

VALENTINE NATIONAL WILDLIFE REFUGE

Valentine, Nebraska

Annual Narrative Report

Calendar Year 2010

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 71,772-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. Valentine National Wildlife Refuge staff also manages the Yellowthroat Wildlife Management Area in Brown County (see J.3) and four easements (see F.13).

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A. HIGHLIGHTS

A second year of good spring rainfall flooded roads and provided excellent wetland habitat throughout the Refuge. Sections B, H-2, I -3.

Four prescribed fires were completed in the spring. A total of 1,459 acres were burned removing invasive cedars and invigorating native grasses. Section F-9.

Several years of using a contractor to spray Canada thistle and leafy spurge with newer herbicides is reducing the acreage of these noxious weeds. Section F-10.

A pair of bald eagles built a practice nest on the Refuge. This is the first nesting of this species on the refuge in many years. Section G-6.

Solar powered fish screens were installed at the outlets of Pony and West Long Lakes and worked well even during the high water. Section I-1.

Extensive emergency repairs and modifications were made to the Calf Camp Water Control Structure and Dike. Section I-3.

The Pelican Lake Water Control Structure was rehabbed by adding wing walls, rip-rap, and fill. Section I-2.



Fig A1. Sunrise in the Sandhills. MLL

B. CLIMATIC CONDITIONS

No temperature records (high or low) were set in 2010, however the high of 82°F in Nov tied the record high set in 1965 and 2005. Total precipitation for the year was near average (only 0.19” less than average) annual precipitation for Hackberry Headquarters (data from 1945-2009, Table B1). Although the total precipitation for the year was nearly average, 8 months actually had lower than average precipitation. Only one month varied by greater than an inch from the monthly average, with 2.45” more rain falling in Jun than the average for the month. The south part of Valentine NWR has received more rain than the northern parts. Lakes and wetlands show this. A local rancher who is located on the south boundary of the refuge reported 18.18 inches of rain for April, May, and June. The weather station at Hackberry recorded 12.02 inches. From July 1 through July 22, the rancher recorded 5.9 inches and while the gauge at Hackberry registered 3.3 inches.

Very little snow fell in 2010, with only 9.3” recorded at Hackberry HQ, and snow cover was recorded for only 23 days all year. For the year, temperatures averaged about 1°F above average (2003-2010), with October being much warmer than average; recorded high temperatures were about 6°F higher than average high temperatures, and recorded low temperatures were 4°F above average low temperatures. Ice covered refuge lakes until 12 March, when there was still some ice remaining in places. Lakes remained ice-free until 21 Nov, when the lakes were mostly frozen over. By 23 Nov, about 2” of ice was on most lakes, and lakes remained ice-covered through the end of the year.

A more detailed description of month by month weather conditions can be found on the biologist’s computer (C:\Documents and Settings\nennemanm\My Documents\mel\Work files\MAR, and C:\Documents and Settings\nennemanm\My Documents\mel\Work files\Weather).

Table B1. Monthly weather data summary from the weather station at Hackberry Headquarters, Valentine NWR, during 2010.

Month	Precip. (inches)	Snow (inches)	Temperature (° F)			Record Temperature (° F)				
			Min	Ave	Max	Ave	Min	Year	Max	Year
Jan	0.25	1.4	-15	15.9	55	34.7	-38	1894	70	1974
Feb	0.34	2.7	-6	14.9	48	35.3	-37	1899	76	1982
Mar	1.14	3.3	14	30.5	82	53.2	-28	1948	87	1946
Apr	3.06	0	29	39.8	77	62.6	-8	1936	97	1992
May	2.61	0	26	45.7	90	68.5	17	1909	102	1934
Jun	6.35	0	49	57.7	94	80.6	30	1973 ^a	107	1937
Jul	3.64	0	54	63.2	102	89.4	38	1971	111	1990
Aug	1.61	0	48	62.2	100	90.0	34	1935	108	1947 ^a
Sept	1.42	0	37	49.9	95	80.9	12	1926	103	1952
Oct	0.69	0	27	42.3	86	70.5	-6	1925	96	1922
Nov	0.2	0.8	-4	25.1	82	49.8	-36	1887	82	2005 ^a
Dec	0.1	1.1	-6	16.2	60	39.7	-34	1907	76	1936
Total	21.41	9.3	Average precipitation (1945-2010)						21.60	

^a Indicates the most recent year record was observed.

C. LAND ACQUISITION

1. Fee Title

Ducks Unlimited was contacted about purchasing the school section adjacent to Yellowthroat WMA. The part of the school section adjacent to the WMA has nice wetlands. DU could possibly purchase the section and then sell part to FWS and part to private interests. They also planned to contact the owner of the FWS easement land adjacent to Yellowthroat WMA for a possible donation. The purchase and donation did not occur.

2. Other

We received word that private landowners have filed on lands the US Fish and Wildlife Service owns in Knox County. The 340 acres is located along the Missouri River and is what we have been referring to as Statewide Number One Lands. We were notified by the local NRCS Office staff who thought we owned land in the area. The private landowners are trying to get the land and then put it into the Wetland Reserve Program. Regional Office Realty was contacted to look into the problem. Administration of the parcel of the Statewide Number 1 land in Knox County along the Missouri River was transferred from the Fort Niobrara/Valentine NWR Complex to Lake Andes NWR. They are much closer to the area than we are.

D. PLANNING

1. Master Plan

We have 3 projects in the SAMMS 5 year plan, which are a new office, a new shop, and a roof for the Hackberry Barn. SAMMS project were updated as follows; A new office for Valentine NWR was taken out of deferred maintenance and put into capital improvements. Our number one DM project is to replace our shop. Our number 2 DM project is to put a metal roof on the Hackberry Horse Barn. The top 5 VFE Projects for Valentine NWR are; pave road and parking at Marsh Lakes Overlook, add gravel to auto tour route, construct interpretive overlook, fishing dock and parking pad, and construct trail head sign. The top 5 roads projects are Repair RP Pelican lake Trail, Repair School Lake Trail, Repair East End Access Trail Rehab auto tour route, and Repair Watts Lake East End Access Road.

4. Compliance with Environmental and Cultural Resource Mandates

Eight boxes of Civilian Conservation Corps original black and white photos and negatives were sent to the Regional Archeologist. The photos will be scanned and the originals sent to the archive at the National Conservation Training Center. They can be stored in a controlled environment under the supervision of a historian at that location.

The refuge will be supplied a copy of the scanned photos. We also have a small collection of CCC documents that we will be also be sending in for scanning and storage at NCTC.

The Grand Island Enhancement office sent a concurrence letter for S-16B North and South (STP-34-2(121)). Nebraska Department of Roads is planning on milling and repaving a portion of US Highway 83 within the refuge. All work should take place on the paved surface so there should be no impact to refuge resources. We requested that if work was to take place off the pavement, that we again be consulted.

