VALENTINE NATIONAL WILDLIFE REFUGE

Valentine, Nebraska

Annual Narrative Report

Calendar Year 2003

INTRODUCTION

Valentine National Wildlife Refuge (NWR) was established on August 4, 1935 under the Migratory Bird Conservation Act by Executive Order 7142. The purpose of the refuge as stated in the executive order is "as a refuge and breeding ground for migratory birds and other wildlife." Acquisition funding came from Duck Stamp sales and the Emergency Conservation Fund Of 1933.

The 71,712-acre Valentine NWR is located in the Sandhills of north-central Nebraska. The Sandhills contain the largest remaining stands of mid and tall grass native prairie left in North America. The refuge is a unique and ecologically important component of the National Wildlife Refuge System. The refuge has about 49,000 acres of grassy, undulating sand dunes, 13,000 acres of sub-irrigated meadows, and 10,000 acres of shallow lakes and marshes. The refuge is home to 271 species of birds, 59 species of mammals, and 22 species of reptiles and amphibians. The refuge is important to nesting and migrating waterfowl and is also one of the few places where good numbers of sharp-tailed grouse and prairie chickens can be found in the same area. Several threatened or endangered birds stop at the refuge during migration. Two listed plants and one listed insect are also found here. Most of the native flora and fauna found here historically are still present today.

The refuge is part of a complex administered from Fort Niobrara NWR. Valentine NWR is in Cherry County with a subheadquarters located on Hackberry Lake, 17 miles south of the town of Valentine on US 83 then 13 miles west on State Spur 16B.

INTRODUCTION

TABLE OF CONTENETS

A. HIGHLIGHTS

B. CLIMATIC CONDITIONS

C. LAND ACQUISITION

D. PLANNING

E. ADMINISTRATION

F. HABIATAT MANAGEMENT

G. Wildlife

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

K. FEEDBACK

A. HIGHLIGHTS

Drought continued in the Great Plains and Sandhills of Nebraska (B)

The 60 acre Duck Lake tract was added to the refuge. (C-1)

A two year study on Blanding's turtles was completed (G-10)

B. CLIMATIC CONDITIONS

Collection of weather data at the Hackberry Headquarters weather station resumed in 2003 (Table B1). Timely rains through June provided excellent moisture for cool season grasses and forbs, with dry conditions prevailing during the remainder of the year. Ice out occurred in mid-March as temperatures went from below 0 ^{o}F to near 80 ^{o}F within a 5 day period. Only 2 days of 100+ ^{o}F weather were recorded for the year, both of these occurring in late July. However, hot, windy weather during the late summer contributed to drought conditions in the Valentine area (Figure B1). No temperature records were set during the year, and the 17.68" of precipitation received for the year was 3.81" below the long-term average.

Table B1. Monthly weather data summary from the weather station at Hackberry Headquarters, Valentine NWR, during 2003. a indicates most recent record

	Precip.	Snow	Temperature (^{o} F)			Record Temperature (^{o} F)				
Month	(inches)	(inches)	Min	Ave	Max	Ave	Min	Year	Max	Year
Jan	0	1	-20	9	48	31	-38	1894	70	1974
Feb	0.22	3	-17	8	59	29	-37	1899	76	1982
Mar	1.61	3.4	-8	23	79	51	-28	1948	87	1946
Apr	3.17	7	16	35	84	59	-8	1936	97	1992
May	4.65	0	26	43	90	67	17	1909	102	1934
Jun	4.09	0	42	52	83	76	30	1973[a]	107	1937
Jul	1.76	0	53	59	103	87	38	1971	111	1990
Aug	0.3	0	49	59	95	86	34	1935	108	1947[a]
Sept	0.74	0	29	43	92	74	12	1926	103	1952
Oct	0.35	0.5	19	38	89	69	-6	1925	96	1922
Nov	0.27	7	0	21	64	41	-36	1887	82	1965[a]
Dec	0.45	9	5	20	62	39	-34	1907	76	1936

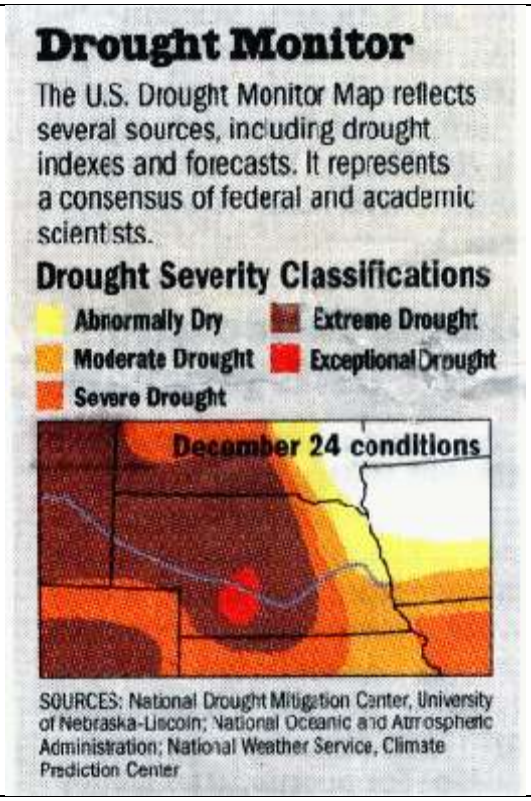

Figure B1. All of Nebraska experienced dry conditions during 2003. Most of the Sandhills region fell into the severe drought category. The figure appeared in the Omaha World-Herald.

C. LAND ACQUISITION

1. Fee Title

The 60 acre Duck Lake tract of land (2h) was transferred from the Nebraska Department of Roads to the refuge during the year. This land was bought by Roads and transferred to USFWS as part of the mitigation for the expanded right-of-way required when US Highway 83 through the refuge was upgraded. The 60 acre tract lies just west of Duck Lake. The endangered white prairie fringed orchid has been located here in years past. The acquisition also moved the boundary fence out of the lake. Nebraska Department of Roads staff contracted the survey of the land and built new boundary fence to enclose the land within the refuge. There is an old windbreak on the property that will need to be removed.

In 2002 a Preliminary Project Proposal for Land Acquisition was completed. This year work on land acquisition continued with refinement of the final acquisition boundary. The land acquisition map received from Realty was reviewed and finalized. The new acquisition boundary includes most of the original legislative acquisition boundary plus additions put forth in the PPP for the refuge. This map

is shown in figure C-1.

Mike Artman from RO Realty submitted a section 7 consultation for land acquisition at Valentine National Wildlife Refuge to the Grand Island Enhancement Office.

The next step in acquisition is to do an environmental assessment including public meetings. This was put on hold for the time being. The process will be resumed following completion of the river management plan for Fort Niobrara National Wildlife Refuge.

D. PLANNING

1. Master Plan

The final version of the site plan that was prepared by a contractor was received. It is very late but should be useful in guiding refuge developments in the years to come. The plan includes a layout and rough drawings for a new headquarters site as well as new interpretive facilities for the refuge. The refuge Comprehensive Conservation plan proposes moving the refuge headquarters from Hackberry Lake to the more centrally located Pony Lake area. The buildings and facilities necessary to complete this move are outlined in the site plan. The cost for the move is estimated at $3,566,875. The plan also outlines improvements to interpretation and recreation facilities for the refuge. The cost for these improvements is estimated at $133,000. It will take many years to get there but a least we have an overall plan.

4. Compliance with Environmental and Cultural Resource Mandates

The threats and conflicts report was done for Valentine NWR. Problems identified included carp, noxious weeds and invasive species, need for seeding of grassland at Yellowthroat WMA, pumping of the aquifer, and wetland drainage.

The results form the comprehensive water tests for the Pelican Lake Quarters (tested in 2002) and the well at Pony Lake (tested in 2003) were received during the year. The water passed all tests conducted. Tests were run for radionuclides, inorganic chemicals, organic chemicals, and metals. Funds for the tests were provided from the regional office.

5. Research and Investigation

a. The following research papers are based on studies conducted wholly or in part on Valentine NWR. Brief summaries are provided for research providing management implications.

Heikes, B. L., C. P. Paukert, and D. W. Willis. 2001. Lentic green sunfish populations in Nebraska Sandhill lakes. Journal of Freshwater Ecology 16:367-374.

DeBates, T. J., C. P. Paukert, and D. W. Willis. 2003. Fish community responses to the establishment of a piscivore, northern pike (Esox lucius), in a Nebraska Sandhill lake. Journal of Freshwater Ecology 18:353-359.
This paper examined the response of bluegill, largemouth bass, and yellow perch to the introduction of northern pike into West Long Lake on Valentine NWR. Pike were first documented in this lake in 1998, and by 2002 had become very abundant. The authors used data from 1998 and 2002 to compare bluegill, largemouth bass, and yellow perch response to the rapid increase in pike numbers over a short time period. No pike were caught in a 1997 survey of the lake, and two were documented in 1998. By 2002, there was an estimated 894 pike with an estimated biomass of 22 kg/ha. Relative abundance of bluegill, bass, and perch were all lower in 2002 than in 1998. Pike predation is thought to have reduced the abundance of these species. Size structure was also affected in bluegills and bass, with the bluegill size structure being reduced, and bass increasing in size. The authors conclude that the high density of pike apparently influenced both bluegill and perch populations, and that if the objective is to provide a quality fishery for bluegill and perch, pike should be excluded.

Paukert, C. P., and D. W. Willis. 2003. Population characteristics and ecological role of northern pike in shallow natural lakes in Nebraska. North American Journal of Fisheries Management 23: 313-322.
This study investigated the influence of northern pike on fish communities (primarily yellow perch, bluegills, and largemouth bass) across 30 natural Sandhills lakes. Specific objectives were to (1) describe the population characteristics of northern pike occupying these lakes, (2) evaluate the effects of shallow waters with no thermal refuge on pike recruitment, growth and condition, and (3) determine the role of pike in structuring the fish community in lakes where warmwater predators (largemouth bass) typically predominate.
The authors report that pike growth, size structure, and condition do not appear to be density dependent, although they cautioned that they had a narrow range of abundances in their samples. Physical and chemical differences among lakes did not seem to influence pike population characteristics, although increased pike size structure was linked to increased measures of productivity. Increased water temperature was related to decreased growth in northern pike. Recruitment varied among lakes, with strong and weak year classes evident, but missing year classes

were nearly nonexistent. Lakes in this study typically had flooded vegetation suitable for spawning. Variable strength in year classes occurred simultaneously across lakes, suggesting that broad environmental factors were not driving year class strength. Authors suggest that pike recruitment and climatological factors were lake-specific.
Pike appeared to play an important role in structuring fish communities. Where largemouth bass are the primary predator, bluegill and yellow perch typically show increased size structure with increased bass abundance. In sympatric pike and bass populations, pike apparently reduce the bass population, as well as consuming yellow perch and bluegills.
Pike populations in the studied lakes appear to be self-sustaining, but population structure (reduced condition and truncated age structure, fast growth associated with higher annual mortality) indicated limited potential for trophy quality northern pike. As the lakes showed variable recruitment, pike may need to be assessed and managed on a lake-specific basis. The implications of pike predation on largemouth bass, yellow perch, and bluegills should be considered by managers before implementing management strategies utilizing northern pike.

Paukert, C. P., W. Stancill, T. J. DeBates, and D. W. Willis. 2003. Predatory effects of northern pike and largemouth bass: bioenergetic modeling and ten years of fish community sampling. Journal of Freshwater Ecology 18:13-24.
This paper examines how predation by northern pike and largemouth bass effect the fish community structure in Pelican Lake. Constant effort sampling during 1992-2001 was used to assess population structure of largemouth bass, bluegill, northern pike, yellow perch, and common carp. Food habits of largemouth bass and northern pike were assessed by extracting stomach contents during four sampling periods (Apr, Jun, Aug, and Sept.). Catch per unit effort (CPUE) was variable for all species during the 10 yr study, and stocking resulted in mixed results. Northern pike CPUE was relatively constant over the study period, and proportional stock density (PSD = percentage of stock-length fish that exceed quality length) was high throughout. Stocking of largemouth bass fry in 1992 apparently had little effect on bass populations, although there was a peak in CPUE in 1997-98. PSD for bass was highly variable, ranging from 20 to 95 percent. Bluegill CPUE showed a large increase following fall stocking in 1996, but PSD was typically below 50. Yellow perch CPUE and PSD fluctuated throughout the study, increasing slightly after stocking. CPUE of carp was low throughout the study, with slight increases in 1995 and 2001. Both small and large bass consumed primarily yellow perch, with macroinvertebrates comprising the bulk of remaining diet. Bluegills were rarely consumed. Northern pike also primarily fed on perch, although large pike did seem to switch to carp in Sept. Bluegills comprised about 30% by weight of pike diets.
The authors suggest that stocking perch may have little effect on increasing populations as pike predation appears to be selective for perch. This information, coupled with bioenergetic modeling suggest that pike could have reduced perch

populations in Pelican Lake. Circumstantial evidence from this study suggests that stocking bluegills may have boosted their population. Common carp had low abundance throughout the study, and consumption of carp by large pike suggest that protecting large pike may be a viable objective for carp management.

