

REVIEW AND APPROVALS
FISH SPRINGS NATIONAL WILDLIFE REFUGE
Dugway, Utah

ANNUAL NARRATIVE
CALENDAR YEAR 2005

Refuge Manager Jay Banta Date 03-29-06
Refuge Supervisor Review Steve Berendse Date 4/14/06
Regional Office Approval Richard A. Coleman Date 4/17/06

INTRODUCTION

Fish Springs National Wildlife Refuge was established in 1959 at the southern end of the Great Salt Lake Desert in western Utah. It encompasses 17,992 acres between two small mountain ranges. The refuge is located in Juab County, 78 miles northwest of Delta and 105 miles west and south of Tooele. Postal and commissary services are available at Dugway Proving Ground, a military base, 61 miles northeast of the Refuge.

There is evidence of continued Indian use of the area before the 19th century. Jedediah Smith visited the area in 1827. The Central Overland Stage, Pony Express, trans-continental telegraph and Lincoln Highway followed within one hundred years and left their marks within the present Refuge boundary.

The Refuge was established primarily to provide waterfowl nesting, wintering and migratory habitat in the Pacific Flyway. However, the Refuge is also important for other species of marsh birds, raptors and passerines, with 250 species being recorded since the Refuge was established. Many species of mammals native to the Great Basin also reside here or utilize the Refuge on a seasonal basis. The Utah Chub and speckled dace are the only native fish, and they are apparently responsible for the name of the area.

Five major springs and several lesser springs and seeps flow from the base of the eastern front of the Fish Springs Range. These warm, saline springs provide virtually all of the water for the 10,000 acre marsh system. The springs flow eastward into the marshlands and then east and northeast into the desert.

The development of nine shallow water impoundments was completed in 1964. The area contains approximately 8,905 acres of saline marsh, 7,084 acres of mud and alkali flats, and 2,003 acres of semi-desert uplands. At optimum water levels, there is approximately 3,500 surface acres of water in a complex of pools, sloughs, and springs. The saline and alkaline soils support relatively few species of plants. Vegetation in the marsh is primarily Olney's three-square saltgrass, alkali bulrush, hard-stem bulrush, wirerush, and saltgrass. Widgeongrass, muskgrass, and coontail are common in the springs and ditches. The upland area supports saltgrass, horsebrush, and shadscale.

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A. HIGHLIGHTS

- ROS Carpenter receives Federal Law Enforcement Commission in February (H17).
- Archaeology crew from University of Wyoming investigates Barn Owl Cave (D5).
- Carpenter and MW Wright receive their 10-year government service certificates (E9).
- ASA Sims became a member of the first Administrative Council (E9).
- Deborah Hughes was extended as a GS04 for another year as a STEP hire (E1).
- Former FWS Director Lynn Greenwalt makes a visit to the refuge in March (E9).
- Volunteers accrue 441.5 hours in May (E4).
- New phone building installed at entrance to refuge in May (
- Sandhill cranes documented nesting on the refuge (G7).
- Scientist from Uzbekistan visit refuge in June (H6).
- Refuge gets new piece of equipment in August (I4).
- New water control structure completed in August (I1).
- Carpenter participates in Hurricane Katrina LE detail in September (H17).
- High levels of mercury found in shovelers and golden eyes in Great Salt Lake (G3).
- Refuge gets new generator installed in October (I4).
- Fish screens installed in Curlew Unit for Least Chub study (G11).

B. Climatic Conditions

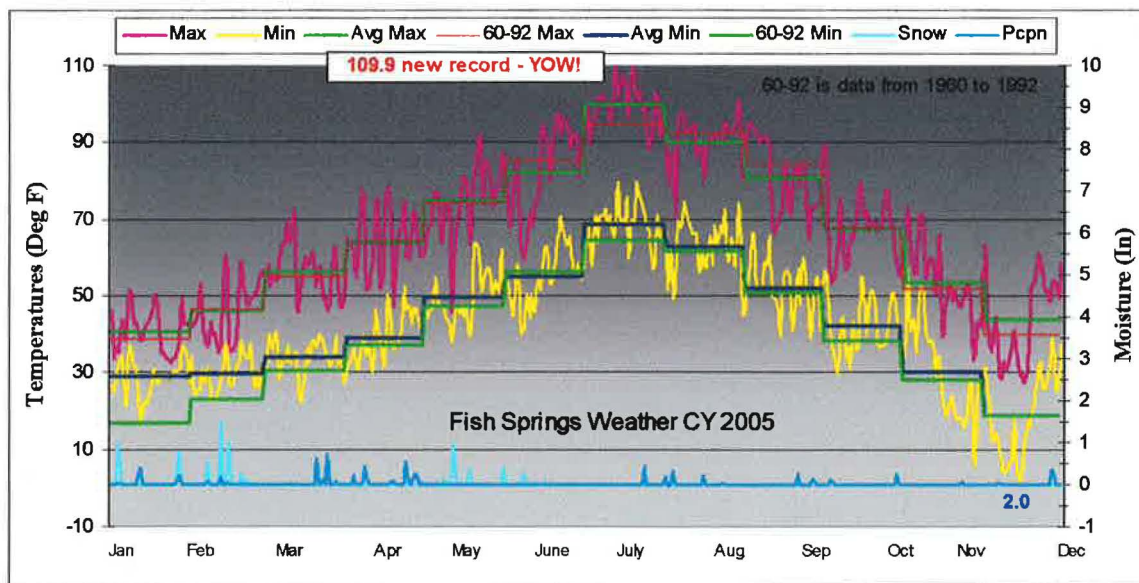


Fig. 1. Weather chart.

CY 2005 started out with a wet spring but fall was below normal. Summer temperatures were cooler than normal with the exception of 2 weeks in July when we had a new hot record of 109.9! The first half of December was very cold and the ponds froze up but we had to kiss our ice goodbye with warm weather at the end of the month. Overall we were 4 degrees below normal in December.

D. PLANNING

2. Management Plan

The Habitat Annual Work Plan was completed by refuge staff in February and sent to the Regional Office for approval.

The Chronic Wasting Disease (CWD) plan was completed in March and sent to the Regional Office.

4. Compliance with Environmental and Cultural Resource Mandates

RM Banta attended a pre-construction meeting in Nephi on March 22 for the Beehive fiber-optic cable project. He re-emphasized right-of-way restrictions and

the need to get a special use permit and to review compatibility stipulations prior to work commencing on the Refuge

Mike George, an Environmental Scientist with the Utah Division of Water Quality, visited the Refuge on July 7th to discuss our need to prepare a storm water discharge permit application the Refuge Landfill. After visiting the landfill and seeing the fact that a storm water discharge was virtually impossible due to the depth of the landfill and the protective berm that is around it, he recommended waiting for further guidance before preparing an application.

5. Research and Investigations

A Special-Use-Permit was issued to Dr. Marcel Kornfeld from the University of Wyoming to conduct investigations in the Barn Owl and Fish Springs Caves on the refuge.

Dr. Kornfeld and several of his graduate students are investigating the potential at the cave for a full-scale investigation. Finds of note during his visit were two different sections of projectile point shafts, one of wood and one of phragmites.

Juab County Mosquito Control collected samples from traps set on the refuge in August. The mosquitoes will be sampled for species and viruses present. A special-use-permit was prepared and signed by the county representative.

A biologist from the Entrix Company came to Fish Springs on November 2nd to collect water and biological data from the refuge. The company is involved in the NEPA process for the Las Vegas Water Project.

6. Other

Maintenance Worker Rodney Wright was brought back Feb 21, one week earlier than was originally planned. This is to get a good start on water control structures.

All permanent staff were provided with new performance standard and performance plans during the month.

All staff received a memo during the month that outline the FWS leave policy and the step-down Refuge leave policy.

Banta attended a meeting to discuss strategy for countering the efforts by the Southern Nevada Water groundwater project at the Cecil Garland Ranch on July 12. In attendance was Ed Firmage, a Professor Emeritus of the University of Utah Law

School and one of the well know "MX Missile Warriors" from the early 80's. Suggestions included creating a website and gaining increased support of several of the religious groups within the state.

The annual narrative for 2004 was completed and turned into RS Steve Berendzen in May.

E. ADMINISTRATION



Fig.2. Fish Springs NWR staff photo.
Back row E,D,C
Front row B, F, A

1. Personnel

A. Jay Banta	Refuge Manager, GS-12 PFT	(EOD 3-91)
B. Travis Carpenter	Refuge Operations Specialist, GS-11 PFT	(EOD 2-04)
C. Bret J. Layland	Maintenance Worker, WG-9 PFT	(EOD 2-90)
D. Robert Sims	Administrative Officer, GS-7 PFT	(EOD 5-00)
E. Rod Wright	Maintenance Worker, WG-8	(EOD-4-94)
F. Deborah Hughes	Biological Science Technician, GS-4 T*	(EOD 4-04)

Deborah Hughes was extended as a GS04 for another year as a STEP hire in March.

Dan Brown finished his work as a STEP hire at Fish Springs in March.