5. Research and Investigation

In January, refuge staff met with staff from the Nebraska COOP Unit to discuss research needs at the refuges. The COOP Unit was interested in research on Koi herpes virus as a biological control measure for common carp. They are also interested in doing research on white pelicans and cormorants in the Sandhills, including Valentine NWR.

Subsequently the Nebraska Cooperative Fish and Wildlife Research Unit submitted a Science Support Proposal with the refuge for study of koi herpes virus for control of common carp. The proposal did not propose work with live virus but would be a first step in study of the virus as a biological control for carp. The proposal was not funded. Of interest was that a large die off of common carp due to koi herpes virus occurred this summer at Calamus Reservoir, about 60 miles from Valentine NWR.

b. Ongoing research at Valentine NWR

Dr. Robert Gibson (professor/researcher from University of Nebraska-Lincoln) visited Valentine NWR in April to collect more data on stress hormone levels in displaying Sharp-tailed Grouse. In a report to the refuge, Dr. Gibson trapped and took blood samples from 21 male and 9 female Sharp-tailed grouse captured on 7 leks from 2008-2010. These blood samples were used to assay corticosterone levels and two measures of immune function. Gibson found that male sharp-tailed grouse tended to have significantly higher baseline corticosterone levels than female grouse, but that female grouse showed a greater increase in corticosterone levels as a response to handling stress (grouse were held for 30 minutes to measure response to capture stress). The response in blood corticosterone levels in female grouse was much more uniform than that observed in males; in all females, the baseline level was lower than the capture induced level measured after 30 minutes, and in 8 of 9 females the increase was statistically significant. The response in male grouse was varied, with 9 of 21 showing a significant increase in corticosterone levels, while 5 males showed no statistically detectable change, and the remaining 7 males showed a significant decline in corticosterone levels. Gibson's results also showed that leukocyte:erythrocyte ratios were significantly lower in males than females, a result consistent with depressed immune function, a condition which can result from elevated corticosterone levels. Dr. Gibson suggests three questions arise as a result of these data: 1. What factors raise baseline corticosterone levels in males?, 2. Are

baseline corticosterone levels sufficiently high to compromise survival?, and 3. Why is male stress response reduced and/or variable? Gibson hopes to continue this work with the goal of linking differences in male grouse behavior to physiological state and ultimately to survival. Gibson's full report can be found in C:\Documents and Settings\nennemanm\My documents\mel\work files\Birds\prairie grouse\Gibson data\Gibson VNWR Report 2010.

E. ADMINISTRATION

1. Personnel

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

Permanent Staff

Mark Lindvall	Refuge Manager	GS-12
Mel Nenneman	Wildlife Biologist	GS-11
Dave Kime	Maintenance Worker	WG-8

Temporary Staff

Matt Coleman	STEP Biological Science Aid GS-0404-2	May 10 -Aug 6
Troy Nelson	STEP Biological Science Aid GS-0404-2	May 10 -Aug 6
Ethan Teter	STEP Bio Tech GS-404-3	May 10 –Aug 20
James Bachelor	STEP Laborer WG -3	May 10 –Aug 13
Shea Magstadt	Biological Technician GS-404-5	April 5 -EOY

The temporary staff's entire first day of work was spent at a paper work party filling out the excessive number of required forms.

Matt and Troy completed a wide variety of maintenance tasks including painting all the buildings at Hackberry Headquarters. James worked alongside our permanent maintenance worker in getting road and windmill work done. Ethan worked with the refuge biologist in mapping invasives, waterfowl counts, endangered and threatened plant surveys, and an American burying beetle survey. It was nice to have a full complement of seasonal workers.

Shea was hired as a term employee using Regional Office Funds for biological monitoring. He worked mostly in GIS on mapping invasive plants. He worked both here and at Fort Niobrara NWR.

Individual development plans were prepared for Lindvall, Kime, and Nenneman.



Figure E1. Valentine NWR staff 2010 – left to right back row Nelson, Coleman, Nenneman, Lindvall; front row Magstadt, Bachelor, Teter, Kime. AP

4. Volunteers

5. Funding

We had submitted a proposal for equipment rental funds to get a Marsh Master to spray Canada thistle. We received word that no funds were made available for this project.

The contract for rehab of the Pelican Lake water control structure was let for \$33,708. This was more than the money that was allocated. The RO was contacted and was able to fund the difference. This is a Recovery Act Project from deferred maintenance.

Our proposal for avian influenza surveillance was funded for \$12,100. We conducted the same surveys we did in 2009.

We received \$8,750 in Youth and Careers in Natural Resources funds and used the money to have the Iowa Conservation Corps out to cut invasive cedar trees.

FY2010 Large Invasive Species Project Allocation funds were applied for to remove invasive trees in prairies at Valentine NWR. We received notice that we did not get funds for our project

An equipment rental request for \$2,400 was submitted to get funding for a scraper which would be used to make repairs to the Pelican Lake Trail.

VFE funds in the amount of \$141,372 were received to improve fishing access at the refuge. We hope to be able to complete the Pelican Lake ramp by adding a concrete handicapped parking spot and buy docks, install parking pads, and improve ramps at 4 other fishing lakes. This work will be done in 2011.

We are scheduled to receive \$125,000 from Refuge Roads Funds to maintain roads on the Refuge. We plan on using a Maintenance Action Team to do the work force account in 2011. We hope to raise, smooth up, and place rock in the wheel tracks of 7.4 miles of the Pelican Lake Trail.

6. Safety

Regional Office Staff conducted a safety and environmental compliance inspection on Valentine NWR on March 31. They noted 45 deficiencies that needed to be corrected within 30 days. Considerable time and expense was devoted to fixing the 42 action items identified during the safety review. The fixes will help us work safer but will not address the long standing problem of inadequate maintenance staff to properly maintain buildings, equipment, and facilities in a safe manner.

Safety topics were discussed on most Mondays during our coordination meeting.

Requirements and certification for continuing atv operations were completed.

7. Technical Assistance

On June 22, Manager Lindvall and Biologist Nenneman attended the stake holder's meeting for the update of The Nebraska Legacy Plan. They were seeking input on new problems and possible solutions for problems to include in the update for the Biologically Unique Landscapes in this area. Of interest is that they will now consider projects on public and other conservation lands.

8. Other

Nenneman organized the annual prairie grouse wing bee with NGPC and USFS. The wing bee was held on 27 Jan 2010 at the Valentine NWR bunkhouse. This wing bee assessed grouse harvested in the 2009 season.

Nenneman attended the Society for Range Management Meeting held in Denver, CO 08-11 Feb 2011. He presented a paper titled "A brief history of prairie grouse and their management at Valentine National Wildlife Refuge, Nebraska". The paper was part of a

symposium on lekking grouse held at the meeting, and a synopsis of the symposium is planned for publication in the journal Rangelands.