Paukert, C. P. and D. W. Willis. 2003. Secrets to trophy bluegills. In-fisherman March: 66-70.
Paukert and Willis summarize the results of their radio-telemetry research on bluegill movements in a nice article for a popular fishing magazine.

Paukert, C. P., D. W. Willis, and D. W. Gabelhouse, Jr. 2002. Effect and acceptance of bluegill length limits in Nebraska natural lakes. North American Journal of Fisheries Management 22: 1306-1313.
The authors examined 18 Sandhills lakes in Nebraska to assess how a minimum size limit would affect the size structure of a bluegill fishery, with the goal of producing more quality-size fish for anglers. Population modeling was used to determine how fish populations might respond to size limits on these lakes. Data to generate models was collected using trap nets during May and June 1998 and 1999. Bluegill exploitation by anglers was assessed using tag returns and creel surveys during the winter months 1998-2001. The creel clerk questioned anglers about their attitudes toward size limits for bluegills while conducting the creel survey.
Bluegill populations varied across lakes sampled, with catch per unit effort ranging from 3-233 fish per trap net, and at least 100 fish greater that 80 mm were sampled on all but two lakes. Time to reach 200 mm ranged from 4.3 to 8.3 years, and only 7 of 18 populations attained 200 mm in less than 5 years. Creel survey data from two lakes indicated that angler exploitation of bluegills was <10%, and that nearly all fish <150 mm were released. Small samples of tagged fish indicated that tag loss was minimal (based on one double tagged fish) and nonreporting of catching tagged fish was estimated at 25%. Anglers favored minimum length limits on Pelican Lake if it would result in greater opportunity to catch larger bluegills. Sixty seven percent of anglers were catching fish to eat, while 33% preferred to catch Master Angler bluegill. Population models predicted that a minimum size limit on bluegill would result in lower yield and reduced harvest, with a minimal increase in bluegill size structure. Increasing exploitation levels would increase size structure, but yield and number harvested would still be reduced.
Data presented in this paper indicate that anglers would favor a minimum length limit, however they would sacrifice yield and number harvested for minimal gains in size structure in the lightly exploited lakes. Exploitation and natural mortality rates appeared to be low for Sandhills lakes compared to data from other midwestern lakes. Angler acceptance of a 200 mm length limit on at least one Sandhill lake was attributed to three potential reasons: low sample size of anglers not representative of the angling population, Pelican Lake typically produces trophy sized bluegills, and lakes surrounding Pelican Lake also produce high-

quality fishing opportunities. The summary indicates that at current exploitation levels, length limits are unlikely to provide substantial benefits to anglers, and would likely decrease the fish harvest. If exploitation increases, a minimum length limit may provide increased size structure with lower reduction in yield and number harvested.

Paukert, C. P., D. W. Willis, and R. S. Holland. 2002. Sample size requirements for in situ vegetation and substrate classifications in shallow, natural Nebraska lakes. North American Journal of Fisheries Management 22: 1329-1333.

The objective of this paper was to determine how precisely vegetation and substrate classification could be visually estimated on shallow, natural lakes. Interest was in coarse scale precision to determine if this method would be sufficiently precise to warrant its use in fisheries and watershed management. Two observers were used on each transect to provide an estimate of between observer variance. Sampling points were either vegetated or open water. At open water points, substrate was sampled with an Ekman dredge, and the percentage of muck, sand, clay, and other material was estimated to the nearest 10%. For vegetated points, vegetation was classified as either emergent or submergent, and plant density was estimated as either sparse, moderate, or dense.
Observer estimates of percent cover and substrate type were similar for all lakes sampled. The number of sites required to produce 95% confidence that vegetation coverage was within 10% of the true mean varied by vegetation type and coverage. Higher sample sizes were required for intermediate vegetation coverage of submergent vegetation. When submergent vegetation coverage approached 50%, about 100 samples were required to produce the desired precision. For emergent vegetation, 40 to 60 samples were required. Agreement between inexperience observers in this study was high in these shallow natural lakes. The authors suggest that the use of simple classification (3 vegetation density categories and 2 vegetation types) can be used to produce relatively high precision estimates of coarse-scale vegetation and substrate in shallow, natural lakes.

Olson, N. W., C. P. Paukert, D. W. Willis, and J. A. Klammer. 2003. Prey selection and diets of bluegill Lepomis macrochirus with differing population characteristics in two Nebraska natural lakes. Fisheries Management and Ecology 10: 31-40.

Paukert, C. P., and D. W. Willis. 2002. Seasonal and diel habitat selection by bluegills in a shallow natural lake. Transactions of the American Fisheries Society 131:1131-1139

Paukert, C. P., D. W. Willis, and J. A. Klammer. 2002. Effects of predation and environment on quality of yellow perch and bluegill populations in Nebraska sandhill lakes.

Chvala, P. J., C. P. Paukert, and D. W. Willis. 1999. Relationship between a lake's chemical/biological characteristics and its management potential for fisheries and waterfowl: Bluegill reproductive biology in Pelican and Cozad lakes, Nebraska. Completion Report. U. S. Department of the Interior, Fish and Wildlife Service, FWS No. 1448-60181-98-N508, Appropriation No. 64310-1261-6056.

Paukert, C. P., T. J. DeBates, and D. W. Willis. 2003. Factors affecting panfish populations in Sandhill lakes: Job 2- Food habits of fish in Nebraska Sandhill lakes: bioenergetic modeling 1 March 2001 through 28 February 2003. Federal Aid in Sport Fish Restoration, Dingell-Johnson project F-118-R-4.

Packard, G. C., and M. J. Packard. 2003. Cold acclimation enhances cutaneous resistance to inoculative freezing in hatchling painted turtles, Chrysemys picta. Functional Ecology 17: 94-100.

Packard, G. C., and M. J. Packard. 2003. Influence of acclimation and incubation medium on supercooling by hatchling painted turtles, Chrysemys picta. Functional Ecology 17: 611-618.

Packard, G. C., and M. J. Packard. 2003. Natural freeze-tolerance in hatchling painted turtles? Comparative Biochemistry and Physiology Part A 134: 233-246.

b. Ongoing research at Valentine NWR

Kathy and Mel met with Dr. Tom Bragg (Univ. of Nebraska - Omaha) to discuss techniques for monitoring plant communities. Dr. Bragg is a plant ecologist with many years of experience working in Sandhills prairie. After considering many different options and a close look at the CCPs for Valentine and Ft. Niobrara NWRs, a vegetation monitoring protocol was developed and implemented in 2003.

Chandreyee Mitra, a PhD. student from the University of Nebraska-Lincoln, arrived on 4 Apr to begin a pilot of her proposed PhD research. Ms. Mitra is a student of Dr. Robert Gibson, and will be studying the potential mechanisms that lead to mixed-species lek formations. Her hypothesis is that it is beneficial for prairie chickens to join sharp-tailed grouse leks if the chickens can utilize sharp-tails alarm calls to avoid predators. Her specific objectives are to test if sharp-tailed grouse produce an alarm call in response to predator vocalizations, and to determine whether male prairie chickens join sharp-tailed grouse leks to exploit sharp-tailed grouse attentiveness and/or alarm calls to reduce their predation risk.

The Science Support Project (SSP) proposal submitted by Pam Pietz (USGS, Northern Prairie Wildlife Research Center) and Nenneman was selected to be

funded. The next step of the project will be developing a full study plan. This project will look at the effects of the refuge grazing program on the distribution and abundance of grassland birds at Valentine NWR, and will begin in 2004.

Dr. Jeff Lang (University of North Dakota) conducted his final year of research on Blanding's turtles at Valentine NWR. Refer to section G. 10 for more on this research.

Drs. Gary and Mary (Kathy) Packard made their annual visit (5 Jun to 18 Jun) to Valentine NWR to collect painted turtle and snapping turtle eggs. Once the turtles started nesting, they were very successful at collecting eggs for their laboratory studies. They collected 55 painted turtle clutches for their studies of hatchling turtle physiology, mostly from the boat landing at Hackberry Lake and the lawns around headquarters.

E. ADMINISTRATION

1. Personnel

Kime Miller Lindvall Nenneman Uthe (MLL)

Valentine National Wildlife Refuge is part of the Fort Niobrara/Valentine National Wildlife Refuge Complex with three permanent staff assigned to the station. They are:

Mark Lindvall	Refuge Manager	GS-12
Mel Nenneman	Wildlife Biologist	GS-11
Dave Kime	Maintenance Worker	WG-8
Vacant	Student Career Experience Program	GS-07

During the year we had 2 firefighters assigned to the refuge:

Ted Miller	Range Technician	GS-4 TFT
Jim Uthe	Range Technician	GS-4 TFT

Both Ted and Jim were out west on fire details for a good part of the summer. When on the refuge they were a big help with refuge biological and maintenance projects.

4. Volunteers

Ted Miller stayed on and volunteered at Valentine National Wildlife Refuge for 90 hours at the start of October. He helped with the buffalo sale at Fort Niobrara National Wildlife Refuge and with windmill work at Valentine National Wildlife Refuge.

Retired Refuge Biologist Len McDaniel volunteered about 40 hours during the year. He helped with the grouse wing bee and is organizing grassland transect photos.

Jonathan Wilde, a wildlife artist from Wisconsin, donated a print to Valentine NWR. The print depicts a winter Sandhills scene, with 4 prairie chickens and one sharp-tailed grouse in the foreground. A falconer and his dogs are in the background. Mel Nenneman contributed a barn wood frame, and had Price's Gallery mat and mount the print. The print is on display at the Hackberry Headquarters Office.

5. Funding

Valentine National Wildlife Refuge receives funding as part of the Fort Niobrara/Valentine National Wildlife Refuge Complex. This year we received no MMS project funding. The RONS database for Valentine NWR was updated during the year. It is disappointing, especially with the low staffing level, that Valentine National Wildlife Refuge projects are ranked so low at the RO and WO

levels. We received $12,000 in RONs funding via some end of the year money from the Regional Office for integrated pest management. We used the money to buy a 6X6 all terrain vehicle for weed spraying and a computer to house a GIS program for tracking weeds.

Challenge Cost Share proposals were submitted for two projects. The first was fisheries surveys at Valentine National Wildlife Refuge in cooperation with Nebraska Game and Parks and the USFWS Pierre Fisheries Assistance Office. This was not funded. The second was with Pheasants Forever and is for seeding native grasses in former cropland at Yellowthroat Wildlife ManagementArea. This was funded in the amount of $7,000 and work will start on this project in 2004.

A grant for $1,498 was received from the North American Nature Photographers Association Infinity Foundation for construction of a photo blind for grouse viewing at Valentine National Wildlife Refuge. The new blind will replace one of two old and inadequate blinds. Construction will be done by Eagle Scout Candidate Danny Lindvall and the local Boy Scout Troop 288.

Grant proposals for a new general brochure, an auto tour route brochure, and a nature trail brochure were prepared and submitted for visitor services grants. The brochures will update to standard or be new products for Valentine National Wildlife Refuge. The new general brochure proposal was funded for $3,000.

6. **Safety**

Monthly safety meetings were held for the Complex. Their content is listed in the Fort Niobrara National Wildlife Refuge Annual Narrative. Refuge Manger Lindvall hosted the November safety meeting and provided information on firearm safety in the field and at home.

7. Technical Assistance

Nenneman met with Kyle Graham (USFWS, Kearney office) to discuss potential management and monitoring of a private ranch near Ericson, NE. The ranch has bottomland along the Cedar River, and has good potential for providing nesting cover for prairie chickens, waterfowl, and passerines associated with taller grass cover. Meadow management on the ranch would need to be altered to accomplish this goal. Upland cover on the ranch seemed to be in good condition.

Nenneman worked at the Region 6 wing bee at Flint Hills NWR in KS. There were a record number of duck wings and goose wing tips and tails sent in for the 2003 wing bee. The opportunity to see so many wings in a short time lets participants really learn how to age and sex waterfowl using wing characteristics, and the interactions with other wildlife people builds useful contacts. Tours of

Flint Hills NWR were also provided, so participants had the opportunity to see the issues and management of an entirely different system. This floodplain refuge is dominated by moist-soil management units that provide stop-over points for migrating waterfowl and other wetland associated species.

The heads and internal organs of 10 pheasants taken by hunters at Valentine National Wildlife Refuge were sent to Nebraska Game and Parks for their use in a parasite study.

8. Other

a. Meetings

Refuge Manager Lindvall attended the project leaders meeting held in Scottsbluff, NE on April 1 and 2.