Hughes resigned on August 18th for a position with the Wyoming state wildlife agency.

Banta and Wright received step increases. Wage grade employees Layland and Wright received COLA increases.

Rod Wright went to Non-pay status for his annual furlough on November 23rd.

4. Program

Volunteer Bob Foster from Salt Lake City, UT arrived at the refuge on April 24th. Bob brought his own equipment to scan refuge photographs for archiving purposes. Bob contributed 12 hours of volunteer time to the refuge. Bob saw our volunteer needs on the Refuge web site.



Fig.3 Volunteer Foster works on scanning refuge photographs.



Fig.4 Volunteer Layland assists with mailing the goose permits.

Volunteers' Joe Jarvis, Zach Jarvis, and Joseph Seamons worked on two projects (noxious weeds and kiosk rehabilitation) on the refuge totaling 62 hours in July.

May was a busy month for volunteers at Fish Springs. Total hours for the month were 441.5 with the majority being accrued in the bird banding program.

Table 1. Volunteer hours for 2005.

Group	Hours
Bird Banders	389.5
Migratory Bird Day	52
Total	441.5

A tourist from Philadelphia visited the Refuge and volunteered to provide us with digital photos he took while here.

Only three people turned out from the Salt Lake chapter of the Audubon Society on September 17th. The group sanded and painted several refuge signs that day which was greatly appreciated by the staff.

Dana Layland assisted AO Sims with preparing the goose draw permits so they could be mailed on time. She also assisted with clean up at the office in October.



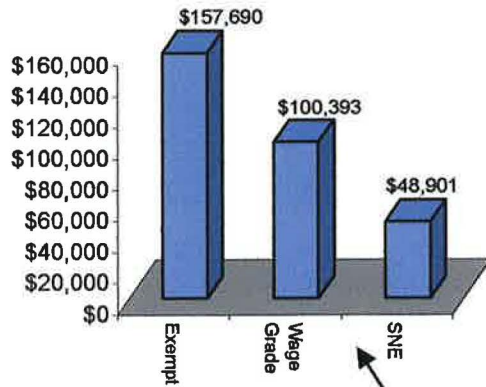
Volunteers working on kiosk rehabilitation

5. Funding

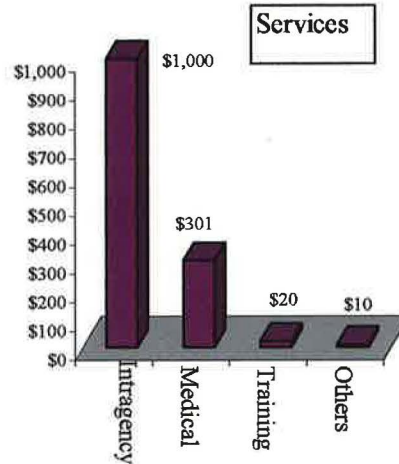
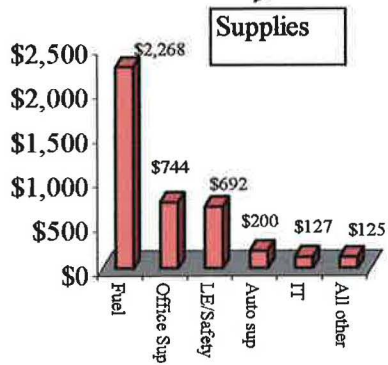
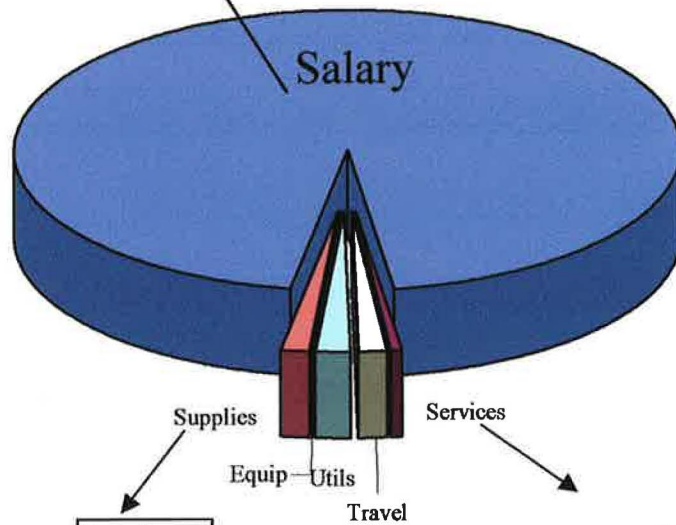
This year we have gone to the 5 sub-activities for RONS. Fish Springs has 3 of the 5. GS Salaries are divided between 1261-Wildlife Habitat and 1263-Edc/Visitor Services. Maintenance WG salaries has gone to 1262MAIN instead of 12610000

We have no actual funding but here is the preliminary salary and benefits. These should be what we get. Annual maintenance has a 1.5% recession at this time which gives us \$41,500.