Mark Lindvall and Mel Nenneman attended the Nebraska Chapter of TWS Annual Meeting and Scientific Papers Session on February 25-27 in Norfolk, NE. Mel is president and Mark is treasurer for the Nebraska Chapter.

Staff from LaCreek, Ft. Niobrara, Valentine, and Crescent Lake met on March 10 and 11 to discuss research and management programs on the three Sandhills Refuges.

Staff from Ft. Niobrara and Valentine NWRS met with District Nebraska Game and Parks staff on March 16. This annual meeting is held so we can learn about and coordinate our activities. Increasing prevalence of deer diseases was discussed as well as deer hunting on Valentine NWR. District staff will recommend to the Commission that bonus antlerless, October antlerless, and January antlerless permits not be valid on the refuge. These permits are planned to reduce depredation complaints and we do not have high numbers of deer on the Refuge.

Lindvall and Nenneman attended the Project Leaders/Biologist meeting held in Missoula, MT from June 8 – 10.

On 27 May, Nenneman provided ATV safety training for seasonal employees from the Ft. Niobrara/Valentine NWR Complex. The course emphasizes safe use of ATVs and ORUVs for conducting a variety of refuge jobs. The course also covers proper tie down procedures for transporting ATVs and ORUVs. A total of 4 employees were provided instruction in ATV/ORUV use.

All Ft. Niobrara/Valentine NWR staff, and several NPS employees participated in Wilderness training. This training focused on defining what wilderness is and why it is important. The training culminated with a brief float down the Niobrara River, and a shore lunch with exercises in leave-no trace practices.

The following training was completed by Refuge staff.

Lindvall

annual Ethics Training
Security Awareness Training
Wilderness and Leave No Trace
Fire Refresher
supervisors training
hiring training
Basic Aviation Safety

Kime

Fire Refresher
security awareness training

Nenneman

Wilderness and Leave No Trace

Fire Refresher

security awareness

Bachelor

Defensive Driving

ATV

Wilderness and Leave No Trace

heavy equipment training for skid steer and farm tractor

security awareness

Teter

Defensive Driving

Wilderness and Leave No Trace

Security awareness

Coleman and Nelson

Wilderness and Leave No Trace

Security awareness

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 59,000 acres. Native grasses provide the dominant vegetation cover, although some areas have been invaded by Kentucky bluegrass and smooth brome. Other exotic plants of concern include small areas of leafy spurge, Canada thistle, Garrison creeping foxtail and spotted knapweed. Low water in larger lakes and wetlands during the past few years has allowed Canada thistle and cottonwood trees to proliferate in the wetland margins. 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. Lakes and wetlands on Valentine NWR held started the year a little drier than average, but went into the fall with generally above average readings thanks to abundant rainfall through the summer months. Based on measures of lake levels (Table F.2.1) and USGS groundwater wells (Table F.2.2), the groundwater on Valentine Refuge is making a recovery from the dry years in 1999-2004. With the spring thaw in March, there was an abundance of water on Valentine NWR. Many lakes were flowing out and small wetlands were full. Waterfowl started to arrive in good numbers.

Above average rainfall from April through July filled refuge wetlands and lakes and flooded roads, over topped dikes, and eroded one dike. In June, the following roads were closed; the Calf Camp Road from Highway 83 to the rock boat ramp on Pelican Lake, the School Lake Cut Across Road, the east end access road into Watts Lake, and the East End Access Road. All together about 14 miles of road remain closed into the fall. The roads and parking lots were flooded, in some places water was flowing across roads, and most were damaged by vehicle traffic before closure. Repairs to the roads will be required when it dries up. Water volume was too much for the structures at Watts and Clears Lakes and water ran over the dikes but caused no erosion. The Calf Camp Water Control structure was blocked by vegetation and the water level rose enough that a spring seep formed on the downstream side of the dike and washed out a section of dike. The water control structure was cleared and the impoundment drained to prevent a possible failure of the dike. Water also flowed out of East Twin Lake through the culvert into the Marsh Lakes. This culvert was installed by Nebraska Department of Roads to prevent the lake from flooding Highway 83. Water flowed from Duck into Rice Lake.

Seven lakes on Valentine NWR have had elevations recorded more or less continuously since 1988. While 20+ years of data is hardly a long term data set, it does provide a basis for comparison, and there has been a period of higher than average precipitation and lower than average precipitation during these years. An exception in this data is for Willow Lake, where the water control structure washed out in 1997. Elevations reported here for Willow Lake are those recorded after 1997. Lake elevations continued their recovery toward average levels not achieved since the drought began in 1999. In spring of 2008, all seven lakes had elevation measures lower than average (mean difference from average -1'1.3"). A comparison of the spring 2010 lake elevations on these seven lakes to the spring averages shows that only one lake is lower than average (Dewey), and the average for all seven lakes is 8.9 inches above average. In fall 2010, a comparison of fall lake elevations to fall lake elevation averages shows that the lakes are still full, with the lakes 7.5 inches above average. Hackberry Lake appears to be fully recovered from the 2004 renovation, with water levels spring and fall exceeding average measures These higher water levels should provide a positive benefit to fish by inundating emergent vegetation that was out of the water during the early part of the decade, making more spawning habitat and escape cover available.

Table F.2.1. Lake elevations recorded on Valentine NWR, 2009. For all lakes, average spring elevations are based on the highest elevation recorded in Mar-May from 1988-2009, and the average fall elevations are based on the lowest elevation recorded in Aug-Oct from 1988-2009.

Lake	Spring 2010	Fall 2010	Spring Average	Fall Average
Clear	2917.68	2916.64	2916.79	2915.99
Dewey	2924.1	2922.94	2924.31	2923.25
Hackberry	2924.38	2923.97	2924.30	2923.72
Pelican	2943.1	2942.88	2942.57	2942.00
Watts	2924.25	2922.9	2923.7	2922.82
Whitewater	2928.8	2927.92	2928.16	2927.44
Willow*	2913.32	2912.55	2910.59	2910.20

* Average elevations for Willow Lake are only from readings taken after 1997, when the water control structure washed out.

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. USGS well readings were completed and sent to the USGS office in Lincoln. Dwain Curtis (dlcurtis@usgs.gov) has taken over the position of collecting well data from remote locations. All 2010 data collected on Valentine NWR have been sent to Mr. Curtis. For the year, most groundwater elevations were higher than average (Table F2.2). In April, groundwater elevations in 17 of 31 wells was greater than 6 inches above average, while 4 were greater than 6 inches below average; the remaining 10 wells were within 6 inches of the average groundwater elevation. The late summer (Sept-Oct) groundwater elevations were similar, with 18 of 31 wells having elevations greater than 6 inches above average, while just 2 wells had elevations greater than 6 inches below average. The remaining 11 wells had groundwater elevations within 6 inches of the average elevation. The difference between average spring and fall well readings is 8.7 inches, so wells varying from average by 6 inches or less can probably be considered within a "normal" range.