Refuge Manager Lindvall and Biologist Nenneman attended the joint meeting of the Central Mountains and Plains Section and Nebraska Chapter of the Wildlife Society held in Sioux City, Nebraska on August 6,7, and 8. The conference focused on Missouri River issues and prairie restoration.

Nenneman traveled to Nebraska City for the Fall Symposium of the Nebraska Partnership for All-Bird Conservation. The meeting featured presentations about grassland bird biology and their conservation in the modern landscape.

Biologist Nenneman attended the 64th Annual Fish and Wildlife Conference in Kansas City, MO from 8-10 Dec. Nenneman presented a paper on nest site selection by three grassland nesting birds. The meeting was well-attended, and there were many good paper presentations.

b. Training

Valentine National Wildlife Refuge employees Kime, Lindvall, Cumbow, and Nenneman completed Microsoft Excel computer class. The 12 week evening class was offered by Mid Plains Community College and held at the Valentine High School.

Kime and Lindvall completed required ethics training via the internet.

Valentine NWR staff, Lindvall, Kime, and Nenneman completed the 8 hour fire refresher training held on March 24. Lindvall and Kime passed the pack test for arduous at their law enforcement refreshers in Arizona.

Refuge Manger Lindvall completed Alternate Conflict Resolution Training. It was difficult to get the CD to run properly to complete the training.

In June Refuge Manager Lindvall and Maintenance Worker Kime completed the crew boss/engine boss training given here in Valentine.

Range Techs Uthe and Miller, Biologist Nenneman, MaintenanceWorker Kim, and Manager Lindvall all completed Load Securement Training held at the Rocky Mountain Arsenal National Wildlife Refuge in July.

Nenneman attended Motorboat and Airboat Operators Certification Course.

c. Reports

The Real Property Inventory verification for Valentine National Wildlife Refuge was completed. Getting this done was the ultimate in frustration as the web page was either unavailable or ran very slow. The system was over loaded and often did not work even during non-duty hours.

The 1992,1993, 1994, 1995, 1996, 1997, 1999, and 2000 annual narrative reports for Valentine NWR were completed this year. Monthly activity reports and some sections done at the time were used to compile the reports. It was difficult to do some of these old narratives as activity reports and other information has been lost.

F. HABITAT MANAGEMENT

1. General

The 71,772 acre Valentine NWR lies at the heart of the Nebraska Sandhills. These grass-stabilized sand dunes provide some of the best native mixed- and tallgrass prairie remaining in the U. S. The refuge contains rolling, vegetated sand dunes and interdunal valleys that characterize the Sandhills region. Shallow lakes and wetlands are interspersed throughout the valleys, grading into subirrigated meadows. Sandhills and choppy sandhills range cover about 49,000 acres. Native grasses provide the dominant vegetation cover, although small areas have been invaded by Kentucky bluegrass and smooth brome. Other exotic plants of concern include small areas of leafy spurge, Canada thistle, and spotted

knapweed. Grassland management is accomplished using permittee grazing and haying, prescribed fire, rest, and weed control.

2. Wetlands

There are 37 major wetland/lake areas on Valentine NWR that comprise about 13,000 acres. Lake elevations have been recorded at seven refuge lakes off and on since 1988. The water control structure at Willow Lake washed out in 1997, and lake elevations are now more difficult to measure. Lake elevations were recorded at 6 lakes in 2003 (Table F2.1). Water levels were mostly down or about the same as long-term averages. Note that almost all elevation data for 2003 is from May, and the long-term average includes data from all of the ice-free months. Thus, although the elevations recorded in 2003 are close to the average, they reflect lower than average May elevations.

Table F2.1. Lake elevations for six lakes on Valentine NWR, 2003.

Lake	Date	Elevation	Average for 2003 [a]	Average 1988-2003 [b]
Clear	9 May	2915.98		2917.28
Dewey	9 May	2924.40	2923.93	2923.91
Hackberry	14 May	2924.36	2923.72	2924.81
Pelican	14 May	2945.11 [c]		2942.78
Watts	14 May	2922.95		2923.91
Whitewater	8 May	2928.00	2927.87	2928.18

[a] Average calculated only if there were multiple elevations recorded during the year.

[b] Average includes elevations readings from throughout the year, while May readings tend to be among the highest in any given year.

[c] This reading may be in error- would only be about 1 foot below top of water control structure.

With below average precipitation and lower water levels in most lakes across the refuge, an attempt was made at drawing down Whitewater Lake in 2003. One stop log was removed on 22 April to begin moving some water into Dewey Lake. In conjunction with letting water out of Whitewater Lake, a carp trap was placed in the canal below the water control structure to capture and remove some large adult carp (see section G 11). The water level dropped slowly and steadily throughout the summer, from a reading of 2928.20 when the water release was begun, to 2926.74 on 14 August, when the stoplogs were put back in place. Drawing down the lake by approximately 1.5 feet did not expose any mudflats on Whitewater Lake. Other casual observations indicate that emergent vegetation may have increased along the shoreline and out into the lake, and that submergent vegetation may have increased. Several small pockets of smartweed were noted along the shoreline, the seeds of which are an excellent food source for migrating waterfowl. No Canada thistle was noted in the emergent vegetation edge where receding water often provides a suitable substrate for thistle germination. The

initial drawdown plan called for reducing the lake level about one foot per month through May, June, and July. Water flow would have had to have been doubled to meet this goal. It does appear that several of the objectives of lowering the water level may have been achieved (e.g. increasing emergent vegetation and providing food sources for migrating waterfowl).

There are 32 ground water monitoring wells located on and adjacent to Valentine NWR. These wells were established in the 1950's by the USDI-Geological Survey, and have been monitored twice annually by refuge staff since 1970. Spring well readings in 2003 were about equal to or slightly above the long term averages, while fall readings were universally below the long term fall average. This pattern reflects the precipitation patterns for 2003, with good rainfall during the spring and early summer, with almost no rain from mid-July on.

Table F 2.2. Spring and fall USGS groundwater well readings, and the spring and fall averages as recorded from 1970-2003. Groundwater elevation is given for all wells for which the elevation is known. For wells that the elevation is not known, an index value is given.

Well No.	Well Location	Spring	Spring Ave	Fall	Fall Ave
1	N. East Long	2875.6	2874.4	2872.1	2873.3
2	SE corner S. Marsh	Plugged	2894.6	Plugged	2893.3
3	SE corner Pony	2900.3	2899.6	2895.9	2897.9
4	SE corner Cow	2920.4	2919.3	2916.4	2918.5
5	Calf Camp & Hwy 83	2896.2	2896.4	2893.7	2895.2
6	Calf Camp West	2916.8	2915.5	2913.6	2913.8
7	Little Hay West	2916.7	2916.1	2915.1	2916.1
8	Little Hay & Hwy 83	2899.0	2899.4	2896.7	2898.3
10	W. Pony & Hwy 83	2923.9	2922.9	2920.8	2922.6
13	S. Willow	2917.5	2917.3	2915.8	2917.2
14	E. McKeel	2921.7	2920.1	2917.8	2919.1
15	S. East Sweetwater	2925.9	2925.1	2923.6	2924.7
16	SE Trout	2899.4	2899.0	2896.8	2898.8
17	E. Crowe Headquarters	95.4	95.3	95.0	95.1
20	S. Watts	2925.1	2924.8	2922.8	2924.2
21	E. Pony Pasture	2925.2	2925.0	2923.5	2924.5
22	Hackberry-Dewey Canal	2924.6	2923.7	2920.7	2923.2
23	Badger Bay	2924.3	2923.7	2922.9	2923.8
25	E. Pelican	2943.1	2943.8	2942.4	2943.4
26	E. West Long	2964.9	2965.3	2962.8	2965.3
27	W. Recreation Area, Dad's	2957.3	2957.7	2954.5	2956.5
29	NW Pelican	2949.4	2948.3	Plugged	2947.7
30	S. Dewey Marsh	2940.4	2940.6	2938.6	2939.5
31	W. Dewey Marsh	98.0	98.3	97.2	98.6

32	N. Pelican	2942.4	2941.6	2939.2	2941.0
33	NW West Long	2980.4	2980.6	2977.2	2979.8
34	Hwy 83 & W. King Flats	2925.0	2924.1	2922.6	2923.9
35	SE "21" Lake	96.7	96.2	93.5	95.5
36	W. Sweetwater & Hwy 83	2927.1	2927.2	2924.0	2926.4
38	SE West Twin	2921.7	2920.6	2918.5	2920.0
39	SW Hassle Place	94.0	94.5	93.0	94.1

5. Grasslands

The native prairie on Valentine NWR was recognized in 1979 with the designation of the refuge as a Registered National Landmark. Four range sites are recognized within the refuge boundaries, each contributing to the diversity of the grassland. Wetland range sites are characterized by prairie cordgrass, blue-joint reed grass, sedges, goldenrods, saw-toothed sunflowers, and willows. The threatened western prairie-fringed orchid is also found in some of these wetland range sites.

Sub-irrigated range sites are located where the water table is near the soil surface. These areas support grasses more characteristic of the tallgrass prairie. Dominant species found in these areas include switchgrass, Indian grass, and big bluestem. Many of our problem plant species occur in these sub-irrigated range sites. Kentucky bluegrass, smooth brome, leafy spurge, and Canada thistle are all most prevalent here.

Sand range and low sand range sites are on lower and gently sloping hills, and are covered with native cool and warm season grasses characteristic of the mixed-grass prairie. Needle and thread, porcupine, June, western wheat, prairie sandreed, sand bluestem, sand lovegrass, little bluestem, and switch grass are prevalent on these sites. Many forbs are also found here at varying abundance and visibility depending on climatic conditions.

Choppy range sites are the high dunes that gave the Sandhills their name. These hills are generally vegetated, but may be subjected to wind erosion resulting in a blowout. These blowouts are habitat for blowout grass and the endangered blowout penstemon. Predominant grasses in the "choppies" are blue grama, sand bluestem, prairie sandreed, sand lovegrass, sandhills muhly, and little bluestem.

Grassland management goals are to preserve, restore, and enhance the ecological diversity of indigenous flora of the Sandhills prairie. Management to meet this goal is accomplished through disturbance with grazing, haying, and fire, and rest.

7. Grazing

In 1985 the refuge habitat management program was changed and short-duration grazing started. Prior to 1985, much of the refuge grassland was grazed on a six

week rotation. Authorized AUMs for each of the permittees have remained about the same when compared to 1997 levels. In 2003 there were six permittees in the program. All have had permits for many years. . Several reduced their herds in response to the drought. At the end of the year long time refuge grazing permittee Orville Gallino passed away. Grazing rates were reduced to compensate permittees for the added expense of moving cattle for short duration grazing.

Ron Shupe from the RO and Tim Hall from WO and refuge staff met with Valentine NWR grazing permittees on May 13. All permittees but Hanna were present. Concerns expressed by the permittees included low payment in lieu of taxes, too much rest, weeds, wildfire, non-red card firefighters not permitted on refuge, can not pass on permits to sons, conversion to electric fence, use of prescribed fire rather than grazing, gates left open, windmills not working, contract fencers not doing good job, cost of grazing too much, conversion to bid system, more wildlife on private land, cow/calf rate too high, and the need to graze more for income to government.

In August about 400 head of cattle entered the refuge at the water gap on East Long Lake and spent a week grazing the habitat units around the lake. The cattle owner was notified and immediately removed the herd. We repaired the water gap. Cattle trespass at water gaps is a continual problem. Later in the month about 40 head of cattle went around the water gap again and trespass grazed the 34 C units. This is the third time they have been in there. Water gaps are a continuing problem as water levels drop.

The continuing drought affected the success of our grazing treatments. We had adequate moisture early and grasses grew very well in May, June, and early July. Needle and thread was especially abundant, blanketing the hills in many places. Mid and late summer was again very dry. Habitat units graze later in the summer had little re-growth due to the drought.

Grazing fees for 2002 were:

spring grazing treatment		$16.07/AUM
	short-duration grazing	
	1 day in unit	$7.84/AUM
	2 days in unit	$14.24AUM
	3 days in unit	$16.07/AUM
	4 days in unit	$16.80/AUM
	5 days in unit	$17.16/AUM
	6 days in unit	$17.53/AUM
	7 days in unit	$17.90/AUM
	8 or more days in unit	$19.36/AUM
fall		$19.36/AUM
winter		$19.36/AUM

The full rate of $19.36 is an increase of $1.00 per AUM (the maximum increase permitted per year by policy) from the 2002 fee and is based on a rate survey conducted by USDA and published in Nebraska Farm Real Estate Market Developments. The market rate as determined by USDA for this area in 2003 was $20.90/AUM. The rates for different classes of animals were also changed this year and now use the US Department of Agriculture Statistics Board conversion factors. Mature cow stayed at 1.00; mature cow with nursing calf went from 1.25 to 1.32; yearling went from .75 to .70; bulls from 1.00 to 1.50; and horse from 1.00 to 1.20.

