	Digital	Item	0.05	400.00	5	4	
Chemical Sprayer	5 Gallon, Classic	Item	0.15	107.00	5	3	
- OPERATIONS							
Supervisor Site Visit	Site visits (4	L. Hours	8.00	45.00	1	360	1,205
Travel	Mileage (5	Miles	600.00	0.39	1	234	

CATEGORY	SPECIFICATION	UNIT	UNITCOUNT	UNITCOST	ONYEARS	ONCOST	CATEGORY TOTAL
Travel	Travel time for site visits (5	L. Hours	12.00	45.00	1	540	
Audit	CPA Audit	Acre	14.00	0.25	1	4	
Endowment	Process endowment	L. Hours	2.00	30.00	1	60	
Insurance	Liability/Fee	Acres	14.00	0.55	1	8	
Subtotal						4,026	4,026
Contingency @ 10%						403	
Administration @ 10%						531	
Total						4,959	