The annual Valentine NWR water use report for 2009-2010 was completed and signed in April. This report provides information on water measurements taken on the refuge during 2009, and describes planned water management for 2010. Summary data on lake level measurements and USGS groundwater monitoring wells is provided, as well as planned water use activities for the year (report found in C:\Documents and Settings\nennemanm\My Documents\mel\Work files\USGS wells and lake levels\water use reports).

Table F 2.2. Spring and fall USGS groundwater well readings, and the spring and fall averages as recorded from 1970-2010. Groundwater elevation is given for all wells for which the elevation is known. For wells that the elevation is not known, an index value based off of 100' is used.

Well No.	Well Location	Spring	Spring Ave	Fall	Fall Ave
1	N. East Long	2876.23	2874.573	2874.83	2873.379
2	SE corner S. Marsh	2896.13	2894.636	2894.03	2893.19
3	SE corner Pony	2899.77	2899.506	2898.57	2897.493
4	SE corner Cow	2921.59	2919.382	2919.89	2918.56
5	Calf Camp & Hwy 83	2896.45	2896.392	2895.25	2895.113
6	Calf Camp West	2915.83	2915.564	2914.13	2913.715
7	Little Hay West	2917.34	2916.129	2917.14	2916.058
8	Little Hay & Hwy 83	2898.68	2899.256	2898.08	2898.163
10	W. Pony & Hwy 83	2925.11	2922.968	2924.41	2922.523
13	S. Willow	2918.35	2917.182	2917.75	2917.088
14	E. McKeel	2921.87	2920.231	2919.97	2919.095
15	S. East Sweetwater	2926.77	2925.2	2926.27	2924.698
16	SE Trout	2900.07	2898.873	2897.67	2897.556
17	E. Crowe Headquarters	98.3	95.61471	99.3	95.66286
20	S. Watts	2925.96	2924.744	2924.56	2924.068
21	E. Pony Pasture	2925.74	2924.872	2924.54	2924.39
22	Hackberry-Dewey Canal	2923.99	2923.741	2922.79	2923.013
23	Badger Bay	2924.29	2923.725	2923.99	2923.754
25	E. Pelican	2942.52	2943.512	2942.52	2943.235
26	E. West Long	2964.18	2964.951	2964.68	2964.87
27	Dad's Recreation Area	2957.59	2957.471	2956.89	2956.326
29	NW Pelican	2948.69	2948.382	2948.69	2947.644
30	S. Dewey Marsh	2940.34	2940.435	2939.54	2939.375
31	W. Dewey Marsh	95.7	97.93714	95.7	98.1675
32	N. Pelican	2942.45	2941.629	2941.65	2940.87
33	NW West Long	2980.2	2979.742	2978.5	2978.838
34	Hwy 83 & W. King Flats	2926.19	2924.116	2927.19	2923.953
35	SE "21" Lake	97.9	96.29474	97.5	95.45641
36	W. Sweetwater & Hwy 83	2926.77	2926.948	2926.97	2926.362
38	SE West Twin	2920.94	2920.543	2920.84	2919.784
39	SW Hassle Place	96.5	94.44194	95.7	94.12143

^a These wells held no water, only damp sand at the bottom.

3. Forests

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. The number of permittees has declined over the years. In 2010, there were four permittees in the program. All have had permits for many years. Grazing rates are reduced to compensate permittees for the added expense of moving cattle for short duration grazing. One bid graze was also let. The program was similar to previous years with emphasis on spring grazing treatments in meadows and short-duration grazing in hill units.

Another permittee sold all his fall cows and will be bringing yearlings. Fall cows have worked the best for us with the type of grazing that we do. The rancher said that prices for fall calves have fallen off so he sold his fall cows. The yearlings are a problem as they have a tendency to jump and break through fences. In an effort to keep them in, we had the permittees put electric training fences up on their ranches before they brought

them onto the Refuge. We also went to 2 hot wires on some of the electric fences. The bid graze and one permittee will each have 2 herds this year.

Two permittees inquired about passing their permits on to their sons. We are preparing a response to their request.

The habitat/grazing program got off to bad start with cattle often getting out of the designated units. Problems included poor fence repair by contractors, fence jumping yearlings, fence chargers that failed, and fixing fence in the wrong unit. At one time we had a bio tech that monitored this program and things went much better. This person retired and was not replaced.

The water gap at Rice Lake went out and the neighbor's cattle entered the refuge. We fixed the water gap and the neighbor quickly removed about 15 head. Water gaps are a continuing problem with trespass grazing. The water gap at Devil's Punch Bowl Lake has also been a problem for trespass grazing. Many of the units south of Mule Lake were heavily grazed by trespass cattle this spring (9C, 11A).

Grazing fees for 2010 were:

spring grazing treatment		\$21.50/AUM
short-duration grazing		
	1 day in unit	\$14.18/AUM
	2 days in unit	\$19.69/AUM
	3 days in unit	\$21.50/AUM
	4 days in unit	\$22.24/AUM
	5 days in unit	\$22.60/AUM
	6 days in unit	\$23.97/AUM
	7 days in unit	\$24.34/AUM
	8 or more days	\$24.80/AUM
	in unit	
fall		\$24.00/AUM
winter		\$24.80/AUM

(for feeding refuge share of hay on refuge at 3AUMs/ton)

The full rate of \$24.80 for 2010 is an increase of \$.80 per AUM from the 2009 fee and is based on a rate survey conducted by USDA and published in Nebraska Farm Real Estate Market Developments. The different classes of animals were also changed in 2003 and we 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 weed control, and improvements and repairs to wells, fence, tanks and other facilities needed for the program. In 2010 \$63,898 was spent on improvements and deducted from final billings. 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 five permittees. They were paid \$40.00 per hour for a crew of two, and supplied their own gas, tools, vehicle, and equipment. Total fees collected for the 2010 grazing season were \$21,658.

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 F7a.

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 2010, 27 habitat units totaling 4,570 acres received a spring grazing treatment and included some areas that were later 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 2010, 3 habitat unit totaling 200 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 2010, 34 habitat units totaling 9,146 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 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 2010 1 habitat unit of 373 acres was summer grazed. When we do summer grazing it is usually in 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 2010 that will be given a spring grazing treatment in 2011. In 2010, 4 habitat units totaling 1,504 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 utilizes waste grain from the feeding operation. In 2010, 4 habitat units totaling 304 acres were winter grazed.

g. **Fire**

Prescribed fire (P) and natural or wildland fire (N) are discussed in the fire section H-9.