Permittees also had their grazing bills reduced for improvements and repairs to wells, fence, tanks and other facilities needed for the program. In 2003, about $42,000 was spent on improvements and deducted from final billings. Several fence replacement projects were not completed and may be done in 2004 using 2003 funds. Permittees were required to hire a contractor to repair fences in the units they used. Basically two fence contractors were hired and they split the fence repair for the six permittees. They were paid $30 per hour for a crew of two, and supplied their own gas, tools, vehicle, and equipment. Total fees for the 2003 grazing season will be about $$51,000. This total does not include the value of the refuge share of hay.

The methods and expected results for the different grazing strategies are explained below. The acreage of grassland treated with each type of grazing is listed in Table F7.

a. **Spring Grazing Treatment**

Spring grazing treatment (SGT) is done before the end of May on sub-irrigated meadow sites. The cattle are in the unit for greater than two weeks. Cattle eat or trample almost all of the residual cover. They also over graze and thus reduce undesirable cool season exotic grasses (Kentucky bluegrass and brome). Cattle can be placed in a unit to remove residual and then brought back in later to hit the cool season exotics. In some instances, cattle are brought back in at several later dates for the same purpose. Because much of the feed is in the form of old mat, this treatment is best done by fall calving cows and not by lactating spring calving cows. Meadows that are hayed are also sometimes given this treatment to add fertilizer.

Dramatic results occur with this treatment. Exotic cool seasons, such as Kentucky bluegrass, are suppressed and native warm seasons, such as switch grass, increase in vigor and density. The disadvantage is the loss of the unit for nesting in the year of treatment and a lower waterfowl nesting density in the following year. Often the unit can however be rested for up to five years following treatment.

In 2003, 23 habitat units totaling 3,351 acres received a spring grazing treatment and included some areas that were latter hayed

b. **Spring Short-duration Grazing**

Spring short-duration grazing (ES-SD) is grazing a unit for less than two weeks during May. Generally the cattle are in the unit for only three to five days. This type of grazing is generally done in hill units to stimulate growth of grasses, especially cool seasons. The short exposure times eliminate overgrazing. In 2003, 9 habitat units totaling 1,974 acres had spring short-duration grazing. Where possible units grazed later in summer the previous years are grazed using this treatment. This both varies treatment and reduces disturbance to nesting cover. Most units grazed with ES-SD show excellent growth by fall.

c. **Short-duration Summer Grazing**

Short-duration summer grazing (SD-S) is done from June 1 through September 1. Cattle are in a unit for less than two weeks. Most units are grazed only three to five days and the cattle moved on to the next unit. Electric fences are used to break up larger units and increase stock density. Most short-duration summer grazing was completed by mid-July. In 2003, 66 habitat units totaling 14,700 acres were short-duration summer grazed. Units grazed in this method show good growth by fall if there is adequate moisture. If little or no late summer rainfall is received, as was the case in 2002 and 2003, re-growth is less, especially in those units grazed in late July or August.

d. **Summer Grazing**

Summer grazing (S) is done from June 1 through September 1 and cattle are in the unit for two weeks or longer. In 2003, no acres were summer grazed. These are usually larger units which have not been cross fenced.

e. **Fall Grazing**

Fall grazing (F) is done from September through November. Fall grazing can reduce mulch accumulations, add fertilization, and maintain grouse leks. If done at the proper time cattle will also graze out small wetlands and leave the surrounding upland vegetation alone. Generally the wetlands have green in them while the uplands have only cured grasses. Grazing in the wetlands recycles nutrients and provides pair habitat for ducks in the spring. Generally we have moved away from fall grazing. Fall grazing eliminates both winter cover and nesting cover in the following year. Some units were fall grazed in 2003 that will be given a spring grazing treatment in 2004. One unit was fall grazed after being hayed. This adds fertilizer to the soil and eventually quality and quantity to the

hay harvested. In 2003, 6 habitat units totaling 1,466 acres were fall grazed.

f. **Winter Grazing**

Winter grazing (W) is done during the November through April period. In winter grazing, cattle are fed hay on a feed ground in a unit. The hay comes off the refuge. When the weather is harsh the cattle feed on hay but when it is nice they graze away from the hay ground. Units with a history of winter grazing combined with feeding also have excellent growth of grasses away from the feedlot. This is due to the import of energy in the form of fertilizer. Hay is cut in the meadows. Resident wildlife also utilize waste grain from the feeding operation. Winter feeding can also be used to stabilize roads. In 2003, 4 habitat units totaling 1,103 acres were winter grazed.

g. **Fire**

Prescribed fire (P) and natural or wildland fire (N) are discussed in the fire section. Due to the continuing drought no prescribed fires were done in 2003.

Table F 7a 2003 HABITAT MANAGEMENT SUMMARY

Treatment	**units**	a**cres**	**aums**
Rest rest(R)	216	38,541	-
Spring			
spring grazing treatment (SGT)	23	3,351	1,316
early spring short duration (ES-SD)			
ES-SD 1-6 days	9	1,974	261
ES-SD 7-9 days	0	-	-
Summer			
short duration summer (SD-S)			
SD-S 1-3 days	30	4,374	739
SD-S 4-7 days	33	10,326	1,574
SD-S 8-14 days	0	-	-
summer S 15-27 days	0	-	-
Fall (F)	6	1,466	419
Winter(W)	4	1,013	1,463
Hayed (H)	14	1,191	-

Fire

prescribed fire (P)	0	-	-
natural fire (N)	0	-	-

**note: some habitat units received double treatment, primarily hayed units that we also SGT or F or R units that had N or P fires.

8. **Haying**

About 1,191 acres of sandy, sub-irrigated, and wetland range sites were mowed and yielded 1,463 tons of hay. All or part of 14 habitat units were mowed and hayed. Hay production was good this year even though we were in drought status most of the year. The spring rains must have been enough to make the grass grow well in the meadows.

The method of charging for hay was changed in 2001. Now hay is put up on a 50/50 split with the permittee taking half home and feeding the other half back on the refuge at the full rate of $19.36/AUM. Some hay is still needed at Fort Niobrara NWR for the horses and exhibition herd. This hay is cut on a 60%permittee/40% refuge split. The permittee also has to deliver the refuge share to Fort Niobrara NWR. One hundred and fifty large bales of grass hay and 220 small square bales of hay were delivered to Ft. Niobrara NWR.

Most of the meadows hayed are also grazed either in the fall or spring. This adds fertilization to the meadows and improves the quality and quantity of hay produced. In general we try to mow low sites with mostly reed and cord grasses.

Haying is used to provide fire protection for facilities, browse areas for Canada geese, sandhill cranes, prairie grouse, and deer and to provide hay to Fort Niobrara NWR. Mowing can also open up small wetlands for waterfowl pair habitat. Hay is also used in the winter treatment described under the grazing section of this report.

Areas to be hayed, in which we have found the endangered prairie white-fringed orchid in the past, were searched on foot. Searches were done when the plant was in bloom. Plants found were marked with lathe with orange tops and the area not mowed. Haying may be of some benefit to the orchid as most of the plants found on the refuge are in areas that are annually hayed. Very few orchids were found again this year, most likely due to the drought.

9. Fire Management

Complete information for the Fort Niobrara/Valentine National Wildlife Refuge Complex fire management program can be found in the Fort Niobrara Annual Narrative.

Due to the drought and burn bans in place due to the drought, no prescribed fires were conducted on Valentine National Wildlife Refuge in 2003. There were also no wildfires on the refuge in 2003.

The final accomplishment report for fire rehab projects needed as a result of the large wildfires of 2000 at Valentine National Wildlife Refuge was completed. Total spent from all fund sources was $80,103 of which $50,303 was fire rehab money, $25,000 from grazing receipts, and $4,800 from refuge funds. In all 93 miles of fence were repaired and 19,500 acres grazed over 2 years. Grazing treatments were planned to reduce exotic grasses and stimulate natives. Unfortunately droughts in 2001 and 2002 reduced the effectiveness of treatments (see 2002 Valentine National Wildlife Refuge Annual Narrative for discussion of success of treatments).

A 30 foot buffer was cleared around the buildings and fuel tanks at Hackberry Headquarters. Trees and brush were cleared to make the buildings less susceptible to burning in the event of a wildfire. There were quite a few cedars growing close to and even touching the buildings. Plans were also made to prepare a project for Wildland Urban Interface funding. The project will involve some thinning and possibly a prescribed fire to remove duff.

10. Pest Control

Low water has allowed cottonwood seedlings to become established around many refuge wetlands and lakes. If these trees survive they will eventually ring the wetlands with large trees. This has happened in other areas in the Sandhills, especially at wetlands in CRP acres. We may need to apply grazing, mowing, spraying, or fire to prevent this invasion of tree around wetlands.

Figure F 10. Cottonwoods growing along the shore of Rice Lake. (MLL)

The tree shears on the Bobcat was used to cut about 500-600 cedar trees in habitat unit 35 C. The trees were cut in one work day. The Bobcat is very efficient in cutting cedar trees and should prove especially useful for removing cedar trees that are larger and sometimes not killed by prescribed fires.

Refuge Operating Needs funding for weed control in the amount of $12,000 was received from the Regional Office. The money was used to purchase a 6 by 6 ATV for spraying weeds and a computer to run a mapping program to monitor weeds on the refuge.

Biologist Nenneman and Manger Lindvall visited LaCreek National Wildlife Refuge is July to see what they are doing for weed control. Of interest was their

use of intensive grazing in June and July to reduce Canada thistle is cattails. They see positive results where Canada thistle is growing in dry cattails with a lot of duff. Receding water levels have opened up new habitat for Canada thistle on Valentine National Wildlife Refuge and it has spread into many new locations. Lindvall and Nenneman visited LaCreek NWR in early July to discuss Canada thistle control with Matt Springer. Springer has been working to reduce Canada thistle using spraying and grazing. Cattle seem to be effective at reducing the duff layer where the thistle germinates well, and they graze the plants as well. Current management is aimed at reducing the amount of cattail edge and promoting grass cover in behind the receding cattail.

All known patches of leafy spurge on Valentine National Wildlife Refuge were fall sprayed with Plateau Herbicide. An estimated 40 acres were sprayed using 2 lbs AI. We have seen good control with this treatment Spraying last year with Plateau appeared to be effective, as there was an evident line between dead plants and live plants, indicating where the spray truck had gone through. Some patches of Canada thistle, about 30 acres, were sprayed with Rodeo (27 lbs AI). (Table F 10.1). Many areas were not sprayed due to time constraints. We say good results using Rodeo on thistle. We were concerned that the Rodeo, being a broad spectrum herbicide, would kill all plants. This did not appear to be the case with some plants that were perhaps not growing at the time of spraying filling in.

Table F 10.1. Weed spraying on Valentine NWR during 2003.

Habitat unit	Plant treated	Date treated	Treated with	Location	Comment
15 A	Leafy spurge	12-22 Sept	Plateau 8oz/acre	N 42 31.205, W 100 37.972	
15 A	Leafy spurge	12-22 Sept	Plateau 8oz/acre	N 42 31.201, W 100 38.044	
15 A	Leafy spurge	12-22 Sept	Plateau 8oz/acre	N 42 31.212, W 100 37.930	
15 C	Leafy spurge	12-22 Sept	Plateau 8oz/acre	N 42 30.989, W 100 37.675	
8 E	Leafy spurge	12-22 Sept	Plateau 8oz/acre	N 42 30.831, W 100 38.947	
8 E	Leafy spurge	12-22 Sept	Plateau 8oz/acre	N 42 30.801, W 100 38.352	
8 E	Leafy spurge	12-22 Sept	Plateau 8oz/acre	N 42 30.826, W 100 38.265	
3 B	Canada thistle	15-16 Jul	Rodeo 1.5% solution	N 42 34.251, W 100 40.596	South of 16 B kiosk
4	Canada thistle	15-16 Jul	Rodeo 1.5% solution	N 42 32.822, W 100 37.197	Dewey campground
16 A1	Canada thistle	15-16 Jul	Rodeo 1.5% solution	N 42 32.682, W 100 36.423	Dewey dike

	Canada thistle	15-16 Jul	Rodeo 1.5% solution	N 42 27.858, W 100 34.217	West Sweetwater
	Canada thistle	15-16 Jul	Rodeo 1.5% solution	N 42 27.967, W 100 34.290	West Sweetwater
	Canada thistle	15-16 Jul	Rodeo 1.5% solution	N 42 27.936, W 100 34.175	West Sweetwater
4	Canada thistle	15-16 Jul	Rodeo 1.5% solution	N 42 33.120, W 100 36.680	East Clear Lake parking lot
4	Canada thistle	15-16 Jul	Rodeo 1.5% solution	N 42 32.939, W 100 36.638	Clear Lake road
4	Canada thistle	15-16 Jul	Rodeo 1.5% solution	N 42 32.819, W 100 36.618	Clear Lake road

13. <u>Easement Monitoring</u>

Manager Lindvall and reps from the Natural Resource Conservation Service and Nebraska Game and Parks visited Wetland Reserve Program easements to prepare long term plans of operation. The easements range from 59 to 1,600 acres in size all have potential of providing good wildlife habitat. Our task will be to develop grazing, haying, and wetland restoration plans (compatible use plans) that will benefit grasslands and wildlife. Violations were observed on some easements so it will likely be an uphill battle. All easements have also changed hands at least once since the WRP contracts were signed and the money paid out. This causes problems as the new landowners now have the easement but didn't get the payment.