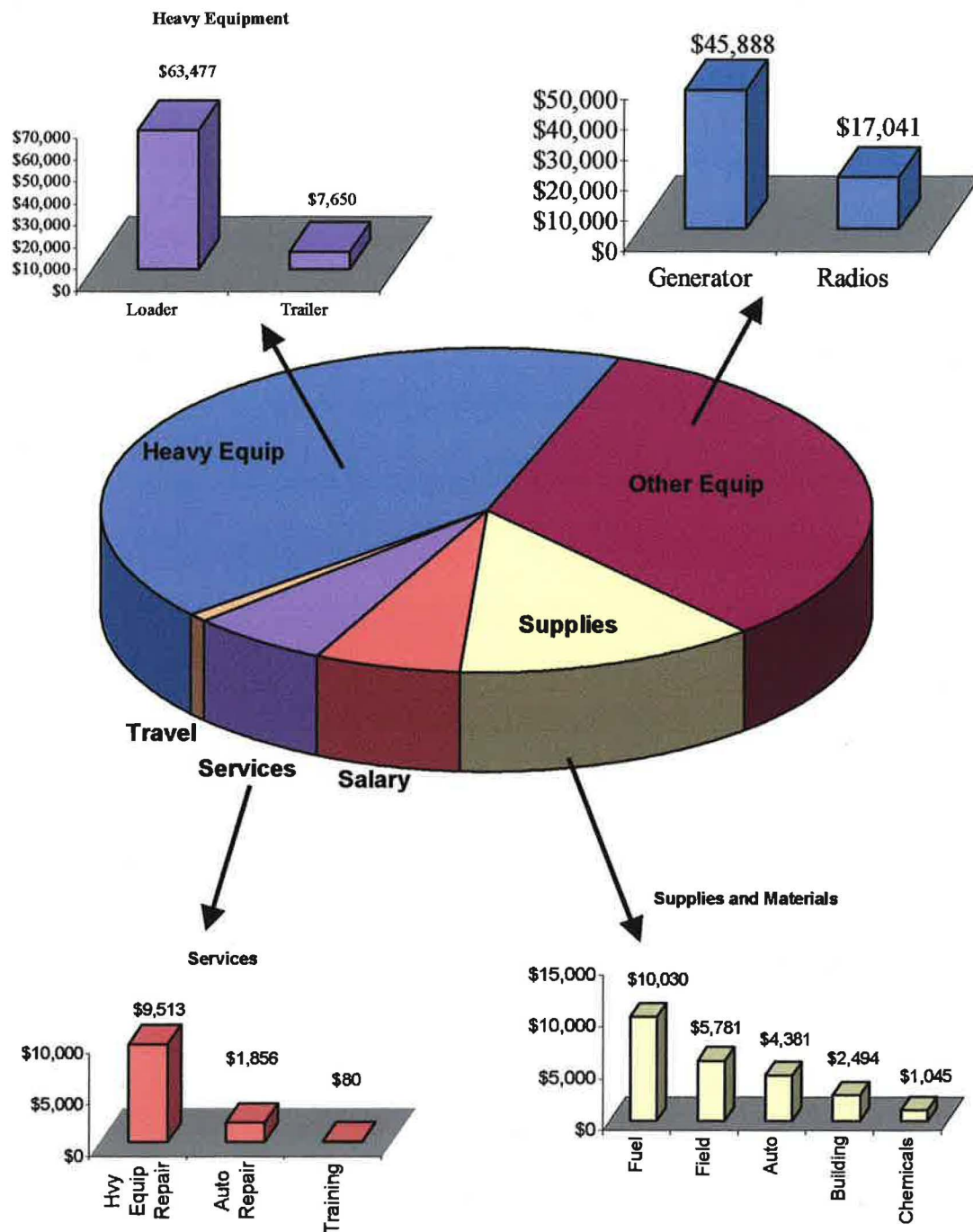
Salary, Benefits and compensations



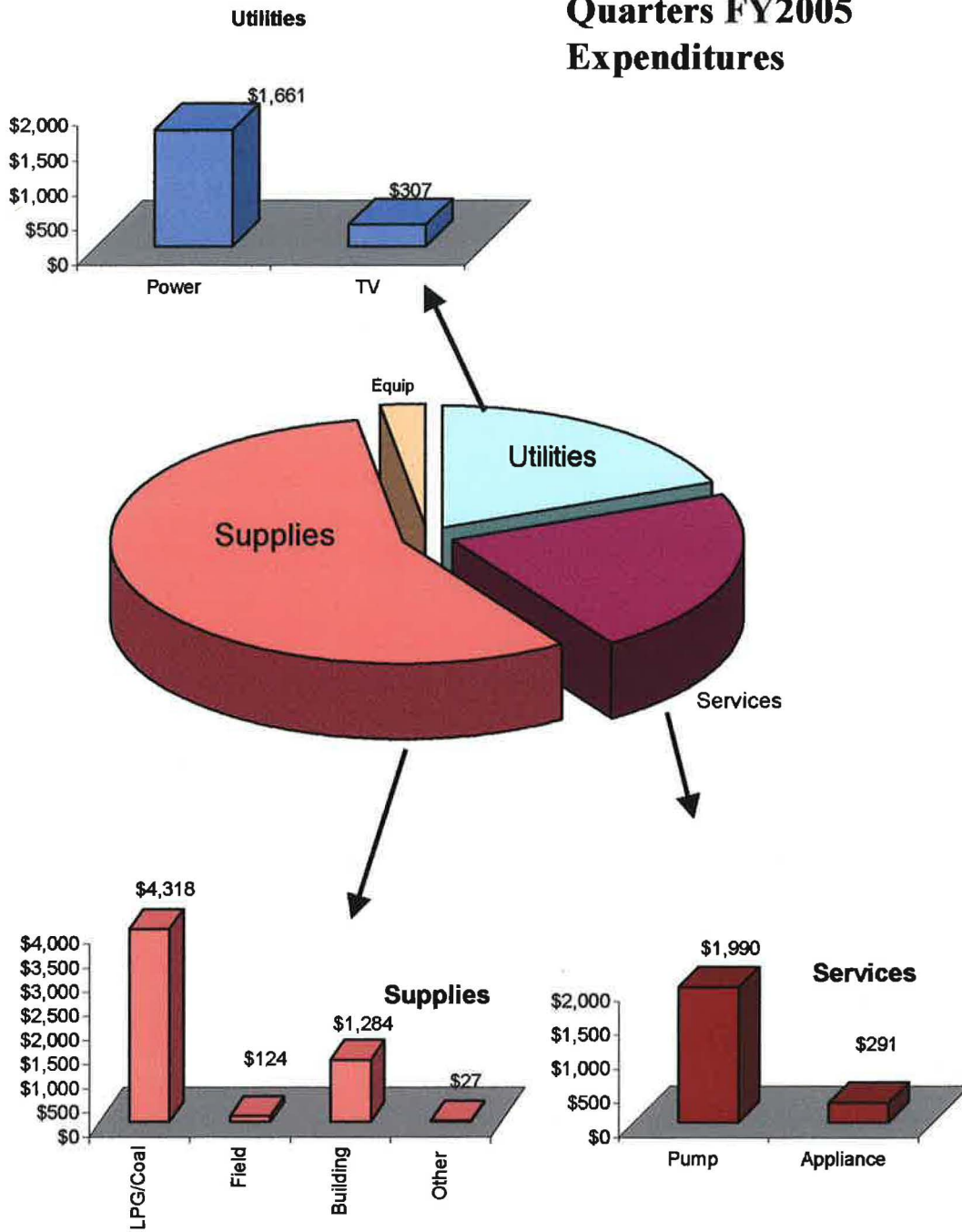
Refuge Operating Needs
(RONS) FY2005
Expenditures



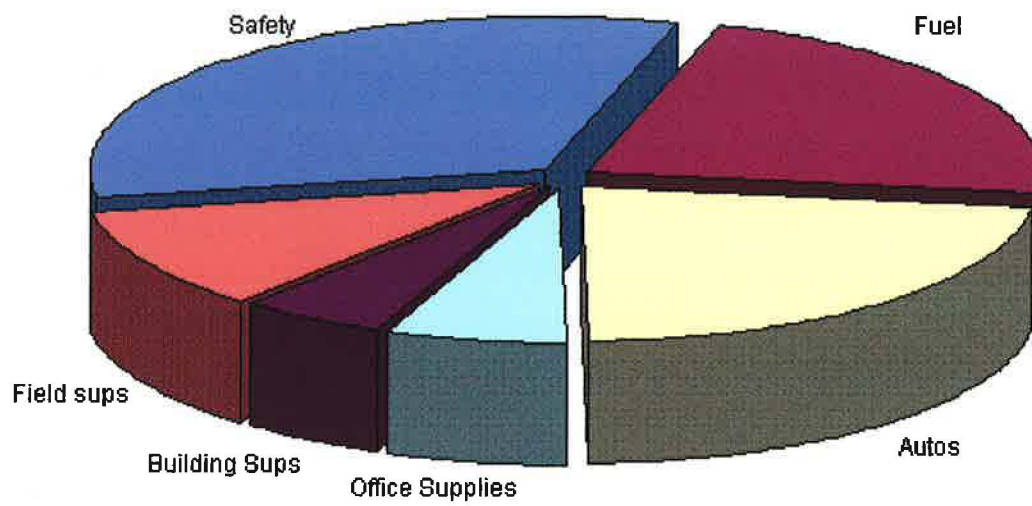
Annual Maintenance FY2005 Expenditures



Quarters FY2005 Expenditures



Fire Preparedness FY2005 Expenditures



6. Safety

The Refuge's quarters were tested for lead paint by contracting company from Provo, UT. All quarters had traces of lead on the eaves, some had lead on inside door jambs and window sills.

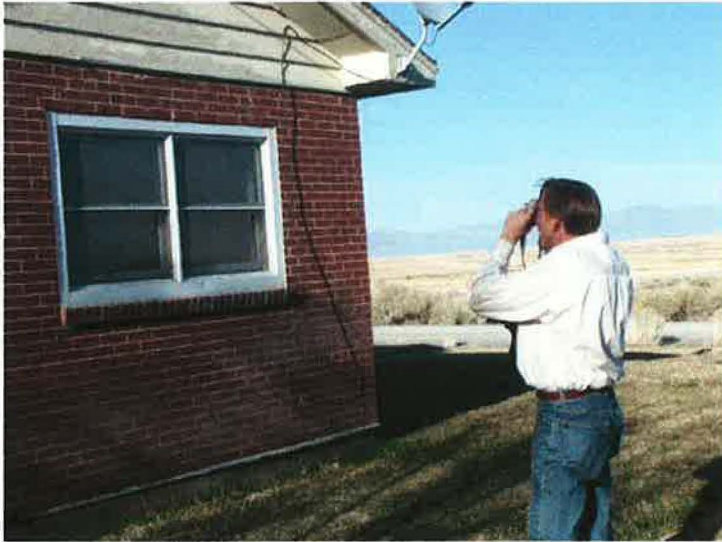


Fig.5 Contractor conducting lead survey on residential quarters.

Hughes suffered a laceration on her left fore arm in July. She was cleaning the shop when a roll of tin fell from the top of a locker and struck her. She was taken to the emergency room in Delta by ASA Sims where she received many stitches. Over 30 man-hours were lost due to this accident.

The refuge's Occupant Emergency Plan was updated in December and given to all staff.

7. Technical Assistance

Dave Allen, a Hydrologic Technician with the USGS, visited the Refuge on May 4th and toured major Refuge springs with Banta. The USGS has an interest in monitoring at least one major spring on the Refuge in conjunction with the proposed groundwater withdrawal project in Nevada.

Cory Angeroth and Dave Allen of the Salt Lake USGS office were on the Refuge on Sept. 14th & 15th installing flow monitoring station on North and South Springs. Based on data they gather during this trip and on previous visit by Dave, we have determined that some of our flume measurement have a larger than desirable margin of error when calibrated against USGS reading. Cory indicated that they would be willing to provide us onsite technical guidance on re-setting flume or correcting inflow issue to get our flume in line with their measurements.

8. Training/Miscellaneous

Banta attended law enforcement refresher training at Marana, AZ from March 9-14. While there he successfully completed the arduous fire pack testing.

Layland and Wright attended the annual Maintenance Workshop held from March 15-18 in Las Vegas, NV.

Sims attended the Administrative Workshop at the Regional Office in April. This was the first Workshop since 2002. The workshop was mostly work with little play. Three and a half days of intensive training were involved with after hour speakers and meetings. The workshop committee came early to make coffee and stayed late to clean up. Sims along with the other workshop committee members was recognized for his work on making this all happen.

Carpenter attended SAMMS training in Jackson, Wyoming at the National Elk Refuge on April 10th-15th.

Banta and Carpenter attended the Project Leader meeting in Rapid City, South Dakota on April 25th-29th.

The staff completed the DOI Discrimination and Whistle blowing web-based training.

Layland had his CDL renewed during May.