Treatment		Units	Acres	AUMS
Rest	rest (R)			----
Spring	spring grazing treatment (SGT)	27	4,570	1,203
	early spring short duration (ES-SD)			
	ES-SD 1-6 days	2	451	53
	ES-SD 7-10 days	1	200	69
Summer	short duration summer (SD-S)			
	SD-S 1-3 days	13	2,747	348
	SD-S 4-7 days	15	4,430	743
	SD-S 8-14 days	6	1,969	379
	summer (S) 15-27 days	1	373	39
Fall	fall (F)	4	1,504	396
Winter	winter (W)	4	304	631
Hayed	hayed (H)	9	421	----
Fire	prescribed fire (P)	10	1,459	----
	natural fire (N)	0	---	----
*Note: some habitat units received double treatment, primarily hayed units that were also spring grazed (SGT) or fall (F) grazed units, or rest (R) units that had N or P fires.				

2010 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	ams	am/acre	permittee
"A"	120	R	0	0	0	0	/ /	0	0.00	0.00	
01A1	105	R	0	0	0	0	/ /	0	0.00	0.00	
01A2	110	R	0	0	0	0	/ /	0	0.00	0.00	
01A3	10	R	0	0	0	0	/ /	0	0.00	0.00	
01A4	115	R	0	0	0	0	/ /	0	0.00	0.00	
01A5	74	R	0	0	0	0	/ /	0	0.00	0.00	
01B1(NW)	45	R	0	0	0	0	/ /	0	0.00	0.00	
01B1(W-E)	63	R	0	0	0	0	/ /	0	0.00	0.00	
01B2	376	SGT	0	0	0	114	06/01/10	36	94.19	0.25	RECE
01C	188	R	0	0	0	0	/ /	0	0.00	0.00	
02A	506	R	0	0	0	0	/ /	0	0.00	0.00	
02B1	176	R	0	0	0	0	/ /	0	0.00	0.00	
02B1(FIL)	5	R	0	0	0	0	/ /	0	0.00	0.00	
02B2	45	R	0	0	0	0	/ /	0	0.00	0.00	
02B3(A)	140	R	0	0	0	0	/ /	0	0.00	0.00	
02B3(B)	129	R	0	0	0	0	/ /	0	0.00	0.00	
02B3(C)	150	R	0	0	0	0	/ /	0	0.00	0.00	
02B3(D)	65	R	0	0	0	0	/ /	0	0.00	0.00	
03A	106	R	0	0	0	0	/ /	0	0.00	0.00	
03B	240	SD-S	0	0	0	114	06/10/10	9	23.55	0.10	RECE
03C1	268	R	0	0	0	0	/ /	0	0.00	0.00	
03C1(W)	21	R	0	0	0	0	/ /	0	0.00	0.00	
03CIDIKE	29	R	0	0	0	0	/ /	0	0.00	0.00	
03C2	137	R	0	0	0	0	/ /	0	0.00	0.00	
03D	516	SD-S	0	0	0	114	06/20/10	10	26.16	0.05	RECE
04	350	HF 48	0	0	0	0	/ /	0	0.00	0.00	
05A	666	R	0	0	0	0	/ /	0	0.00	0.00	
05B1	527	R	0	0	0	0	/ /	0	0.00	0.00	
05B2	30	R	0	0	0	0	/ /	0	0.00	0.00	
06	308	R	0	0	0	0	/ /	0	0.00	0.00	
07A1(N)	225	R	0	0	0	0	/ /	0	0.00	0.00	
07A1(S)	85	R	0	0	0	0	/ /	0	0.00	0.00	
07A2	20	R	0	0	0	0	/ /	0	0.00	0.00	
07B1	112	R	0	0	0	0	/ /	0	0.00	0.00	
07B2	152	SD-S	0	6	2	88	06/28/10	7	16.20	0.11	RECE
07B3(E)	25	R	0	0	0	0	/ /	0	0.00	0.00	
07B3(W)	66	R	0	0	0	0	/ /	0	0.00	0.00	
07C	105	R	0	0	0	0	/ /	0	0.00	0.00	
08A1	166	R	0	0	0	0	/ /	0	0.00	0.00	
08A2	155	R	0	0	0	0	/ /	0	0.00	0.00	
08A3	160	SD-S	0	6	2	88	06/21/10	7	16.20	0.10	RECE
08B1/2	373	S	0	6	2	88	06/14/10	17	39.35	0.11	RECE
08B3	185	R	0	0	0	0	/ /	0	0.00	0.00	
08B4	185	R	0	0	0	0	/ /	0	0.00	0.00	
08C1	275	R	0	0	0	0	/ /	0	0.00	0.00	
08C2	175	R	0	0	0	0	/ /	0	0.00	0.00	
08C3	170	R	0	0	0	0	/ /	0	0.00	0.00	

2010 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	ams	amv	permittee
									acre		
08D1	120	R	0	0	0	0	/ /	0	0.00	0.00	
08D2	250	R	0	0	0	0	/ /	0	0.00	0.00	
08D3	134	R	0	0	0	0	/ /	0	0.00	0.00	
08E1	152	R	0	0	0	0	/ /	0	0.00	0.00	
08E2	137	R	0	0	0	0	/ /	0	0.00	0.00	
08E3(H)	100	R	0	0	0	0	/ /	0	0.00	0.00	
08E3(M)	187	R	0	0	0	0	/ /	0	0.00	0.00	
08F1	190	SD-S	0	343	0	0	06/28/10	3	33.74	0.18	CULURN
08F2	211	R	0	0	0	0	/ /	0	0.00	0.00	
08G	206	R	0	0	0	0	/ /	0	0.00	0.00	
09A1	119	SGT	0	3	1	33	05/28/10	32	28.96	0.24	FERCE
09A2	133	SGT	0	2	1	37	05/28/10	32	30.85	0.23	FERCE
09A3	68	SGT	0	1	0	18	05/28/10	32	14.27	0.21	FERCE
09B2	123	SGT	0	21	0	0	05/15/10	6	4.13	0.03	CULURN
09C1/2	160	SD-S	0	173	11	0	06/01/10	7	43.49	0.27	CULURN
09C10	40	R	0	0	0	0	/ /	0	0.00	0.00	
09C3/4	160	SD-S	0	172	11	0	06/01/10	7	43.26	0.27	CULURN
09C5	110	R	0	0	0	0	/ /	0	0.00	0.00	
09C6	90	R	0	0	0	0	/ /	0	0.00	0.00	
09C7	90	R	0	0	0	0	/ /	0	0.00	0.00	
09C8	70	R	0	0	0	0	/ /	0	0.00	0.00	
09C9	80	R	0	0	0	0	/ /	0	0.00	0.00	
10A1	640	R	0	0	0	0	/ /	0	0.00	0.00	
10A2	240	R	0	0	0	0	/ /	0	0.00	0.00	
10A3	160	R	0	0	0	0	/ /	0	0.00	0.00	
10B(C)	260	R	0	0	0	0	/ /	0	0.00	0.00	
10B(E)	275	SD-S	0	343	0	0	06/18/10	4	44.98	0.16	CULURN
10B(W)	929	SGT	0	150	0	0	05/15/10	6	29.51	0.03	CULURN
10B(W)	929	SGT	0	304	19	0	05/25/10	10	109.02	0.12	CULURN
11A1	126	SD-S	0	155	11	0	06/10/10	9	50.61	0.40	CULURN
11A2	126	R	0	0	0	0	/ /	0	0.00	0.00	
11A3	118	R	0	0	0	0	/ /	0	0.00	0.00	
11A4	110	SD-S	0	345	22	0	06/14/10	4	49.57	0.46	CULURN
11A5	126	R	0	0	0	0	/ /	0	0.00	0.00	
11A6	126	R	0	0	0	0	/ /	0	0.00	0.00	
11A7	126	R	0	0	0	0	/ /	0	0.00	0.00	
11A8	114	R	0	0	0	0	/ /	0	0.00	0.00	
12A1	83	R	0	0	0	0	/ /	0	0.00	0.00	
12A2	82	R	0	0	0	0	/ /	0	0.00	0.00	
12A3	83	R	0	0	0	0	/ /	0	0.00	0.00	
12A4	110	R	0	0	0	0	/ /	0	0.00	0.00	
12A5	80	R	0	0	0	0	/ /	0	0.00	0.00	
12A6	100	R	0	0	0	0	/ /	0	0.00	0.00	
12A7	110	R	0	0	0	0	/ /	0	0.00	0.00	
12A8	110	R	0	0	0	0	/ /	0	0.00	0.00	
12A9	82	R	0	0	0	0	/ /	0	0.00	0.00	
12B	290	R	0	0	0	0	/ /	0	0.00	0.00	