Refuge Manager Lindvall along with Natural Resource Conservation Service and Game and Parks staff visited two existing and one proposed Wetland Reserve Program site in May. The proposed site had several small wetlands in a corn pivot. Some of the wetlands had been filled so the pivot could cross. The ranking for this site came out fairly low. A management plan for the Hawk WRP including a winter graze and grass seeding was decided upon. This site was seeded in the past with poor results. A five year management plant for the Solomon WRP was also set. This WRP has a good stand of grass that is in 10 plus years rest. In 2003 it will get a spring grazing treatment. In the following 4 years it will be divided into 3 pastures that will be fall followed by spring grazing in rotation.

The Hoff Wetland Reserve Program land was checked for compliance. The area has a grazing program that was not followed this year. The landowner assured us that this will not happen again. The landowner also requested assistance with water pumping to fill wetlands and funds to dig out cattail choked wetlands. Game and Parks and FWS declined to assist with these projects. We did provide

some information on pumping that the landowner could do at his expense. We also provided information on using grazing to reduce cattails. The area also has many cottonwood trees that we are encouraging the landowner to remove.

Refuge Manger Lindvall went on two Wetland Reserve Program site visits on November 12. The visits were to review or make new compatible use plans. One site, the Double M Wetland Reserve Program, is being used as a hunting club and the manager is interested in providing good cover for game birds. This plan has one year left and we have had good compliance with the plan. The second wetland Reserve Program area was just purchased by Ron Dearmont. He purchased the land from a real estate agent who said that he could basically graze as he pleased on the acreage. The real estate agent bought the land and held it for about a year before turning it over. NRCS has informed the new owner about the need for a compatible use plan before any use could take place. We set up a plan to reseed parts of the land where past seedings did not take. We will also allow the land owner to hay part and feed the hay back on sandy areas to promote better grass stands.

The Mead FmHA Easement in Keya Paha County was checked during the year. A special use permit was issued to the landowner to do a spring grazing treatment on the western half of the land. A leasor built the needed fence and did the graze. Part of the deal was to cut the many cedar trees growing in the meadow. This was done and should help keep this from becoming a forest, the fate of a lot of similar grasslands in the area. Where there was a native grass component the area responded well to the grazing. Indian grass and big bluestem grew especially well. Where it was solid brome, the brome looked very stressed but there were no natives that came up. We will repeat the spring grazing treatment here again next year.

The ¼ section under FmHA easement in Knox County, part of the Wagner FmHA easement, sold to Becker and Weibelhouse who live in Norfolk. The Knox County Assessor called to inquire about the easement as she is charged with setting an evaluation. As the easement is fairly restrictive it is difficult to set an assessment. The 160 acres sold for $28,000. This easement now has two land owners that we need to deal with. It was not visited during the year.

We also have an FmHA easement that adjoins Yellowthroat Wildlife Management Area in Brown County. We visit this easement regularly as it is adjacent to the Wildlife Management Area. In the fall about 20 head of trespass cattle were noted. The owner was tracked down and the cattle were removed. The cattle did not belong to the land owner.

G. WILDLIFE

1. Wildlife Diversity

Wildlife diversity, with the exception of large ungulates and their predators, is relatively unchanged in the Nebraska Sandhills as compared to most areas of the United States. Native grasslands dominate the local flora, and indigenous wildlife is well represented. Threats to this largely intact grassland system are changes in the disturbances that led to the evolution of the grassland system and invading exotic species. While much is not known about historic disturbance, fires and large bison herds undoubtedly played a role in shaping this grassland system. A bison vertebra, with the long spine that extends into the buffalo hump, was found along the dry shoreline of the Marsh Lakes at Valentine NWR in 2002.

Maintenance and enhancement of the Sandhills prairie is necessary to ensure the ecological integrity of the flora and fauna found on Valentine NWR. Grassland management on the refuge incorporates grazing, mowing, rest and prescribed burning to accomplish refuge objectives. Nesting information collected at the refuge indicates that management for greater quantities of tall, vigorous native vegetation provides the best nesting cover for migratory waterfowl and resident prairie grouse. This type of cover is often lacking on private land, thus the refuge has sought to use grassland disturbance to maintain grassland vigor without compromising nesting cover.

Refuge wetland management is primarily accomplished to maintain wetland quality. Size limits on northern pike, capture of adults, and chemical renovation of lakes have all been used to reduce carp populations. Carp have detrimental effects on water quality, and subsequent plant and invertebrate production which play an important role in waterfowl production. Removal of carp has not been accomplished on refuge lakes, although renovations in the 1970's and 1980's removed carp for a few years. Current management using northern pike seems to be working to limit carp population growth.

2. Endangered and/or Threatened Species

a. Bald Eagle

An possible eagle nest was located about 200 yards east of the Valentine NWR boundary, east of North Marsh Lake. The nest was reported to the state and was checked for activity in the spring (April). No Bald Eagles were in the area; however, a red-tailed hawk was observed using one of the nests in the tree grove.

A fairly large concentration of eagles was observed on Valentine NWR during mid- to late March around Willow Lake. There was a major fish kill in the lake during the fall or winter, and the abundance of carp carcasses attracted large numbers of eagles. LEO Melvin reported a maximum count of 58 eagles on 25

March. The birds began leaving shortly after, probably migrating on to their breeding grounds.

b. Peregrine Falcon

Migrating peregrine falcons are usually observed traveling through Valentine NWR in the spring (generally April) and in the fall (generally Sept-Nov).

c. Whooping Crane

Bob Grabher called 5 April 2003 to report seeing 3 adult whooping cranes on the meadows near his house and on Valentine NWR (King Flats area). Mark Lindvall talked with Grabher and filled out a whooping crane field report sheet and sent the sighting in to John Dinan.

d. Western Prairie Fringed Orchid

Marge From (Henry Doorly Zoo) was on Valentine NWR on 15 May to transplant western prairie fringed orchids. From and two assistants from Omaha, with Nenneman and fire tech Miller, transplanted 29 orchids in the subirrigated meadow just west of Hwy 83 (HU 24C 4). Nenneman and Uthe spent several unsuccessful hours searching for western prairie fringed orchids. Only 5 orchids were found on the refuge this summer, and only one was in bloom. Marge From indicated that very few orchids have been located anywhere in Nebraska this summer. Cattle grazing in HU 25B heavily trampled one of the known orchid locations this year, so it will be interesting to see what comes back next summer. We have noted on several occasions that orchids appeared in areas where the soils was disturbed.

Staff from the Henry Dorly Zoo visited Valentine National Wildlife Refuge on October 17 to plant white-fringed orchids. Nine corms were planted at West Sweetwater in Habitat Unit 24C4 (N42' 27.488" by W100' 32.579"). This is a site of previous transplants. One corm planted this past spring was dug up and examined. It was still alive which offered some hope. The planting location this spring and fall was much dryer due to the drought. Seven corms were also planted in West Sweetwater in Habitat Unit 25B (N42' 27.729" by W100" 32.703").

e. Blowout Penstemon

Blowout penstemon, *Penstemon haydenii*, was listed as an endangered species in September 1987. This species is endemic to the Nebraska Sandhills, and grows in open sand blowouts that are generally found in choppy sand range sites. Blowouts result from disturbance and are maintained primarily by wind erosion, and blowout penstemon grows in and adjacent to these open sand areas.

Naturally occurring blowout penstemon has been documented at 5 locations on Valentine NWR, and at locations on the Ballard Marsh State Special Use Area and the Crowe Ranch adjacent to the refuge. From 1996-2001, blowout

penstemon seedlings were transplanted into blowouts at various locations on the refuge. These transplants were done by Dr. James Stubbendieck, University of Nebraska-Lincoln, with a grant from the Nebraska Environmental Trust. During this period, approximately 8000 seedlings were transplanted onto the refuge. Counts of surviving transplants were initiated in 1999, and there has been a slow decrease in the number of plants counted during the following 3 years. However, 2002 was the first year in which no transplants were done, so it remains to be seen whether or not this effort will succeed.

Blowout penstemon surveys were completed during June. Fire techs Ted Miller and Jim Uthe assisted in counts in known locations and in some expanded searching. This years survey indicates that penstemon numbers generally held steady or slightly decreased in most locations. More plants flowered in 2003 than in 2002, and fewer vegetative plants were recorded in 2003 (Table G 2.1).

Table G 2.1. Blowout penstemon (Penstemon haydenii) counts on Valentine NWR from 1999-2003. Most of these plants were transplanted into blowouts from 1996-2001 by Dr. Jim Stubbendieck.

Plant growth	1999	2000	2001	2002	2003
Vegetative	433	555	398	630	290
Flowering	1085	848	829	462	733
Flowering stems	4577	2426	3346	1217	3294
Total plants	1518	1403	1227	1092	1023

f. Wolves

Three groups of deer hunters reported seeing a wolf on Valentine National Wildlife Refuge in the Marsh Lakes area. One of the hunters was from Minnesota and had seen wolves before. Refuge Manager Lindvall visited the area of the reported sighting to look for the wolf, tracks, hair, or sign but found none of these. Chuck Melvin deployed a camera with a motion sensor on a deer carcass in an attempt to obtain photographic evidence. Bald eagles were the only animal photographed at the carcass, and coyotes disturbed the photographic equipment. Wolves have been sighted and one shot in Nebraska in the last few years, so while this sighting was never confirmed, it is possible that a vagrant wolf traveled through this area.

3. Waterfowl

a. Ducks

No specific data were collected on duck use or production at Valentine NWR in 2003.

b. Geese

Canada Geese began using a pocket of open water on Hackberry Lake around 20 Feb. Their numbers increased into March, peaking at approximately 15,000-20,000 between Hackberry and Dewey lakes. Once the ice went out on 15 Mar, the geese spread out and large concentrations were no longer seen.

c. Trumpeter Swan

Trumpeter swans are observed periodically on the refuge throughout the year. In 2003, three pairs apparently nested on the refuge. A refuge visitor reported seeing a pair on swans and at least one cygnet on a pond south of Willow Lake. A pair of swans was observed by refuge staff one this pond during the summer, but never with young. The Center Lake pair nested again, but never succeeded in producing a cygnet. The eggs were never checked, but the pair incubated well past when the eggs should have hatched. A third pair was observed with two cygnets on East Long Lake in August.

LE officer Chuck Melvin reported 21 trumpeter swans at East Twin Lake on 15 Nov. One swan had a green neck collar, but Chuck was unable to read the identification on it. This information was passed on to Rolf Kraft at LaCreek NWR.

4. Marsh and Water Birds

a. Sandhill Cranes

Many groups of sandhill cranes stopped on Valentine NWR during the fall migration. They used mowed meadows and exposed mud flats for roosting areas. Normally cranes migrate through the area but seldom land. A lone Sandhill crane was spotted on December 18 near Twenty-one Lake on Valentine National Wildlife Refuge. Cranes are not usually present at this time of year.

5. Shorebirds, Gulls, Terns and Allied Species

With drought conditions and low lake levels, there was more shorebird habitat available on Valentine NWR than is typically available. Common snipe were observed using short vegetation along the lake edges during the fall, and small flocks of sandpipers were observed along exposed lake shoreline into October. Twin Lake seemed especially suitable gauging by shorebird use.

7. Other Migratory Birds

The Breeding Bird Survey (BBS) route established during the biological inventory done by the National Ecology Research Center in 1991-92 was run again this year. The route was run two times (2 Jun and 16 Jun). Sixty-two species were recorded during these surveys, with red-winged and yellow-headed blackbirds being the most abundant birds. Results will provide a comparison to species composition recorded in 1991-92.

Refuge Manger Lindvall sighted a woodcock in a wetland near Dewey Lake on Valentine National Wildlife Refuge on November 2. This is a new bird for the refuge.

8. Game Mammals

a. Deer

There was an apparent outbreak of Epizootic Hemorrhagic Disease at Valentine NWR during the summer of 2003. Fire technician Billy Cumbow reported several dead deer near water bodies in the Pony Lake area, and Mark Lindvall also reported observing dead deer. Casual observations of deer in the course of other work also seemed to be down. Despite this apparent decline in population, the fall harvest remained relatively unchanged.