Banta and Carpenter attended the Refuge Annual Performance Plan (RAPP) training in the Regional Office on August 24th- 26th. It was not time particularly well spent and the logistic involved with computer support and space at the training site were pretty damn poor.

9. Other

Sims volunteered to assist with the upcoming Administrative Workshop. He worked on IT issues to determine needs and coordinate training. He also assisted in all scheduling and consulted on goodie bag items.

Sims also volunteered for the newly formed Administrative Council. This is the first Admin Council and the 9 members will be setting the foundation for future years. They're first face to face meeting was held at the Regional Office in October. While there they developed three different Business Unit models for administrative functions within the region. These business units will be required for all the USFWS Refuges and possibly other departments as well.

Carpenter and Wright receive their 10-year government service certificates.



Fig.6 Carpenter with 10-year shingle and pin.

Banta and Carpenter attended the Change-Of-Command Ceremony at the Dugway Proving Ground on July 13. Out-going Commander Col. Gary Harter was succeeded by Col Greg Olsen.

Sims attended the first conference call for the Administrative council of which he is part.

On July 27, Banta participated in the first conference call of the recently established Regional Communications Team. This team was formed after two consecutive Regional customer service surveys identified a need to have better communication in both directions between the field and the RO.

Banta attended the National Lincoln Highway Conference in Ely, NV from June 7-11.

Banta participated in a conference call with several USFWS staffers and biological staff from the Southern Nevada Water Authority in preparation for the upcoming Biological Technical Team meeting for the Nevada groundwater withdrawal project in May.

Sims attended the first meeting of the newly formed Administrative council in October at the regional office. While there the council put together 3 model Business Units and addressed concerns put forth by the admin personnel in the region.



Fig.7. Lynn Greenwalt and Jay Banta pose for a picture.

Lynn Greenwalt and some of his family visited the Refuge.

Lynn (now retired) was the first manager and the mastermind who took a large wetland and created Fish Springs NWR. His continued service led him to become the Director of the Fish and Wildlife Service.

F. HABITAT MANAGEMENT

1. General

Fish Springs NWR is characterized by an extensive saline marsh system amid the Great Basin desert ecosystem. Nine man-made impoundments compromise roughly 9,300 acres of the 17,992 acre refuge. At optimum water levels, approximately 3,500 surface acres of water exist in a complex of springs, canals, sloughs, and open pools. The average depth of the impoundments at optimum water elevations is 1.7 feet. Desert uplands and alkali flats typify areas outside the dike system.

Marsh meadow vegetation is characterized by saltgrass (*Distichlis spicata*), marsh cane (*Phragmites australis*), and scattered stands of alkali sacaton (*Sporobolus airoides*). Marsh emergents are primarily Olney's three-square bulrush (*Scirpus americanus*), and wire rush (*Juncus arcticus*). Narrowleaf cattail (*Typha domingensis*), alkali bulrush (*Scirpus maritimus*), and hardstem bulrush (*S. acutus*) are also present. The principle submergents are widgeongrass (*Ruppia maritima*), muskgrass (*Chara spp.*), spiny naiad (*Najas marina*), and coontail (*Ceratophyllum demersum*). Upland portions of the refuge are characterized by fourwing saltbush (*Atriplex canescens*), shadscale saltbush (*A. confertifolia*), and greasewood (*Sarcobatus vermiculatus*). High lava peaks and cliffs of the Fish Springs Mountain Range encompass a small area in the northwest corner of the refuge. Soils are generally sandy-clay in the marshes with peat deposits occurring near the springs. Upland soils are very alkaline, thus limiting plant diversity.



Fig.8. Pool at structure H9 in the Harrison Unit.

Table 2. Water data collected during 2005.

MONTH	TOTAL SPRING CES	10 YEAR AVERAGE	VARIATION FROM AVERAGE
January	XX	28.5	na
February	28.8	29.5	-2.4%
March	31.66	29.03	8.3%
April	31.19	29.03	6.9%
May	32.1	28.61	10.9%
June	33.02	27.91	15.5%
July	31.89	27.81	12.8%
August	32.65	28.35	13.2%
September	33.78	28.04	17.0%
October	32.51	28.79	11.4%
November	31.32	28.35	9.5%
December	31.99	29.08	9.1%

2. Wetlands

The refuge receives virtually all of its water from five major springs and several lesser springs located along the eastern base of the Fish Springs Range. The warm saline springs range from 70 degrees F to 80 degrees F, year round. Conductivity measurements at the six southernmost springs range from 2900 to 3400 umhos/cm. North Spring measures 5100 umhos/cm. At these levels, all springs are considered moderately brackish.

Spring output is insufficient to counteract high evaporation rates. Therefore, summer water levels drop significantly in most impoundments. Excess winter and early spring flows are diverted through the impoundments in an attempt to dilute the concentration of salt in the pools. All excess water eventually drains into the desert.

High water salinities and past water management practices have helped shape a unique complex of marsh impoundments. Southern areas such as Avocet Unit receive nearly year-round water flow, therefore remaining less saline. These areas support extensive stands of emergent vegetation. These units supply the bulk of the high quality nesting habitat for ducks, colonial birds, and other marsh birds. In contrast, northern units, such as Gadwall and Harrison, dry up each summer and are characterized by highly saline waters and soil. These areas support little emergent vegetation and consist primarily of saltgrass and *Salicornia spp.* The corresponding wildlife use is generally of a seasonal nature and relatively low. All units have developed unique vegetative and wildlife use regimes based on their physical features, water flows, and salinities.

A Special-Use-Permit was issued to a sheep rancher for water use on the south end of the refuge. The well on the BLM had broken and the rancher needed water for his sheep herd.



Fig.9. Unidentified field person opening newly constructed screw gate at structure #8.

Evapotranspiration rates, as exacerbated by record high temperatures, resulted in the shrinkage of Refuge units on the north end as a result of more water being required to maintain those on the south. Curlew and Ibis Units were drained and remaining water subject to evaporation in preparation for early September prescribed burns.

Water data from 1995 to the present was collected and sent to the regional office in August. The general management strategy of trying to maintain stable to slowly dropping water level in waterfowl nesting and brooding impoundments in the southern half of the Refuge and allowing the very high evapotranspiration rate cause partial or total drying of units in the north half of the Refuge was the case for August. Curlew was almost completely dry and Ibis Unit reduced to a sump as those units are targeted for prescribed burns in early September.

9. Fire Management

Carpenter attended the Richfield Interagency Fire Meeting in Richfield on 2/24. Carpenter served as the host for the meeting and was required to schedule the meeting, confirm attendance, and lead the meeting.

Refuge conducted prescribed fire in Curlew and Ibis Units. Staff from Browns Park and Charles M. Russell conducted the burn on September 6th-7th. High winds and lack of burning staff slowed the progress the first day but with the additional crew and good weather, they completed the job.



Fig.10. CMR firefighter in Curlew Unit.



Fig 11. Prescribed fire in Curlew Unit.

The fire prescriptions for Pintail/Shoveler burns were completed and sent to FMO Rebarchik for approval before sending them to RM Banta for signature.

10. Pest Control

Noxious weeds at Fish Springs NWR have been reduced or controlled by mechanical and chemical practices for the past 20 years. All noxious weeds on the refuge are considered priority species. Due to the refuges remote location, eliminating seed sources for possible colonization of land adjacent to the refuge is very important. The refuge's Integrated Pest Management Plan was approved in 2004 by the Regional Office. Noxious weeds found on the refuge as of 2004 include: salt cedar (*Tamarix spp.*), tall whitetop (*Lepidium latifolium*), Squarrose knapweed (*Centaurea virgata* Lam. Ssp. *Squarrose* Gugl), and common reed (*Phragmites australis*). The refuge has actively targeted salt cedar, whitetop, and knapweed for complete eradication. Efforts to control salt cedar have been ongoing, at a varying level of intensity, since the refuge was established. Efforts at chemical control were intensified during the early 1980s and salt cedar was reduced markedly. Whitetop was first detected on the refuge in 1991. Three colonies were detected and removal included mechanical and pulling by hand which proved to be ineffective. By the late 1990s, refuge staff had incorporated chemical control of whitetop with good results.

Pesticide-Use-Proposals (PUP) were completed and signed by RM Banta. The herbicide Habitat was included this year for phragmites and cattail control in the marsh.



Fig.12. BT Hughes recording data on vegetation plot in Avocet Unit.



Fig.13. Phragmites along interior Avocet Road.