2010 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	sums	sum/acre	permittee
13A	709	SD-S	0	343	0	0	06/25/10	7	78.72	0.11	COLBURN
13B1	942	R	0	0	0	0	/ /	0	0.00	0.00	
14A1	280	R	0	0	0	0	/ /	0	0.00	0.00	
14A2	294	R	0	0	0	0	/ /	0	0.00	0.00	
14A3	153	R	0	0	0	0	/ /	0	0.00	0.00	
14A4	200	R	0	0	0	0	/ /	0	0.00	0.00	
14B1	340	R	0	0	0	0	/ /	0	0.00	0.00	
14B2	340	R	0	0	0	0	/ /	0	0.00	0.00	
14B3	312	SD-S	0	343	0	0	07/05/10	3	33.74	0.11	COLBURN
14B4	260	R	0	0	0	0	/ /	0	0.00	0.00	
14B5	283	SD-S	0	343	0	0	07/02/10	4	44.96	0.16	COLBURN
15A	398	R	0	0	0	0	/ /	0	0.00	0.00	
15B	273	R	0	0	0	0	/ /	0	0.00	0.00	
15C1	93	R	0	0	0	0	/ /	0	0.00	0.00	
15C2	155	R	0	0	0	0	/ /	0	0.00	0.00	
15C3	175	R	0	0	0	0	/ /	0	0.00	0.00	
15C4	199	R	0	0	0	0	/ /	0	0.00	0.00	
16A1	44	R	0	0	0	0	/ /	0	0.00	0.00	
16A2	95	R	0	0	0	0	/ /	0	0.00	0.00	
16A3	149	R	0	0	0	0	/ /	0	0.00	0.00	
16B1	160	FF 160	0	0	0	0	/ /	0	0.00	0.00	
16B2	317	FF 245	0	0	0	0	/ /	0	0.00	0.00	
16B3	40	FF 39	0	0	0	0	/ /	0	0.00	0.00	
16B4	175	FF 164	0	0	0	0	/ /	0	0.00	0.00	
16C	524	R	0	0	0	0	/ /	0	0.00	0.00	
16E1	145	R	0	0	0	0	/ /	0	0.00	0.00	
16E2	71	R	0	0	0	0	/ /	0	0.00	0.00	
16E3	65	FF 25	0	0	0	0	/ /	0	0.00	0.00	
16E4	266	FF 171	0	0	0	0	/ /	0	0.00	0.00	
17	871	R	0	0	0	0	/ /	0	0.00	0.00	
18A1	339	R	0	0	0	0	/ /	0	0.00	0.00	
18A2	163	R	0	0	0	0	/ /	0	0.00	0.00	
18A3	150	SD-S	124	115	4	0	06/10/10	3	26.54	0.18	BID
18A4	220	SD-S	124	115	4	0	06/07/10	3	26.54	0.12	BID
18A5	260	R	0	0	0	0	/ /	0	0.00	0.00	
18A6	290	R	0	0	0	0	/ /	0	0.00	0.00	
18B1	81	R	0	0	0	0	/ /	0	0.00	0.00	
18B10	40	SGT	9	8	0	0	06/01/10	22	13.56	0.34	BID
18B2(H)	93	R	0	0	0	0	/ /	0	0.00	0.00	
18B2(M)	83	R	0	0	0	0	/ /	0	0.00	0.00	
18B3(H)	112	R	0	0	0	0	/ /	0	0.00	0.00	
18B3(M)	95	R	0	0	0	0	/ /	0	0.00	0.00	
18B4(H)	103	R	0	0	0	0	/ /	0	0.00	0.00	
18B4(M)	42	R	0	0	0	0	/ /	0	0.00	0.00	
18B5	72	R	0	0	0	0	/ /	0	0.00	0.00	
18B6	69	R	0	0	0	0	/ /	0	0.00	0.00	
18B7(N)	76	SGT	16	15	0	0	06/01/10	22	24.67	0.32	BID