There are two State deer management units on Valentine NWR - Highway 83 divides the refuge into the Calamus West and Sandhills units. Harvest regulations are set by the Nebraska Game and Parks Commission, and regulations for the Sandhills unit are set to provide a higher percentage of quality bucks. The overall harvest for 2003 was down by 10 deer from 2002, and similar to the average harvest since 1989. Hunters reported harvesting 17 buck and 6 doe mule deer, and 52 buck and 16 doe white-tailed deer (Table F 8.1).

Table F 8.1. Deer harvest on Valentine NWR during the 2003 deer season. Harvest information based on deer reported to the state check stations. One white-tail buck was reported as harvested at Valentine but was listed in the KeyaPaha unit.

		White-tailed Deer		Mule Deer	
Age	Unit	Buck	Doe	Buck	Doe
Fawn	Calamus W	1	3	0	0
	Sandhills	4	5	1	3
	State buck	0	0	0	0
	Muzzleloader	0	0	0	0
1.5	Calamus W	3	0	2	0
	Sandhills	13	0	4	1
	State buck	0	0	0	0
	Muzzleloader	0	0	0	0
>1.5	Calamus W	8	1	2	0
	Sandhills	14	3	6	1

	State buck	0	0	0	0
	Muzzleloader	0	0	0	0
Adult unaged	Calamus W	2	0	0	0
	Sandhills	3	2	1	1
	State buck	1	0	1	0
	Muzzleloader	2	1	0	0
	Archery	0	1	0	0

10. Other Resident Wildlife

a. Prairie Grouse

Greater prairie chickens and Sharp-tailed grouse occur in nearly equal numbers across Nebraska, with the prairie chicken being more abundant in the central and eastern grasslands. Sharp-tailed grouse are more abundant in the western part of the state, and throughout the Sandhills. Lek counts were conducted on the state study block area during the month of April. Counts on the refuge outside of the state study block were not completed. Lek numbers and grouse numbers appear to be comparable to 2002 numbers, with the overall number of birds somewhat higher this year than last. Counts in the state study block recorded 15 prairie chicken leks with 116 booming males and 8 sharp-tailed grouse leks with 70 displaying males.

Grouse hunting opened on 13 Sept. Many hunters were out on opening weekend, and most seemed to be successful. LE contacts and wing envelopes returned indicate a high percentage of successful hunters are returning wings to collection boxes. About 25% of the total grouse harvest in 2003 occurred on the opening weekend, and grouse hunting pressure dropped off each month through the rest of the season.

During the hunting season, hunters are asked to voluntarily place one wing from each prairie grouse they harvest into one of five collection boxes on Valentine NWR. This collection affords a way to assess hunting pressure, harvest, and productivity of prairie grouse. Similar collection boxes are placed at Crescent Lake NWR, S. R. McKelvie, and Halsey National Forests. During the 2003 hunting season, 180 hunters reported taking 239 prairie grouse on Valentine NWR. One hundred eighty-three of these were sharp-tailed grouse, 46 were prairie chickens, and for 10 wings the species was unknown or no wing was submitted. The Juvenile:Adult harvest ratio for sharp-tails was 2.87, and for prairie chickens was 3.09. The total harvest and Juvenile:Adult ratios during 2003 indicate that prairie grouse numbers and productivity were higher in 2003 than during the previous 2 years. The total harvest falls short of the objective

established in the CCP, but the harvest ratios meet the objectives for a healthy population.

b. Ring-necked Pheasant

No systematic surveys were conducted for pheasants during 2003. However, anecdotal observations by refuge staff indicate that pheasant production for the year was higher than perhaps the last five years. Dry conditions and lower lake levels may be improving conditions for pheasant production, as annual forbs germinate along the expanded lake edge, providing a ready food source. Lower lake levels may also provide more nesting cover for hen pheasants in the now dry emergent vegetation along the lakeshore.

c. Merriam's Turkey

Turkeys typically occupy the area around Hackberry Headquarters and Pelican Lake subheadquarters year-round. One hen nested unsuccessfully next to the pumphouse at headquarters, and several broods were observed in the area around headquarters. One white juvenile was observed briefly, but likely fell victim to a predator early in life. Throughout the year, 20-30 turkeys were regularly observed roosting in the ponderosa pines north of the office. Several of these birds figured out how to eat out of the birdfeeder, and were regular visitors during the winter.

d. Gray partridge and Bobwhite Quail

One bobwhite quail was spotted several times in the area around Hackberry Headquarters during 2003. Quail are uncommon in this area, and the ones that are here may be releases by dog trainers.

e. Reptiles, amphibians, and others

Dr. Jeff Lang completed the second year of research on Blanding's turtles in 2003. This work was funded by the Nebraska Department of Roads (NDOR) and a U.S. Fish and Wildlife Service Challenge Cost Share. The main focus of his research was to determine the effectiveness of turtle fence along Highway 83 in allowing safe passage of Blanding's turtles across the highway. The goals of the study are to 1.) Determine levels of road mortality along Highway 83, 2.) Investigate the effectiveness of turtle fences in conjunction with existing culverts in allowing turtle movements between wetlands and reducing turtle mortality, 3.) Assess short and long-term effects of road-related turtle mortality on the health of the Blanding's turtle population at Valentine NWR, and 4.) Develop a comprehensive management plan for the long-term viability of Blanding's turtles inhabiting wetlands adjacent to Highway 83 on Valentine NWR. In addition to these goals, Dr. Lang was able to collect information pertaining to the natural history of this species throughout the year (e.g. overwintering sites, first spring activity, clutch sizes and nest sites, and seasonal movements). To help assess Blanding's turtle distributions across the refuge, limited trapping was conducted for a few days in areas that had not been previously studied. These trapping areas

were in the southwest corner of the refuge (Devils Punch Bowl, Roger's potholes, Mule and Colman lakes), and on the east end of the refuge (wetlands around Crooked and East Long lakes and in Dew Lake). Some Blanding's turtles were captured in these locations. Dr. Lang's final report to the refuge should be done sometime in early 2004.

A third year of sampling as part of the National Amphibian Malformation Monitoring on Refuges was undertaken on Valentine NWR during 2003. Christina Kravitz (USFWS Ecological Services Office, Grand Island) and a SCEP student from Cornell University in Iowa were at Valentine NWR on 24-25 Jun and 10-11 Jul 2003 to collect frogs for this monitoring effort. Biologist Nenneman and Fire Technician Jim Uthe assisted with collecting frogs during both sampling periods. During the first visit, > 50 chorus frogs were captured at two sites. Site one was a small wetland located southwest of the Pelican Lake control structure, just north of the trail leading to the boat landing on the east end of the lake. Site two was a somewhat larger wetland where Dr. Lang has trapped Blandings turtles, south of School Lake. Preliminary indications are that the chorus frogs are healthy (no malformations observed). During the second collection period, leopard frogs were captured in the large pond in the Pony Pasture, and bullfrogs were captured in ponds along the northeast shore of Duck Lake. Over 60 leopard frogs were captured, checked for malformations, and released. One leopard frog exhibited an overbite, and was preserved for transport to Grand Island. Only 13 bullfrogs were captured, and all of them appeared normal. The following is a report prepared by the Ecological Services office in Grand Island, based on sampling done in 2002. We will receive a report on the three years of monitoring in 2004.

Valentine National Wildlife Refuge - 2002

1. Introduction/Background

2. Sampling Locations

Valentine NWR, along with many other Midwestern states, suffered from drought conditions this summer. As a result, the two sample sites from 2001 (the Headquarters Site and Pelican Lake Control Structure) were both completely dry throughout the spring and summer. After some extensive searching, two new sites were found at Valentine, School Lake Marsh and Duck Lake Pond. School Lake Marsh (Appendix A) is a low area just off of the southwest section of School Lake that is filled by overflow water and spring run-off/melt. Similarly, the Duck Lake Pond site is actually a low area located just east of Duck Lake that also is filled by overflow water and spring run-off/melt. Weather conditions for both sampling days were sunny with some clouds. The maximum temperature

was 100EF and 93EF while sampling at School Lake Marsh and Duck Lake Pond, respectively.

Refuge	State	Site Name	Sample Season	Potential Contaminants	Latitude	Longitude
Valentine NWR	NE	School Lake Marsh	1	None		
Valentine NWR	NE	Duck Lake Pond	1	None		

3) Methods and Materials:

The Standard Operating Procedure (SOP) for Site Assessment was used to select two new sampling sites for 2002 because drought conditions had made the two previous sites from 2001 unsuitable. Frogs were captured according to the Capture Protocol SOP with one modification. Once a frog was captured, it was placed in a large plastic ziploc bag along with a small amount of site water instead of being placed in a plastic tupperware container. The ziploc bag was used because it was easier to keep track of and the top portion could be placed in a pocket (with the bottom of the bag hanging out) where it was immediately accessible. The problem with the tupperware containers was that they were too big to stay tucked inside a set of hip or chest waders. Therefore, the tupperware container had to be placed on the ground and was not always immediately on hand. Additionally, chorus frogs sampled in 2001 suffered injuries related to their feet getting caught in the lid of the container. It was easier to make sure that no frogs were injured by using ziploc bags. Overall, the ziploc bags worked very well and did not have any noticeable adverse effects on the frogs. After several frogs had been collected, they were transferred to a bucket kept in the shade as described in the SOP. Data collection was conducted according to the SOP. Because the two sites were sampled in two different time periods, decontamination was performed according to the SOP with the exception that the equipment was first transported back to the Grand Island Ecological Services Field Office and then cleaned with the bleach solution. Used cleaning materials were disposed of at the field office. Abnormal frogs were preserved according to the Preservation Protocol SOP.

4. Results

Refuge	Sample Date	Site Name	Common Name	Genus species	# collected	# ab-normal	# mal-formed
Valentine NWR	06/25/02	School Lake	Chorus Frog	*Pseudacris triseriata*	80	0	NA

		Marsh					
Valentine NWR	07/08/02	Duck Lake Pond	Bullfrog	*Rana catesbeiana*	76	2	NA

The chorus frogs (*Pseudacris triseriata*) (Appendix B) were either near the end or at the end of metamorphosis with Gosner stages (Gosner 1960) ranging from 43-46. One chorus frog was missing its hind right digits, however there was a visibly red stub that indicated this was most likely a capture-related injury. Therefore, this frog was not considered to be abnormal and was not preserved. The bullfrogs (*Rana catesbeiana*) were all recent metamorphs with a Gosner stage of 46. Four bullfrogs died while being held in buckets. Bullfrogs were captured the same day that staff biologists drove from Grand Island to Valentine, NE. Due to the lateness of the day after capturing all bullfrogs, a decision was made to hold the bullfrogs overnight in buckets with site water and vegetation. All bullfrogs were processed for data collection the next day, and the four dead frogs were discovered at that time. Two out of 76 bullfrogs were abnormal. Of the two abnormal bullfrogs, only one appeared to be malformed. The left hind limb of this bullfrog was present in its entirety (thigh, calf, foot, and digits were present) but was significantly smaller than the right hind limb. Pictures were taken (Appendix C) and the bullfrog will be submitted to the USGS National Wildlife Health Center to confirm whether or not this abnormality is truly a malformation. The second bullfrog had an area where skin was scraped away on its upper lip. There was no sign of bleeding. The scraped area could be an old injury or a lesion of some sort. In either case, this most likely is an abnormality as opposed to a true malformation.

5. Discussion/Conclusions

Valentine NWR does not have a history of contaminant issues; therefore all sites on the refuge are considered to be "non-contaminated" sites. The survey results this year appear to support this position, with the one definitive abnormality representative of a normal, background abnormality rate. However, last year four out of 52 chorus frogs had abnormalities. The differences in the number of abnormalities observed between the two years make it difficult to draw any concrete conclusions. In addition, the drought conditions provided a complicating factor and influence. This year was the second year of reported drought conditions across the Midwest. It is difficult to survey frog species for abnormalities when the frogs are not present in enough numbers to adequately conduct a survey. The situation is not that bad yet, but next year is already being redicted to be another drought year. Hopefully, the frog surveys will be able to continue despite the predicted drought conditions.

6. References

Gosner, K. L. 1960. A simplified table for staging anuran embryos and larvae with notes on identification. Herpetologica 16:183-190.

7. Acknowledgments

The staff from the Grand Island Ecological Services Field Office would like to thank Mark Lindvall, Valentine NWR Refuge Operations Specialist, for his assistance in locating ponds and wetlands with tadpoles and monitoring the progress of the tadpoles. In addition, thanks are extended to researchers Jeff Lang and John Levell for assistance in capturing chorus frogs.