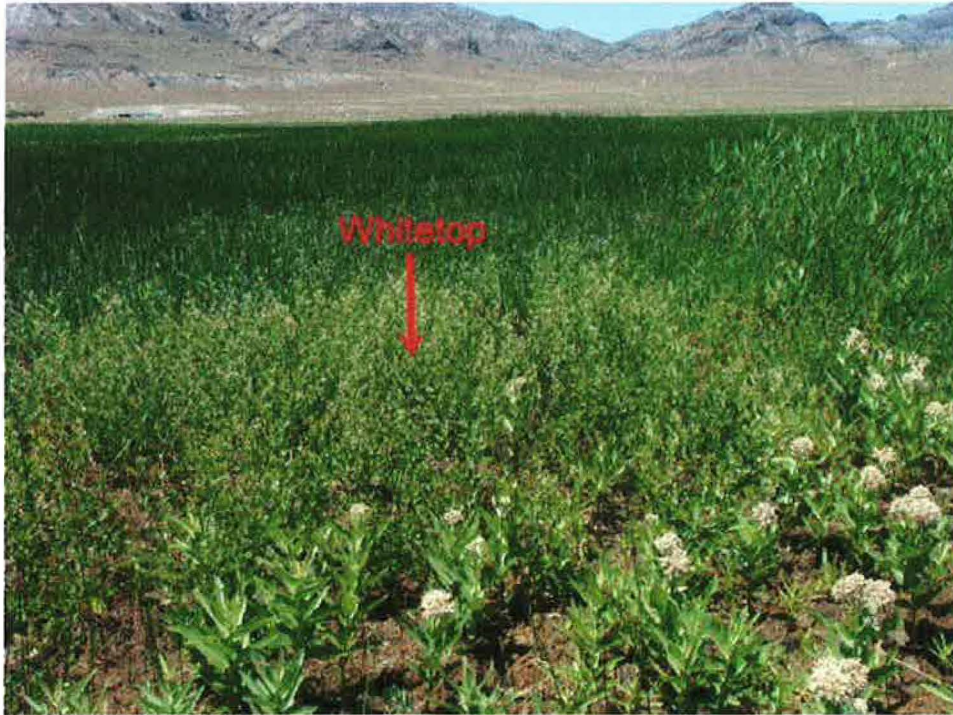


Fig.14. Whitetop in Avocet Unit.



Fig.15. Saltcedar plant in Harrison Unit.

Volunteers GPS nearly 100 spots of knapweed on the BLM. The site, number of plants, and waypoints were all collected and will be sent to the BLM for their weed control program.

Hughes passed her non-commercial pesticide applicators test to be licensed in the state of Utah.

Phragmites in transects #5 and #8 were sprayed in the Avocet Unit. High winds discontinued spraying.

Hughes and Layland sprayed cattails in the Avocet Unit around the disabled duck hunting blinds in June. This proved to be an ineffective way to spray the weeds due to the very shallow water and weight of the chemical. Approximately 50 percent of the cattails were sprayed, the remaining part will be sprayed with backpack sprayers next month.

Hughes completed vegetation sampling on ten transects in the Avocet Unit in May. The study will hopefully show the positive or negative effects of fire combined with flooding, chemical, and disking applications on certain types of vegetation.

Banta has been spraying phragmites along the interior road of the Curlew Unit in October. This area was burned in September and the phragmites is about 2.5 feet tall. Chemicals used have been AquaNeat, Mirage, and Habitat.

Carpenter attended a pesticide workshop in Delta on November 30th.

Carpenter completed Pesticide-Use-Proposals for 2006 and the chemical usage report for FY2005 in December.

11. Water Rights

The refuge controls all water rights to the spring outflows. The Certificate of Water Appropriation is for 43.88 cubic feet per second (cfs).

A potential threat to the Refuge's water rights became known during the month when the BLM announced the beginning of an EIS associated with the application by the Southern Nevada Water Authority to remove groundwater from the vicinity of Garrison, UT.

Region groundwater flows and hydrological assessment indicated that this area is likely in the recharge zone for the Fish Springs outflows. The withdrawals are actually taking place in Nevada so Utah water law will not pertain to the effort.

A combined effort of Nevada, CNO, Utah, and Region 6 staff from both Refuge and Ecological Services are working on the issue.

Banta attended a presentation that was put on by the Utah St. Engineer on the issue as well as a local citizen's group meeting to organize efforts to confront this potentially very damaging activity.

Sims and Banta attended meetings concerning the Southern Nevada Water Authority water grab in July. A lawyer arranged by the Snake Valley group visited the Refuge.

Banta attended the first (and so far only) meeting of the biological technical advisory team assembled for the Southern Nevada Water Authority groundwater project EIS. The meeting was in Las Vegas and is the first of not less than five that are planned.

G. WILDLIFE

2. Endangered or Threatened Species

Bald eagles are currently listed as a Threatened species and are regularly seen on the refuge. Sightings tend to be intermittent, as eagles roam about the area, but the majority of the sightings are at the Thomas Ranch Wildlife Viewing Area. This area contains the only roosting site in the vicinity of the marsh or on the frozen impoundment areas where they can often be seen feeding on waterfowl. Utah has one of the highest wintering populations of bald eagles in the lower 48.

A peregrine falcon was observed in March at the Thomas Ranch Wildlife Viewing Area.

The refuge hosts a variety of candidate species for T&E listing. Ferruginous hawks and black terns are occasionally recorded on the refuge. Western burrowing owls are not common, but have been sighted on the refuge.

White-faced ibis are a nesting species on the refuge.

The Bonneville Southern pocket gopher (*Thomomys umbrinus Bonneville*) is known to exist in the Fish Springs area and nowhere else in the state. There have been no studies conducted to determine its status. This subspecies is a candidate 2 species for listing.

The refuge is host to a number of species that are state classified as Species of Special Concern, due to limited distribution or declining populations at the statewide level.

Long-billed curlews nest in fair numbers on the refuge but little is known of their true status. Western snowy plovers also nest on the refuge, and can be found throughout the summer foraging in the Harrison Unit.

Common yellowthroats can be found nesting throughout the marsh during the breeding season.

American white pelicans and Caspian terns, as well as an occasional osprey, can be found during spring passage.

3. Waterfowl

Fish Springs is an important wintering and nesting area for a variety of waterfowl. Some of the common species found on the refuge are mallard, Northern pintail, Northern shoveler, cinnamon teal, green-winged teal, gadwall, redhead, canvasback, ruddy duck, American widgeon, and bufflehead. The refuge continues to monitor waterfowl numbers by conducting bi-monthly surveys. Numbers of ducks and species are recorded and entered into the refuge's migratory bird database.

Canada geese were plentiful with 609 counted during the June 29th survey. A common merganser was also counted in the survey.

A pair of blue-winged teal and a common merganser were counted during the survey in June.

The Utah Department of Health released an advisory to the public not to consume shovelers or common goldeneyes due to high levels of mercury. The refuge posted the advisory at the check-in station for hunters.

MONTH	Number of waterfowl	Number of waterfowl.
January	XX	XX
February	6,380	XX
March	10,146	XX
April	9,294	5,481
May	XX	XX
June	XX	XX
July	XX	XX
August	1,300	XX
September	4,153	XX
October	10,214	12,385
November	3,275	4,725
December	11,290	8,249

Table 3. Waterfowl Surveys Conducted in FY2005.

XX = No counts done

4. Marsh and Water Birds

The refuge provides nesting, migratory and wintering habitats for a variety of marsh-dwelling species. Grebes, herons, egrets, and rails are the most common. American white pelicans and double-crested cormorants are present during the summer and the refuge documented the first nesting pair of cormorants on the refuge. The nest was observed and recorded in the Shoveler Unit.

Virginia rails, soras, and American bitterns nest on the refuge in unknown numbers. Fish Springs provides one of the few, consistent wintering sites for these species in Utah.

Four species of grebes are present on the refuge with pied-billed grebes being the only year-round resident. Eared grebes and western grebes were documented throughout the breeding season in the impoundments.

The black-crowned night herons have taken up their rookery once again around Lost Spring. There are usually 30-40 birds roosting in the phragmites.

5. Shorebirds, Gulls, Terns and Allied Species

Eighteen species of shorebirds were recorded on the refuge in 2005. Killdeer, black-necked stilt, American avocet, and Wilson phalarope are common nesters. Snowy plovers, long-billed curlews, and willets also nest. Long-billed dowitchers, western and least sandpipers, yellowlegs, red-necked phalaropes, and marbled godwits are common migrants. Greater yellowlegs and snipe are the only regular wintering species, with long-billed dowitchers making an occasional showing.

Snowy plovers, a Species of Special Concern, were observed in good numbers again this year. They are primarily documented in the Harrison Unit of the refuge.

Ring-billed and California gulls were present throughout much of the year, though neither species breeds on the refuge. Aside from Utah Lake, Fish Springs supports the only known summering population of ring-billed gulls in Utah. Franklin's and Bonaparte's gulls were seen in low numbers during migration.

Three species of terns are found on the refuge. Forester's and Caspian terns are found as both a nesting and occasional fall migrant on the refuge, while black terns are frequently observed spring migrants.

6. Raptors

Twelve species of raptors (including two owl species) were recorded in 2005. Northern harriers were present and nesting in the marsh.

Golden eagles and prairie falcons nest adjacent to the refuge and are frequently seen hunting on the refuge. Short-eared owls were observed this year in April and May during migratory bird surveys. Rough-legged hawks are winter visitors, while red-tailed hawks are occasionally observed throughout the year.