2010 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	ams	am/acre	permittee
18B7(SE)	33	SGT	7	7	0	0	06/01/10	22	11.11	0.34	BID
18B7(SW)	85	SGT	18	17	0	0	06/01/10	22	27.84	0.33	BID
18B8	171	SGT	37	35	2	0	06/01/10	22	59.44	0.35	BID
18B8(W)	36	SGT	7	6	0	0	06/01/10	22	10.39	0.29	BID
18B9(H)	97	SGT	21	19	2	0	06/01/10	22	34.05	0.35	BID
18B9(M)	41	SGT	9	8	0	0	06/01/10	22	13.56	0.33	BID
18C1	216	R	0	0	0	0	/ /	0	0.00	0.00	
18C2	149	R	0	0	0	0	/ /	0	0.00	0.00	
19A	173	R	0	0	0	0	/ /	0	0.00	0.00	
19B	174	R	0	0	0	0	/ /	0	0.00	0.00	
19C	101	R	0	0	0	0	/ /	0	0.00	0.00	
20A1	120	R	0	0	0	0	/ /	0	0.00	0.00	
20A2	175	SD-S	113	0	4	0	06/10/10	3	13.93	0.08	BID
20A3	160	SD-S	113	0	4	0	06/07/10	3	13.93	0.09	BID
20A4	203	R	0	0	0	0	/ /	0	0.00	0.00	
20B1	340	R	0	0	0	0	/ /	0	0.00	0.00	
20B2	185	R	0	0	0	0	/ /	0	0.00	0.00	
20B3(E)	127	SD-S	113	0	4	0	06/04/10	3	13.93	0.11	BID
20B3(W)	112	R	0	0	0	0	/ /	0	0.00	0.00	
20B4	185	R	0	0	0	0	/ /	0	0.00	0.00	
20B5	115	R	0	0	0	0	/ /	0	0.00	0.00	
20B6	155	R	0	0	0	0	/ /	0	0.00	0.00	
20B7	40	R	0	0	0	0	/ /	0	0.00	0.00	
21A1(A)	296	R	0	0	0	0	/ /	0	0.00	0.00	
21A1(B)	285	SD-S	124	115	4	0	06/04/10	3	26.54	0.09	BID
21A1(C)	155	R	0	0	0	0	/ /	0	0.00	0.00	
			0	0	0	0	/ /	0	0.00	0.00	
			0	0	0	0	/ /	0	0.00	0.00	
21A2	134	R	0	0	0	0	/ /	0	0.00	0.00	
21A3(E)	149	H	0	0	0	0	/ /	0	0.00	0.00	CULBPN
21A3(E)	149	SGT	0	86	0	0	05/09/10	24	67.67	0.45	CULBPN
21A4	179	H	0	0	0	0	/ /	0	0.00	0.00	CULBPN
21A4	179	SGT	0	85	0	0	05/09/10	24	66.89	0.37	CULBPN
21B1	120	R	0	0	0	0	/ /	0	0.00	0.00	
21B2	106	R	0	0	0	0	/ /	0	0.00	0.00	
21B3	130	R	0	0	0	0	/ /	0	0.00	0.00	
21B4	128	R	0	0	0	0	/ /	0	0.00	0.00	
21B5	128	R	0	0	0	0	/ /	0	0.00	0.00	
21B6	143	R	0	0	0	0	/ /	0	0.00	0.00	
21B7	143	R	0	0	0	0	/ /	0	0.00	0.00	
21C1	120	R	0	0	0	0	/ /	0	0.00	0.00	
21C2	1170	R	0	0	0	0	/ /	0	0.00	0.00	
21C3	80	R	0	0	0	0	/ /	0	0.00	0.00	
21C4	127	R	0	0	0	0	/ /	0	0.00	0.00	
21C5	189	R	0	0	0	0	/ /	0	0.00	0.00	
22A1	360	R	0	0	0	0	/ /	0	0.00	0.00	
22A2	385	R	0	0	0	0	/ /	0	0.00	0.00	

2010 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	ams	am/acre	permittee
22A3	372	R	0	0	0	0	/ /	0	0.00	0.00	
22A4	350	SD-S	0	343	0	0	07/09/10	4	44.98	0.12	COLBURN
22B1	240	R	0	0	0	0	/ /	0	0.00	0.00	
22B2	421	R	0	0	0	0	/ /	0	0.00	0.00	
22B3	40	R	0	0	0	0	/ /	0	0.00	0.00	
22B4	50	R	0	0	0	0	/ /	0	0.00	0.00	
22B5	171	R	0	0	0	0	/ /	0	0.00	0.00	
23A1	160	R	0	0	0	0	/ /	0	0.00	0.00	
23A2	231	R	0	0	0	0	/ /	0	0.00	0.00	
23A3	211	R	0	0	0	0	/ /	0	0.00	0.00	
23B1	121	R	0	0	0	0	/ /	0	0.00	0.00	
23B2	142	R	0	0	0	0	/ /	0	0.00	0.00	
23C	599	SD-S	0	343	0	0	07/18/10	9	101.21	0.17	COLBURN
24A1	96	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN
24A1	96	SGT	0	0	0	28	06/01/10	18	11.57	0.12	COLBURN
24A2	80	SGT	0	0	0	28	06/01/10	18	11.57	0.14	COLBURN
24A3	67	R	0	0	0	0	/ /	0	0.00	0.00	
24A4	40	R	0	0	0	0	/ /	0	0.00	0.00	
24A5/6	144	W	0	63	3	0	03/16/11	103	227.95	1.58	COLBURN
24A5/6	144	W	121	0	0	0	04/22/11	37	180.55	1.25	COLBURN
24A7	54	R	0	0	0	0	/ /	0	0.00	0.00	
24A8	80	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN
24C1	147	R	0	0	0	0	/ /	0	0.00	0.00	
24C2	97	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN
24C2	97	SGT	0	0	0	56	05/14/10	21	26.99	0.28	COLBURN
24C2	97	SGT	0	0	0	56	06/15/10	14	17.99	0.19	COLBURN
24C3	54	R	0	0	0	0	/ /	0	0.00	0.00	
24C4	82	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN
25A	258	R	0	0	0	0	/ /	0	0.00	0.00	
25B	410	R	0	0	0	0	/ /	0	0.00	0.00	
25C1	82	R	0	0	0	0	/ /	0	0.00	0.00	
25C2	69	R	0	0	0	0	/ /	0	0.00	0.00	
25C3	161	ES-SD	0	0	0	432	05/10/10	3	29.74	0.18	LEE
25C4	200	ES-SD	0	0	0	432	05/17/10	7	69.40	0.35	LEE
26A1	335	SD-S	0	0	0	460	07/12/10	11	116.13	0.35	LEE
26A2	349	R	0	0	0	0	/ /	0	0.00	0.00	
26B1	110	R	0	0	0	0	/ /	0	0.00	0.00	
26B2	115	R	0	0	0	0	/ /	0	0.00	0.00	
26B3	110	SGT	0	88	0	0	05/20/10	15	43.28	0.39	ANDERSON/GRABER
26B4	125	R	0	0	0	0	/ /	0	0.00	0.00	
27A1	32	R	0	0	0	0	/ /	0	0.00	0.00	
27A2	267	H	0	0	0	0	/ /	0	0.00	0.00	ANDERSON/GRABER
27B1	57	R	0	0	0	0	/ /	0	0.00	0.00	
27B2	36	R	0	0	0	0	/ /	0	0.00	0.00	
27B3	37	R	0	0	0	0	/ /	0	0.00	0.00	
27B4	37	R	0	0	0	0	/ /	0	0.00	0.00	
28A1	158	R	0	0	0	0	/ /	0	0.00	0.00	