Section G 10 e. Appendix C. Pictures of bullfrog with abnormal leg.
(CK)

11. <u>Fisheries Resources</u>

Fire Technician Billy Cumbow reported a number of dead fish on Pony Lake. A follow-up check revealed dead carp, black bullhead, bluegill, and a large number

of minnows (probably fathead minnows). Estimated numbers of carp are in the 100-200 range, bullheads in the teens to twenties, and large numbers of smaller fish (bluegill and minnows). The cause of the kill is unknown. Dave Tunink (Nebraska Game and Parks Commission) was notified, and he suggested an algal bloom and temporary reduction in oxygen availability may have been the cause.

A carp trap was operated during most of May in the canal between Whitewater and Dewey lakes. The trap was set on 22 April by Lindvall, Kime, Nenneman, and fire tech Miller. A stop log was removed from the Whitewater structure at this time to start water flowing into Dewey Lake. On 01 May, the water temperature was 52 F, and only about one dozen carp were observed in the trap. By 08 May, the water temperature increased to 56 F, and approximately 100 carp were in the trap. On 14 May, the water temperature was 61 F, and Lindvall estimated that there were about 500 carp in the trap. The following day, water temperature was 68 F, and there were about 700 carp trapped. Unfortunately, the flowing water scoured a hole under the trap over the weekend, and by the time the trap was checked on 19 May, only about 100 carp remained in the trap. The trap was repaired, but no further carp movement into the trap was noted. On 27 May, stop logs were put in and water flow through the trap stopped. Two floating pumps were run for about 2 hrs that afternoon, dropping water levels in the trap pool 6-8 inchs. The following morning, all carp in the trap were dead (or nearly so). Thirty carp were weighed, with the smallest weighing 15 lbs, and the heaviest 30 lbs, with a 20 lbs average. An estimated 150 carp were removed by this trapping effort. The trap was reset, but little carp activity was noted within a week, so the trap was removed. Lessons learned here should aid future trapping efforts. Modifications to the trap to prevent scouring underneath should alleviate losing carp from the trap, and it appears that the use of chemicals (e.g. rotenone) is unnecessary to kill captured carp.

Large numbers of carp died in Willow Lake starting last fall and possibly into the winter. The dissolved oxygen was checked when the ice was on and it was not low. The fish may have died from the same thing that killed carp last fall on the Marsh Lakes. It is believed it was a complete kill of Willow Lake. A peak count of 17 bald eagles were dining on the carp along with several thousand gulls when the ice went out in the spring.

Valentine Fish Hatchery staff collected pike eggs at West Long Lake on Valentine NWR. The 339 pike caught in West Long were transferred to Dewey Lake in an attempt to take the pressure off the panfish in West Long. There are no carp in West Long so the pike are not needed for carp control. They will also tried collecting chain pickerel in Watts Lake for re-establishing this native fish in a lake near Lincoln but were unsuccessful.

A coordination meeting on fishery management was held on January 30 at the Valentine Fish Hatchery. Refuge, Nebraska Game and Parks, South Dakota State

University, and Fisheries Assistance biologists met and discussed the recent national USFWS fisheries meeting and emphasis, facility improvements at Valentine NWR, last years fishery surveys, the creel survey, the recent carp die off on Marsh Lakes, results of SDSU research, and needs for future research and management.

An outline of Nebraska Game and Parks "Focusing on the Future" was received. In the Sandhills lakes fishing section it states, "Gain access through legislation or other means to publicly owned Sandhills lakes not currently open to fishing, including meandered lakes and those owned by other agencies." It appears that Game and Parks will make another run at opening additional lakes at Valentine National Wildlife Refuge to sport fishing. During the writing of the refuge Comprehensive Conservation Plan they made such an effort which was denied.

A fish kill occurred on Rice Lake. On August 20 Dr. Lang was at Rice Lake and saw no dead fish. Fishermen reported seeing dead bass and bluegills on August 28. On August 29 there were 42 bass from 12-18 inches found dead on the lake. No bluegill or perch were seen but about 75 gulls were on the lake and probably were removing the smaller fish. Nebraska Game and Parks biologists were contacted. They requested a sample of bass but none of the fish were fresh enough for testing. They are concerned about bass virus, a disease that kills larger bass. The fish may have died from heat stress. The lake is shallow, deepest water found was 45 inches, and full of submergent vegetation. A string of 100 degree days and the dark colored vegetation may have raised water temperatures in the lake to lethal levels.

A fishery research proposal was received from the Nebraska Game and Parks Commission and South Dakota State University. The objectives of the proposal are to 1. determine cohort dynamics of bluegill and perch in Pelican Lake and relate reproduction to environmental conditions, 2) assess perch age structure in Marsh Lakes, 3) determine under ice food habits of pike, and 4) assess invertebrate communities in lakes with and without fish. The proposal was funded and work on part 3 started during the ice fishing season. Game and Parks is also doing a creel survey this winter on the refuge.

Wayne Stancill and crew from the US Fish and Wildlife Assistance Office in Pierre, SD conducted fisheries surveys of Hackberry, Dewey, Clear, and Pelican Lakes. They used electro-shocking and later trap and gill nets. The possibility of renovating Hackberry Lake was discussed. Results from these surveys were not received in time to be included in this narrative.

17. Disease Prevention and Control

Hot temperatures and shallow water provided the right conditions for the botulism on the Marsh Lakes in August. Nenneman and Kime checked the Marsh Lakes

for a potential botulism outbreak in late August. No botulism was noted, although there were about 7 dead white pelicans around the lakes. The cause of death for these pelicans was not determined, but was apparently not disease related as many healthy pelicans were observed using the lakes.

Deer populations on the refuge and in the area appear to have been affected by epizootic hemorrhagic disease (EHD). In late summer and early fall many dead deer were seen in and around lakes and wetlands on the refuge. Similar sightings were recorded in areas adjacent to the refuge.

H. PUBLIC USE

1. General

A Centennial event celebrating the 100th Anniversary of the National Wildlife Refuge System was held at Valentine National Wildlife Refuge on March 15. We started with a great catered lunch provided by the Fort Niobrara Natural History Association. Eleven people including a mix of refuge staff present and retired, refuge neighbors, and school children then read from writings that were included in the time capsule. They shared some touching messages and thoughts on the present and the future. We then went as a group and buried the time capsule beneath the fire observation tower located on the hill above Hackberry Lake. About 80 people, mostly ranchers and people from Valentine, attended the event. The Norfolk, Valentine, and North Platte Newspapers ran articles on the event.

Figure H1a. Visitors helped bury the refuge time capsule. (CM)

Figure H1b. Refuge staff finished filling the hole. (CM)

The time capsule was stuffed full of items rounded up at the refuge and from the local community. The stainless steel, sealed in gasses, time capsule is buried about 10 feet underground directly under the fire tower that is located on the west end of Hackberry Lake on a high hill. A plack denoting the location was placed at the ground surface directly above the capsule. The coordinates of the location are latitude N 42 degrees 33.654 minutes and longitude W 100 degrees 42.122 minutes. The GPS was reading plus or minus 15 feet.

The time capsule contents are listed below:
1. refuge boundary sign
2. blowout penstemon print
3. buffalo bone
4. scroll
5. Sharp-tailed grouse and prairie chickens at Valentine NWR
-narrative
-wing fan
-prairie grouse wing envelope
-carving of grouse feather

-story to go with carving
5. Valentine NWR 2001 Annual Narrative Report
6. uniform shirt
7. Valentine NWR 2002 Annual Work Plan and January - December work schedules
8.US Fish and Wildlife Service Fulfilling the Promise
9. An Atlas of the Sandhills
10. Valentine NWR Comprehensive Management Plan
11. Midland News January 1, 2003
12. Country Schools
-Ballard Marsh
    class photo
    school building photo
    Christmas program
-Simeon School
    class photo and roster
    school building photo
    "I like Going to Country School Because"
    Attending a two room school and country living 2002
13. Discover Valentine
14.Centennial Items
-Americas National Wildlife Refuge System Celebrating a Century of Conservation
-Centennial button
-Centennial refrigerator magnet
-Centennial lapel pin
-Trail Tales Magazine with Centennial article
15. Blowout penstemon
-Nebraska's Threatened and Endangered Species Blowout Penstemon
-restoration of blowout penstemon
-blowout penstemon seeds
16.Nebraska Game and Parks
-25th Anniversary medallion for Habitat Stamp
- Habitat Stamp Poster
-Nebraska's Wildlife Habitat Program
17. Civilian Conservation Corps
-Tower Trail and Observation Deck dedication invitation
-Civilian Conservation Corps Fire Tower Trail
-CCC History
-newspaper article on CCC
-ten CCC at work photos
18. Photo Series
-summer photo series from CCC tower at Hackberry Lake
-winter photo series from CCC tower at Hackberry Lake
-Nebraskaland photos from the shoreline of Hackberry Lake

19. Quilt
-quilt square
-quilt square news release
-letter form contest winner
20. Fire
-fire crew shirt
-2000 fires story
21. Miscellaneous
-John Farrar story and pelican photo
-visitors log
-real naturalist
-Edward Abbey Quote
-Audubon magazine article, Some Small Blue Places
-Bob and Janet Grabher story and photo
-Growing Up on the Shores of Pony Lake
-Yellowthroat WMA leaflet with story
-pickup door decal
-Important Bird Area Certificate
-white-fringed orchid brochur
22. Refuge leaflets
-general brochure
-hunting and fishing regulations
-bird list
23. American burying beetle
-narrative
-beetle in plastic case
24. Thirteen photos of refuge headquarters buildings
25.patches and pins
-old uniform patch
-2002 uniform patch
-refuge officer patch
-refuge officer badge pin
-award pin
-Nebraska Game and Parks badge pin
26. employees
-Employee Pocket Guide
-Mark Lindvall leave and earning statement
-Mel Nenneman leave and earning statement
27. Hunting and Fishing
-2002 waterfowl regulations
-2002 Hunt Guide
-2002 Fishing Guide
28. Fishing
-Harold McGuire story and lure
-Corky Thornton story and lure

The April issue of Nebraskaland Magazine had a very nice article on Valentine NWR in the parks and places section.

Nebraskaland writer Jon Farrar was provided with information on bird watching for Valentine National Wildlife Refuge. Jon is finishing up a book on bird watching in Nebraska which will feature both Valentine and Fort Niobrara as places to go.

The November issue of Nebraskaland Magazine has a cover photo taken at Valentine National Wildlife Refuge. The photo shows a sleeping hunting dog, shotgun, 2 pheasants, and a grassland scene.

A photo of Calf Camp Marsh at Valentine National Wildlife Refuge was included in the brochure for the Sierra Club's "Share the Journey, Discover the Lands Explored by Lois and Clark." The event was held on November 16 at the Joslyn Art Museum in Omaha and attended by about 300 people.

Biologist Nenneman was a guide for two tour groups visiting Valentine NWR in early June. On 7 June, a group of about 20 from the Kansas Wildflower Society visited the refuge to observe the flora of the Sandhills. The highlight of their visit was the chance to observe blowout penstemon in bloom. On 8 Jun, a group of 25 people from the Sierra Club stopped for a refuge tour. Nenneman took the group to Center Lake to observe nesting trumpeter swans, and talked about grassland management on the refuge. The group also visited a blowout with flowering blowout penstemon.

Photos and text for Valentine National Wildlife Refuge were provided to the Valentine Chamber of Commerce for the 2004 Discover Valentine publication.

Office Automation Clerk Marge McPeak figured out how to get refuge e-mail from the fortniobrara@fws.gov site open and we had a back log of replies to inquiries to send out. The e-mail address is available on the FWS web site.

2. Environmental Education

Refuge Manger Lindvall received a Friends of Future Farmers of America Award for helping with the Valentine High School Wildlife Management Course. The class also visited Valentine NWR on May 7 and toured with an emphasis on the variety of projects that take place on a refuge during a year. Dr. Lang also gave an excellent presentation on his Blanding's turtle research. On another occasion, Manager Lindvall also talked to the Valentine High School Wildlife Management Class about prairie dogs and the Endangered Species Act.

Dr. Lang presented programs on Blanding's turtles at the Simeon and Goose Creek County Schools. The students and teachers really enjoyed his presentation that included live turtles and radio tracking equipment.

Refuge Manger Lindvall and Refuge Officer Melvin taught sections of the Nebraska Hunter Safety course to 15 students on August 18. Lindvall covered muzzle loader safety and Melvin hunting regulations.

In June the 4 H Fishing/Camping Camp visited the refuge and fished at Dewey Lake. The camp is set up to introduce youth to these outdoor sports. They camped at Ballards Marsh.

Refuge Manager Lindvall was on the local radio station's comment show talking about ice conditions, fishing, and refuge regulations on several occasions during the year.