Banta observed a Peregrine falcon on Easter weekend (March 26th) in the Avocet Unit hunting some of our ducks, no doubt.

7. Other Migratory Birds

The refuge serves as a magnet to many migrating birds, though stopovers tend to be very short due to the lack of habitat and foraging areas (trees) for most species. This makes observations difficult and, thus accounts for sporadic sightings of many species.

Three sandhill cranes were observed in the Avocet Unit in March. One of the cranes does have a leg band but staff has been unable to get the numbers from it.

Two pairs of sandhill cranes have been documented on the refuge in April. One crane has legbands (#318).



Fig.16. Two sandhill cranes in the Avocet Unit.

Carpenter conducted the Breeding Bird Survey on June 30th. Caspian terns were documented on the survey.

Volunteer Tom Newman and his birding group located a sandhill crane nesting in the Avocet Unit in May. The nest was in an unusual place, just south of the Avocet-Mallard

dike, not more than 20 yards from the road. Two pairs of sandhill cranes have been documented on the refuge this month.

A rock dove was seen in the residential area in September.

8. Game Mammals

A variety of game mammals utilize the refuge, though most are rarely observed. Mule deer, in small numbers, are common from mid-May to October on the refuge. Occasionally the deer particularly the does and fawns will feed and bed on the refuge. About 15 deer were observed on the refuge throughout the late summer and fall.

Pronghorn are observed regularly during the summer and fall along the northern portion of the refuge. They appeared to move out of the area during the state's hunting season, as disturbance increases.

Coyotes are commonly observed throughout the year. Blacktail jackrabbits and desert cottontails are also observed on the refuge. Hunting of game mammals is not allowed on the refuge.

Seven mule deer and one pronghorn were documented on the refuge in May.

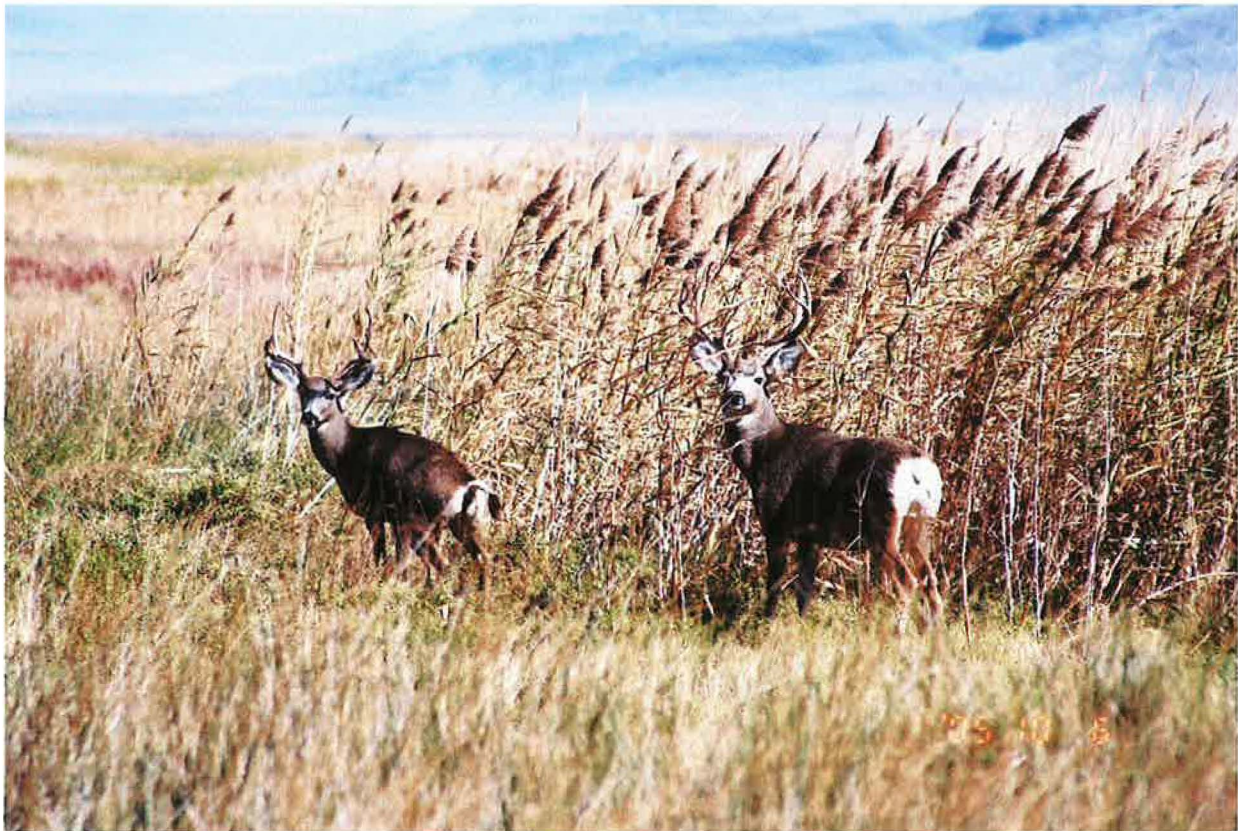


Fig.17. Two mule deer bucks at the Thomas Ranch Watchable Wildlife Area.

10. Other Resident Wildlife

Over forty species of mammals have been recorded on the refuge, of which nineteen are small rodents. Muskrat populations have remained strong throughout the marsh this year. There has been no effort to trap the muskrats since 1995.

Badgers are also seen on the refuge sporadically. They have been observed at the landfill and around the marsh area.

Bats are frequent visitors to the refuge in low numbers during the warmer months. They are common around the housing and office areas where the lighted areas create excellent foraging habitat.

Seven species of lizards, five snakes, and two frogs reside on the refuge. The Great Basin sagebrush lizard, desert side-blotched lizard, western fence lizard, gopher snake, and Great Basin rattlesnake are commonly observed species. The introduced bullfrog is common in most springs and canals, while the native leopard frog appears to be decreasing.

A long-tailed weasel was seen crossing the Avocet-Mallard dike in May.

11. Fisheries Resource

The native Utah chub (*Gila atraria*), Least Chub and introduced Gambusia (mosquito fish) are found in the springs and canals on the refuge. Native speckled dace also occur in low numbers. The Least Chub, a candidate species, were introduced in Walter and Deadman's Springs.

Layland installed 4 new fish screens in the Curlew Unit at structures C-6, C-7, C-9 and C-10.

14. Scientific Collections

Wesley "Skip" Skidmore, the Assistant Curator of the Monte Bean Museum of Natural History at BYU was on the Refuge on June 23 in an unsuccessful attempt to collect two Wilson's phalaropes for a display being prepared at the University.

16. Marking and Banding

ARM Carpenter sent a text file containing 2004 bird banding data to the Patuxent Research Laboratory in March. Some additional bands were ordered and received this month for the banding program.

A dead barn swallow was recovered in front of quarters 4 on July 4 that had been banded here on the Refuge as an adult on May 12, 2000 making it at least 6 years old !

The banding schedules were sent to Patuxent Research Laboratory Bird Banding Lab in June. The Band Manager software proved to be time consuming and a difficult program to work in.

Refuge staff and volunteers banded 411 birds with 37 species represented during May. A total of five nets were used with three of them located in the Great Basin Cold Desert Shrubland and Grassland and the remaining two in the housing unit. Species banded in the shrubland and grassland habitats included Black-throated Sparrow (4), Lark Sparrow (2), Blue-gray Gnatcatcher (1), Lazuli Bunting (1), Bullock's Oriole (1), Western Kingbird (3), Audubon's Warbler (4), Western Wood Pewee (1), and Brewer's Sparrow (1). Yellow Warblers were the most numerous bird banded (102) with Cassin's Finches second (65). Banding hours this year were down due to the bad weather, which included lots of rain and wind.

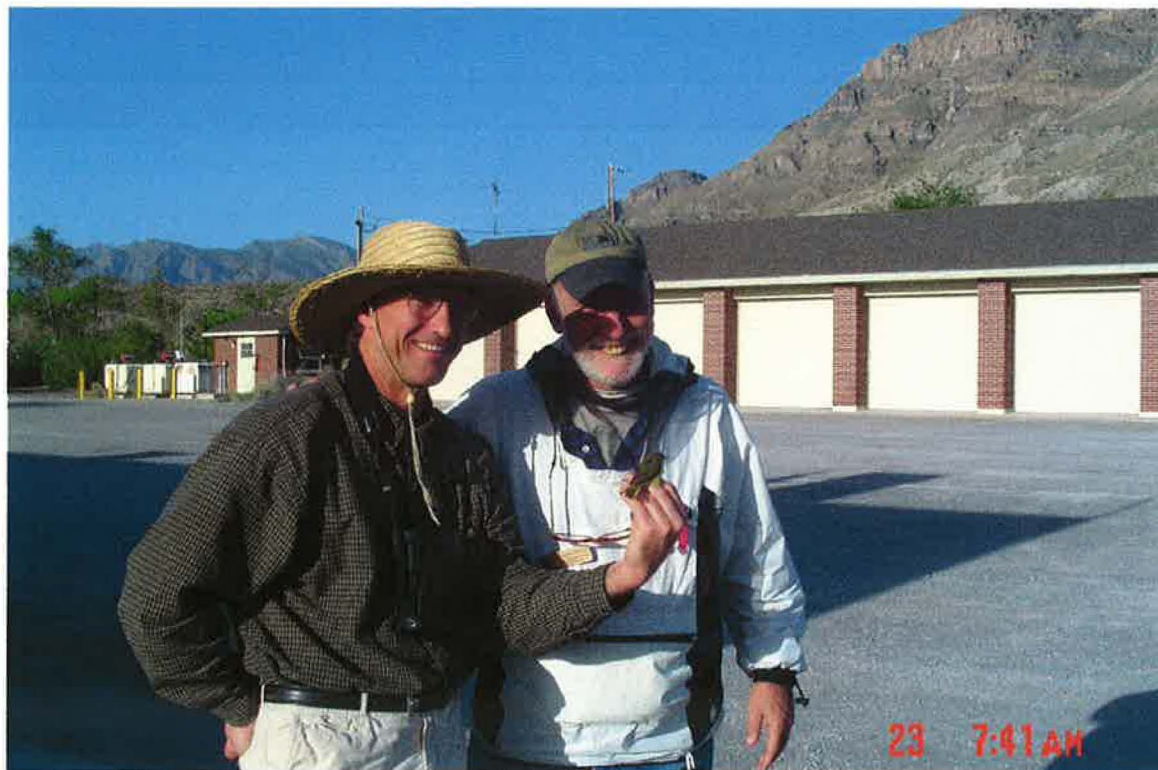


Fig.18. Volunteers Skalicky and Haupt with a banded yellow warbler.



Fig.18. Banded Western Tanager.

H. PUBLIC USE

1. General

Table 4. Visitation during 2005 at Fish Springs NWR

MONTH	VISITOR NUMBER	HUNTER NUMBER
January	23	75
February	101	xxx
March	110	xxx
April	124	xxx
May	256	xxx
June	168	xxx
July	91	xxx
August	83	xxx
September	129	xxx
October	142	147
November	46	250
December		177
TOTALS		649

5. Interpretive Tour Routes

Fish Springs has an 11 mile self-guided tour route which is open daily. Starting at the visitor contact station, visitors pass through a variety of habitat types including desert shrublands, saltgrass meadows, and marshlands. A new kiosk was constructed at the entrance of the tour route and the old kiosk will be erected at the Thomas Ranch Wildlife Viewing Area.

6. Interpretive Exhibits and Demonstrations

Banta gave a presentation on the Lincoln Highway in Utah to the Tooele Historical Society on April 12.

Carpenter gave a presentation and tour of the refuge to nine boy scouts on April 22nd.



Fig. 19. Carpenter with a boy scout group on the refuge.

Carpenter gave a brief presentation on the refuge and its history to approximately 20 visitors from the Utah Water Division on June 9th. The group had been at a meeting in Trout Creek and wanted to tour the surrounding area and get input on the proposed Nevada Water Plan.

Banta conducted a tour for Fee Busby, the Dean of the School of Natural Resources at Utah State University and four visiting scientists from Uzbekistan. One of the Uzbek visitor was a wildlife preserve manager of many years experience. The climate in much of Uzbekistan is very similar to the Great Basin. All were treated to a genuine American feed while here !

7. Other Interpretive Programs

In conjunction with Utah Pre-history week and International Migratory Bird Day, the Refuge hosted a day for the public to learn about eastern Great Basin and Fish Springs cultural history in May. Birding tours we also held as well as opportunities for the public to observe Refuge migrational mist netting activities. Estimated visitation for the event was between 45-60 visitors.



Instructor speaking on the ancestral history of the refuge.



Fig.20. RS Berenzen, Banta, and Volunteer's Newmans at International

Migratory Bird Day.



Fig.21. Volunteer Sanders watches as the kids get ready to throw the pre-historic weapon the atl-atl.



Fig.22. Volunteer Haupt showing the banding technique.

8. Hunting

Hunting of ducks and coots is the only form of hunting allowed on the refuge.

The 2005-06 waterfowl hunting season opened on October 1st. Only 78 hunters registered for the opening weekend which is lower than previous years. High fuel prices, recent news of avian flu, ducks testing positive for mercury, and warm weather could be responsible for the low turn-out. The average for the month was approximately 2 birds/hunter. The most common bird bagged was the green-winged teal.

Table 5. Waterfowl and coot harvest data.

SPECIES	HARVEST				TOTALS
	January	October	November	December	
Mallard	19	56	50	126	251
Gadwall	15	53	38	66	172
N.Pintail	11	35	48	72	166
GW Teal	0	95	40	47	182
Cin. Teal	0	13	0	3	16
Am. Widgeon	41	51	71	81	244
Redhead	0	0	11	3	14
North. Shoveler	2	9	20	8	39
Bufflehead	0	2	12	2	14
Comm. Goldeneye	0	0	0	2	2
Ruddyduck	0	0	0	0	0
Am. Coot	57	11	17	76	161
Other	1	0	12	6	19
TOTALS	136	325	319	492	1280
Average: Birds/Hunters	1.81	2.21	1.27	2.77	

Hunter registration is mandatory at Fish Springs and efforts in the past with compliance have appeared to work. There are exceptions every year where only the driver from a party will register.

Five limited entry goose hunts were held every Saturday in November. AO Sims entered 428 hunters into a computer database and drew 25 hunters for each hunt. Turnout was high with a few no-shows with a moderate harvest.

Table 6. Goose harvest data from special draw hunts in 2005.

DATES	NUMBER OF HUNTERS	GEESE HARVESTED
11/5	22	27
11/12	22	10
11/19	24	17
11/26	18	5
TOTALS	86	59

Zone Officer Kennedy assisted refuge LE staff with the first limited entry goose hunt on November 5th. Banta ran the check station for the goose hunters and Kennedy and Carpenter worked in the field.



Fig.23. A successful group of goose hunters on the Refuge.

17. Law Enforcement

Fish Springs currently has two commissioned law enforcement officers, Manager Banta and ROS Carpenter. The majority of the law enforcement work is during the waterfowl season and sporadically during the other months. Fish Springs, due to its extreme remoteness, requires two dual function officers in case there is a need for back-up. It would take nearly 2.5 hours for any assistance to get to the refuge and respond. The Regional Office has been very supportive of keeping both the manager and assistant manager as dual function law enforcement officers.

Carpenter completed the law enforcement training to receive his commission as a federal law enforcement officer. The training took nearly 8 months away from the duty station which included some annual leave.

Refuge Officers Banta and Carpenter worked Easter weekend looking for off-road vehicles on the refuge. Banta observed two individuals on the south end of the refuge in the closed area and contacted Carpenter to make contact. The two individuals had crossed the drift fence and were approximately 75 yards into the closed area bird watching when Carpenter arrived. They were both issued citations for entering a closed area on the refuge.

Zone Officers Clay Ronish and Lisa Kennedy visited the refuge on July 11th. Banta and Carpenter met with them and discussed law enforcement issues at Fish Springs NWR.

Carpenter was called for assistance to a vehicle accident on the Pony Express Road. The driver was going to fast and lost control at Deadman's spring corner and wrecked his vehicle into the refuge's boundary gate. The Juab County Sheriff's Department was called and an incident report was faxed to them. There were no injuries to the driver and minimum damage to his vehicle.



Fig.24. Accident on Pony Express Route at Deadman's Corner.

Two warnings were given out in June on entry into closed areas and collecting animals, plants, and/or artifacts.

The following violations and their dispositions were noted during the year:

<u>Offense</u>	<u>Number</u>	<u>Fine</u>
➤ Enter closed area of refuge	2	\$300
➤ Exceeding bag limit (pintails)	1	\$225*
➤ No state license	1	\$225
➤ Take of migratory bird during closed season.	1	\$525
➤ Take of migratory bird during closed season.	1	\$425.

TOTAL FINES

\$1700

*Fine was reduced in the Salt Lake City court from \$325 to \$225.



Fig.25. Carpenter with a seized over-limit of pintails.

Due to brake problems and constant whining about not having a manly truck by the Refuge Officer assigned to it, the Colorado had the emergency equipment in it moved into the 2001 Dodge in August.

Carpenter volunteered for the Hurricane Katrina detail in New Orleans from September 10th- 18th. The detail was primarily focused on search and rescue with Fish and Wildlife Service officers serving as boat operators and security.

Banta and Carpenter traveled to Brigham City, UT for firearms requalifications and policy updates on September 19th-20th.

Carpenter worked the youth waterfowl hunt on September 24th. Only four youths showed up for the hunt and bagged seven ducks. All youngsters were in compliance.



Fig.26. Boat along highway in New Orleans.



Fig.27. Service LE with National Guard troops in New Orleans.