4. Interpretive Foot Trails

The Civilian Conservation Corps Nature Trail goes from a parking area on the west end of Hackberry Lake to the old fire tower constructed by the CCC. An observation deck is located inside the legs of the tower and interpretive panels teach about the geology, habitats, and wildlife of the Sandhills. The local 4 H club has adopted the trail and helps maintain benches, the trail, and plant id markers.

6. Interpretive Exhibits/Demonstrations

Text about and photos of Valentine NWR were provided for the Centennial display being put together for The Wildlife Society National Meeting in September. The completed poster looked great and has information on the refuge, research, endangered species, and visitor activities (Figure H-6). Following the display at The Wildlife Society Meeting the panel will be part of a national tour and then come back for use at the refuge. With a few minor changes it would make a nice poster for sale. We have the completed design on a CD.

8. Hunting

Waterfowl hunting is permitted on Watts, Rice, and Duck Lakes. Seasons and bag limits are the same as those set by the state. The 2003 season was October 4-December 14 and December 20 – January 12. Six groups of hunters were for the opening weekend. Several took limits of ducks. There were quite a few local and early migrants at the refuge. Most of the rest of the month was record breaking hot which made for poor hunting. At the end of the month more waterfowl started to migrate into the area and provided good hunting until the refuge lakes froze

over in early November. A rough estimate of the number of visits by duck hunters is 200.

The September issue of Field and Stream magazine mentioned Valentine NWR as a location for grouse hunting and the Sandhills as a site for trophy deer hunting. We have received several calls asking about the hunts and may see an increase in hunting pressure as a result of the articles.

Grouse season opened on September 13 and will run through December 31 with a limit of three. Most of the refuge is open to grouse hunting except the natural areas and around building sites. Turn out for the opener was light with about 12 groups of hunters at Valentine National Wildlife Refuge. We have noticed a decline in the number of hunters for grouse. Nebraska Game and Parks estimated that grouse hunter numbers declined from 20,000 in 1987 to 6,200 in 2002. The hunters that were out had good success. Hunter harvest is reported through voluntary wing collection boxes placed at five locations on the refuge. In 2003 hunters that turned in wing envelopes and reported harvest of 239 prairie chickens and sharp-tailed grouse. Harvest is up from the past 2 years which were record lows. More complete information on grouse harvest can be found in section G10a.

Nebraska's pheasant season opened on November 1, 2003 and ran through January 31, 2004 with a limit of three roosters. Pheasant numbers were up this year and actually provided some good hunting for those with good dogs and strong legs to root the birds out of the cattail marshes. It appears that the drought has helped increase pheasant populations on the refuge. Many annual plants, preferred by pheasants, have grown up along the edges of lakes and in dried up wetlands. No counts were made of the number of hunters and we do not use the wing boxes for monitoring as we do with grouse. An estimate of 200 visits by pheasant hunters is made. Some people combine a pheasant hunt with a grouse, duck, or deer hunt.

Nebraska rifle deer season was from November 15 through 23. Most of the deer hunting takes place on opening weekend. A total of 84 deer was recorded and included 64 white-tails and 23 mule deer. More complete information on deer harvest can be found in section G8. Numbers come from records obtained at Nebraska Game and Parks check stations.

All of the refuge west of Highway 83, in the Sandhills Deer Hunting Management Unit, remained in a trophy management unit (100 percent either sex permits). The idea is that hunters will take does instead of small bucks. This is possibly the case on private land but not on the refuge where harvest is still heavily weighted toward bucks including the younger age classes. In 1995 Nebraska Game and Parks removed Valentine NWR and McKelvie National Forest from the area where antlerless only deer permits for the Sandhills Unit are valid. Starting in

1997 a statewide bucks only permit was also available. A few of this type of permit were seen being used on the refuge in 2003. The portion of the refuge east of Highway 83 is in the Calamus West Unit. The refuge probably receives about the heaviest hunting pressure of any location within the units but a quality hunt is possible especially if opening day is avoided. This year there seemed to be a real influx of out of state hunters on the refuge. We did not make a count of hunters this year but it was probably about the same as last year when we counted 307 hunters.

The muzzle loader deer season started on December 1 and runs through the end of the month. It appears that hunting pressure for this season is down for the first time in many years. The number of deer on the refuge may also be low. We have been finding many carcasses of dead dear that most likely died from EHD. The deer usually die near water in the late summer or early fall. Three deer were checked in and recorded as shot on the refuge.

The refuge is also open to archery deer hunting which runs from mid-September through the end of December. Archery deer hunting is not permitted during rifle deer season. Only a few hunters were known to have visited the refuge for archery hunting. One deer was checked in and recorded as taken during archery season on the refuge.

Coyotes can be hunted on the refuge from December 1 through March 15. A free permit is required. The permit is a postcard that the hunter returns at the end of the season. There is no charge for the permit. For the 2002-2003 season 70 permits were issued and 29 returned (41 percent return rate). This was the most permits we have given out for many years. Eight successful hunters took 39 coyotes. One hunter shot 22 of these. Three reported that they did not hunt at all. Seventeen indicated that they hunted but did not shoot any coyotes. Fur prices were up a little this year, which increased the interest in coyote hunting.

9. **Fishing**

Nine refuge lakes (Watts, Rice, Duck, West Long, Pelican, Hackberry, Dewey, Clear, and Willow) are open to fishing year round. Fishing, especially ice fishing, accounts for most visits to Valentine NWR. Willow Lake had a complete winter kill in the winter of 2002 – 2003 and there was a partial summer kill on Rice Lake in 2003. These lakes were open to fishing but received no fishing visits. There was sufficient ice for ice fishing for 97 days from December 6, 2002 through March 13, 2003. Pike fishing was good just before the ice went out, especially on Dewey and Clear Lakes. Ice fishing for large bluegill has been popular on Pelican Lake. Fishermen had very poor success in December of 2003. They usually fish in submergent vegetation and this was just not present.

In the spring lake levels were low due to the drought but all but the two that had kills were fishable. May rains brought the levels up some and the bass and pike fishing was better. Launching of boats was made difficult because of the low water. Rumors flew about the internet that the refuge lakes were dry and all the fish gone.

Refuge size limits remained the same as last year with a 15-inch minimum on bass and northern pike with a 28-inch maximum size limit (pike greater than 28-inches must be released). The state has a 15-inch minimum on bass for most public waters including the refuge. Minnows are prohibited on refuge lakes to prevent introduction of exotic fish. Gas powered boats are not allowed. Catch and release for bass and muskie remained in effect on Watts Lake. Saugeye were stocked in Watts and Duck Lakes in previous years. The state 15-inch minimum for this fish for lakes in western Nebraska applies to refuge lakes.

Not enough counts were made of fishermen so no estimate was made for annual visitation. Nebraska Game and Parks conducted a winter creel survey on Pelican Lake. On a per acre basis the lake had high fishing pressure. Catch rates on pike were good but poor on perch and bluegill. Many out of state fishermen came for bluegill fishing. Local fishing pressure on bluegill was down, probably due to the local grape vine. Compliance with the length limit on northern pike was very good.

11. Wildlife Observation

Blinds were placed for observation of both sharp-tailed grouse and prairie chickens this year. The blinds were put in Habitat Units 33 and 30A2. A grant for construction of one new blind was received A grant for $1,500 from the North American Photographers Association was applied for and received. The grant will be used to construct a new photo blind for the spring grouse displays. Eagle Scout candidate Danny Lindvall and Troup 288 will build the blind (see section E.5).

People come to the refuge to bird watch and enjoy the prairie. No counts are made for this type of visit which seems to be on the increase.

12. Trapping

The refuge has a trapping plan and is open to trapping. No recreational trapping took place on the refuge in 2002.

17. Law Enforcement

Violation/Warning Total "2003"
(Jan 1, 2003 - Dec 31, 2003)

Violations	Valentine NWR
Possession of Alcoholic Beverage	15
Possession of Narcotics	7
Fishing Violation	3
Hunting Violation	2
Boating Violation	2
Traffic Violation	3
TOTAL	**32**

Warnings	Valentine NWR
Possession of Alcoholic Beverage	35
Boating violation	1
Trespass	1
Fishing Violation	2
Hunting Violation	23
Off road travel	2
Traffic Violation	3
TOTAL	**67**

Approximately 850 law enforcement contacts were made by FTO at Valentine NWR.

Refuge officers started keeping logs of time spent doing LE work to document if we are spending the required minimum of 25 percent of our time on LE duties. In the fall during hunting season we easily meet this requirement but will most likely fall short on an annual basis. Meeting the requirement is especially difficult as we are short on staff and sometimes can not spend the needed time on LE.

Refuge Officers Lindvall and Kime attended annual law enforcement refreshers held in Marrana, Arizona.

Refuge Officers Lindvall and Kime attended the fall LE refresher held in Kearney on August 19 and 20. Both have opted to retain LE authority and keep a log to document whether they meet the new 25 percent time requirement.

Complex refuge officers traveled to LaCreek National Wildlife Refuge to work law enforcement details for their pheasant, deer, and goose openers. LaCreek no longer has a refuge officer stationed there.

An individual was contacted concerning guiding on the refuge during the rifle deer season. He had leased land adjacent to the refuge and was guiding two out of state hunters. The guide never entered the refuge but the hunters did. This is the first instance of guiding for hunting that we are aware of occurring on the refuge. We have had requests by guides to get permits for this activity but have denied them.

I. EQUIPMENT AND FACILITIES

1. New Construction

The dock ordered as part of last years Challenge Cost Share project to improve fishing access at Dewey Lake was delivered and installed. The 50 foot dock (SAMMS number 10050189) is mounted on wheels so it can be taken out in the fall and put back in the spring. This prevents ice damage to the dock. The steel dock can also be raised or lowered to accommodate changing water levels. The dock was purchased for $6,478 from Zachmeier MFG in Mandan, ND.

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2. Rehabilitation

A 200 yard section of the Calf Camp Trail was rebuilt. Wind had created a sand trap in this section of road and vehicles were often stuck here. The shoulders were bulled up and hay placed to keep the sand from blowing.

Five miles of old barbed wire fence were tore out and replaced with one wire electric. One third mile of boundary fence was replaced. This work was done by contractors using a portion of grazing receipts.

Window air conditioners and the old upstairs furnace in Quarters 13 (Pelican Lake) were replaced with a new furnace with central air conditioning.

3. Major Maintenance

Gravel from stockpiles was spread on the Little Hay Road at Valentine National Wildlife Refuge. Traffic was starting to churn up the base rock of the road. The gravel was placed mainly in the wheel tracks to make it go as far as possible. The gravel was part of a prior years MMS project. Stockpiles were located at Pony, Hackberry, and Clear Lakes. The Clear Lake stockpile was used up.

Five loads of rock, of about 25 tons each, were hauled and spread on the Calf Camp Dike. There was enough rock to cover the whole dike top. In the past wind erosion has been a problem here. The work was done force account and used salvage rock from an old railroad right of way. This significantly lowers the cost of the rock.

The small storage shed to the west of the shop was scraped and painted. The work was done by the fire crew. What was an eyesore looks pretty nice now.

4. Equipment Utilization and Replacement

Left over Refuge Operating Needs System money from the regional office was used to purchase a 6 by 6 Polaris all terrain vehicle. The vehicle cost about $8,000. We outfitted it with a weed sprayer at a cost of $1,500. The vehicle has proved useful for spraying weeds and other work on the refuge.

Figure I –4 6 by 6 atv with weed sprayer (MLL)

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An old two horse trailer was fixed up and now serves as a recycling collection point at Hackberry Headquarters. Basically we just fill it up, hook it up, and take it into the recycle center in town. They currently accept aluminum, newsprint, paper, and cardboard.

5. Communication Systems

New base, vehicle, and hand held radios were received and installed by the contractor. The signal quality of the digital is very good. Repeaters were placed near Valentine (on the Beaver Lake Tower) and Fort Niobrara National Wildlife Refuges and provide excellent coverage. All we need now is to learn how to use the much more complicated system.

6. Computer Systems

A computer dedicated to GIS was purchased using left over RONS money received from the regional office. The computer will be used to track weed locations. Range Tech. Uthe set up a base map with refuge boundaries on the computer.

A new laptop computer was purchased for use by the refuge biologist.

J. OTHER ITEMS

4. Credits

Mark L. Lindvall: Introduction; Highlights; C; D-1,4; E-1,4,5,6,8 part; F-7,8, 9, 10 part,13; G-11 part; H-1,2,4,6,8,9,11,12, part 17; I- all. (MLL) photos
Mel Nenneman: B; D-5; E-7, 8 part;F-1,2,5, 10 part, 11 part; G-1,2,3,4,5,7,8,10,11part, 17
Chuck Melvin: H-17 (table)
Christina Kravitz G-10 Malformed Amphibian Survey (CK) photo
Casey McPeak (CM) photos