I. EQUIPMENT AND FACILITIES

1. New Construction

Water control structures 9 and 11 were completed during April. The new structures are fabricated from concrete and have stainless steel screw gates. These structures should last longer, easier to operate and should have little maintenance required.

The replacement of WCS #7 was accomplished by Wright in August. The old two bay drop log structure was replaced with a much more efficient and easier to use concrete culvert with a screw gate. This was the fourth of six drop log structures on the main distribution canal that have been replaced since 2003. We anticipate that the final such structure remaining will be replaced under Refuge Roads funding in FY2008.



Fig.28. Newly constructed water control structures with screw gates attached.

2. Rehabilitation

MM Layland cleaned all chimneys associated with coal/wood burning stoves in refuge housing during January.

Heavy snows created drifts up to three feet in depth between Fish Springs and Dugway and required MM Layland to plow portion of the county road going that direction so we could get to town for supplies and mail.

The starter for the Chevy S-10 pickup was taken off and sent to Salt Lake City for repair.

Two dishwashers were repaired in March by Pete's Repair Service in Tooele.

The kitchen faucet was replaced in the apartment.

Volunteer Joe Jarvis and his grandsons Zach Jarvis and Joseph Seamons refurbished the old visitor contact kiosk so that it can be used at the Thomas Ranch Watchable Wildlife Area. The kiosk was moved to the Thomas Ranch in August.

Minor fence repair was needed where the vehicle rollover at Deadman's spring corner occurred.

Layland re-routed the dryer vent in the Refuge bunkhouse so that it vented to the outside and did not have more than one 90 degree bend to be in compliance with safety concerns.

Wright cleaned the outflow ditch from WCS 7 and constructed a Refuge use only road from WCS 7 to WCS 1A. Previously a walk of about ¼ miles to include climbing over a barbed wire fence was necessary to check this structure.

Layland and Carpenter cleaned the residential quarters' chimneys and checked all the smoke alarms on December 21st.

3. Major Maintenance

The Colorado was taken into the Chevy dealership in Delta to get the rear brakes repaired. This proved to be a very expensive endeavor due to the newness of the truck and lack of brakes on the market.

A leaking brake line was replaced on the Chevy S-10 in March.

A leaking rear axle seal on the 1995 Chevy Utility truck was replaced along with bearing and brake shoes.

The alternator for the 1991 Dodge was found to be faulty and was sent in to be repaired.

The Quarter chimneys were swept by Layland. The chimney cap was replaced on Qtrs. 4.

Vacuum hoses and electrical wires were replaced in the stake truck in April. The damage was caused by rodents chewing the wires.

The Chevrolet Colorado was taken into the dealership to get the rear brakes replaced on June 7th. The vehicle only had 1600 miles on it since the last time they were replaced. The dealership did not know why the brakes were wearing out except there was an excessive amount of dirt and mud in the drums. A representative with the GM corporation was contacted about the problem.

In what would turn out to be a major trial and consume the greater part of the time of both maintenance staff for much of the month, the Refuge's Caterpillar excavator and the John Deere dozer became stuck **in the collection ditch** by water control structure 8.

Layland and Wright spent three days trying to extricate the two piece of equipment before coming to the conclusion the could not. Banta arranged for assistance from the Fugal Company, a contractor who was installing fiber optic along the Pony Express Road. The Fugal staff brought a D-6 size dozer from Callao but was unable to extricate either piece of equipment. They then brought a larger excavator from near Simpson Springs and after another 12 hours were able to get both piece of equipment on high ground. The process of cleaning, drying out, returning them to the shop and ultimately sending the excavator into Salt Lake City for repairs consumed well over 100 staff hours and several thousand dollars in repairs.



Fig.29. Rod Wright removes the old radiator from front-end loader.



Fig.30. A muddy, cold mess in the canal west of the Avocet Unit.

The new Aztec trailer was taken to Bringards Auto Repair in Delta to have the wiring repaired.

A new radiator, purchased at the end of last fiscal year was installed in the Case loader but failed after only about 40 hours.

The Refuge domestic water well and cistern system had repeated problems during the month with the inability to pump a sufficient amount of water to the cistern. Maintenance staff purged line think there might be sediment in the line leading to the cistern but that did not solve the problem. Ultimately it required a service call from a well expert who identified a defective inline foot valve.

The CASE loader had the failed radiator removed and ASA Sims got the ball rolling for repair and hauled the radiator in to Salt Lake City for evaluation. A new one was received at Century Equip on Aug 24.

A tire on the 2001 Dodge was damaged beyond repair and replaced under warranty by Big O in Nephi in August.

Two new batteries for the John Deere bulldozer were purchased from Scott Machinery in August.

4. Equipment Utilization and Replacement

The 1994 Ford was sold for \$3333 on the third listing by GSA. It was purchased and picked up by a dealer from Pocatello ID.

Sims worked on the issues concerning the new CAT tracked loader and the trade-in vehicle. The new unit was received at Wheeler machinery in SLC on Aug 10 and was delivered to FSNWR. Included were accessories that included a backhoe, clamshell type bucket, dozer type blade, a heavy-duty mower, and a rot tiller attachment. Pick up of the Bombardier trade-in was delayed pending delivery of the new system

A crew from Central Electric in Salt Lake City installed a new back up generator for the Refuge in October. The new generator, a 50 KW unit will start and stop automatically and will spare staff from invariably having to get up at 2:30 am to start and switch to generator power when an outage occurs. The old generator has served since the original construction back in 1962 and were the sole source of power for the Refuge from 1962-71.



Fig.31. New generator for the refuge.

5. Communication Systems

The wireless transceiver quit functioning for several days. Although this system is only 4 years old, the manufacturer is no longer in business. Replacement parts are not available. It was repaired by Sims on the Fish Springs end and a DPG person (Burt) on Cedar Mountain. There continued to be an error indication but the system continued to function. Sims connected a computer to the microwave system to monitor the system status and replaced the coax cable from the RMA to the ODU.

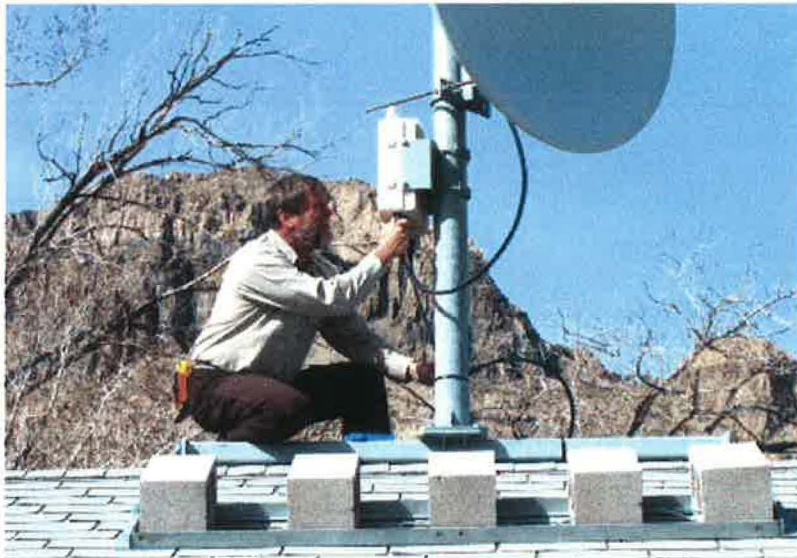


Fig. 32. ASA Sims repairs microwave system.

Dugway repaired a broken phone line at quarters #5 in June.

6. Computer System

A new Dell computer was setup in the office to serve as a bird database, weather system and file server. Another new 3COM switch was installed to address computer capacity. The switches were installed in the communication closet and Ethernet and phone lines were run accordingly.

The old FAX was replaced with a new one.

Many computer problems persist in August. The maintenance system had to have all software reinstalled. The Weather/File server has network problems. Heavy workload due to purchasing and budget issues has delayed computer repair activities.

7. Energy Consumption

As part of the RPI update, Sims calculated power consumption of the refuge buildings and individual systems in August. The power consumed by the well and water treatment systems have never been identified and were a large draw of power. Other high power consumption was due to a very hot July and air conditioners usage.

8. Other

Hughes picked-up two pallets of salt from Deseret Peak Supply in Tooele in June.

Tier II data was completed for the refuge and sent to Salt Lake City on October 24th.

J. OTHER ITEMS

2. Other Economical Uses

Hughes took four recycle bins into Salt Lake City on June 1st.

A run to SLC with a load of cardboard and three bins of recyclable materials was done during May.

3. Items of Interest

The "Water Run" came through Fish Springs. It was done by concerned citizens in an effort to gain support of elected officials for the SNWA ground water development project. Backpacks of letters were carried Pony Express style by runners who braved the hot summer days to carry the letters across the desert from Baker NV to Salt Lake City UT. Most of the runners were local children with a mix of parents and grandparents. The Southern Nevada Water Authority (SNWA) proposed pumping project taps into the aquifers, which feed Fish Springs NWR.



Fig.33. Pictures associated with water run.

4. Credits

This document was prepared by Carpenter and Sims.