2010 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	aums	aum/acre	permittee
28A2	80	R	0	0	0	0	/ /	0	0.00	0.00	
28A3	80	R	0	0	0	0	/ /	0	0.00	0.00	
28A4	85	W	0	106	0	0	01/17/11	32	111.21	1.31	ANDERSON/GRAHER
28A5	75	W	0	106	0	0	01/17/11	32	111.21	1.48	ANDERSON/GRAHER
28A6	80	R	0	0	0	0	/ /	0	0.00	0.00	
28B1	289	R	0	0	0	0	/ /	0	0.00	0.00	
28B2	294	R	0	0	0	0	/ /	0	0.00	0.00	
28B3	280	R	0	0	0	0	/ /	0	0.00	0.00	
28B4	400	R	0	0	0	0	/ /	0	0.00	0.00	
28C	750	R	0	0	0	0	/ /	0	0.00	0.00	
29A1	50	SGT	0	0	0	146	06/01/10	15	50.26	0.56	LEE
29A2	176	SGT	0	0	0	286	06/01/10	15	98.46	0.56	LEE
29B1	99	R	0	0	0	0	/ /	0	0.00	0.00	
29B2	182	R	0	0	0	0	/ /	0	0.00	0.00	
29B3	69	R	0	0	0	0	/ /	0	0.00	0.00	
29B4	89	R	0	0	0	0	/ /	0	0.00	0.00	
29B5			0	0	0	0	/ /	0	0.00	0.00	
30A(T)	15	R	0	0	0	0	/ /	0	0.00	0.00	
30A1	468	SD-S	0	0	0	460	06/24/10	6	63.34	0.14	LEE
30A2	201	R	0	0	0	0	/ /	0	0.00	0.00	
30A3	410	SD-S	0	0	0	460	07/01/10	7	73.50	0.18	LEE
30A4	312	R	0	0	0	0	/ /	0	0.00	0.00	
30B1(E)	202	SD-S	0	0	0	460	06/11/10	4	42.23	0.21	LEE
30B1(W)	146	R	0	0	0	0	/ /	0	0.00	0.00	
30B2	256	R	0	0	0	0	/ /	0	0.00	0.00	
30B3	128	SD-S	0	0	0	460	06/07/10	3	31.67	0.25	LEE
30B4	135	R	0	0	0	0	/ /	0	0.00	0.00	
30C1	328	R	0	0	0	0	/ /	0	0.00	0.00	
30C2	180	R	0	0	0	0	/ /	0	0.00	0.00	
30C3	134	SD-S	0	0	0	460	06/04/10	3	31.67	0.24	LEE
30C4	108	R	0	0	0	0	/ /	0	0.00	0.00	
30C5	188	R	0	0	0	0	/ /	0	0.00	0.00	
30C6	130	R	0	0	0	0	/ /	0	0.00	0.00	
31A	171	R	0	0	0	0	/ /	0	0.00	0.00	
31A(T)	15	R	0	0	0	0	/ /	0	0.00	0.00	
31B(T)	30	R	0	0	0	0	/ /	0	0.00	0.00	
31B1	555	R	0	0	0	0	/ /	0	0.00	0.00	
31B2	469	R	0	0	0	0	/ /	0	0.00	0.00	
31C	506	SGT	113	0	4	0	06/01/10	29	134.64	0.27	BID
32A	491	SD-S	0	0	0	460	06/18/10	7	73.50	0.15	LEE
32B1	257	R	0	0	0	0	/ /	0	0.00	0.00	
32B2	155	FF 51	0	0	0	0	/ /	0	0.00	0.00	
32C1	314	F	0	220	0	0	10/04/10	21	151.48	0.48	ANDERSON/GRAHER
32C2	83	F	0	22	0	0	10/30/10	26	18.75	0.23	ANDERSON/GRAHER
33	840	F	13	177	0	0	09/07/10	15	94.91	0.11	ANDERSON/GRAHER
33	840	F	0	198	0	0	10/30/10	26	168.79	0.20	ANDERSON/GRAHER
34A1	240	R	0	0	0	0	/ /	0	0.00	0.00	

2010 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	ams	am/acre	permittee
34A2	240	R	0	0	0	0	/ /	0	0.00	0.00	
34A3	222	R	0	0	0	0	/ /	0	0.00	0.00	
34A4	219	R	0	0	0	0	/ /	0	0.00	0.00	
34A5	160	SD-S	204	110	6	0	06/21/10	3	36.39	0.23	ANDERSON/GRAHER
34A6	120	R	0	0	0	0	/ /	0	0.00	0.00	
34B1(E)	174	R	0	0	0	0	/ /	0	0.00	0.00	
34B1(W)	201	R	0	0	0	0	/ /	0	0.00	0.00	
34B2	306	SD-S	204	110	6	0	06/11/10	4	48.51	0.16	ANDERSON/GRAHER
34B2	306	SD-S	204	110	6	0	06/18/10	2	24.26	0.08	ANDERSON/GRAHER
34B3(N)	164	SD-S	204	110	6	0	06/16/10	5	60.64	0.37	ANDERSON/GRAHER
34B3(S)	142	R	0	0	0	0	/ /	0	0.00	0.00	
34C(T)	15	R	0	0	0	0	/ /	0	0.00	0.00	
34C1	202	R	0	0	0	0	/ /	0	0.00	0.00	
34C2	227	R	0	0	0	0	/ /	0	0.00	0.00	
34C3	155	R	0	0	0	0	/ /	0	0.00	0.00	
34C4	155	R	0	0	0	0	/ /	0	0.00	0.00	
34C5	155	R	0	0	0	0	/ /	0	0.00	0.00	
34D	231	R	0	0	0	0	/ /	0	0.00	0.00	
34E1	222	R	0	0	0	0	/ /	0	0.00	0.00	
34E2	310	R	0	0	0	0	/ /	0	0.00	0.00	
34E3	290	ES-SD	204	110	0	0	05/22/10	2	23.67	0.08	ANDERSON/GRAHER
34F	103	R	0	0	0	0	/ /	0	0.00	0.00	
35A(N)	224	R	0	0	0	0	/ /	0	0.00	0.00	
35A(S)	400	SD-S	204	110	6	0	06/07/10	3	36.39	0.09	ANDERSON/GRAHER
35B	322	SGT	102	55	0	2	06/04/10	13	77.51	0.24	ANDERSON/GRAHER
35BCAMP	38	SGT	12	7	0	2	06/04/10	13	9.87	0.26	ANDERSON/GRAHER
35C	277	SGT	90	48	0	2	06/04/10	13	68.24	0.25	ANDERSON/GRAHER
36A	229	R	0	0	0	0	/ /	0	0.00	0.00	
36B	615	R	0	0	0	0	/ /	0	0.00	0.00	
37A	340	R	0	0	0	0	/ /	0	0.00	0.00	
37B	340	R	0	0	0	0	/ /	0	0.00	0.00	
37C	400	R	0	0	0	0	/ /	0	0.00	0.00	
3D	516	FF 41	0	0	0	0	/ /	0	0.00	0.00	
9B1	153	SD-S	0	190	11	0	06/10/10	9	60.93	0.40	COLBURN
9B2	123	SGT	0	41	3	0	05/25/10	10	14.92	0.12	COLBURN
GWNA	922	R	0	0	0	0	/ /	0	0.00	0.00	
HACKBERRY	121	R	0	0	0	0	/ /	0	0.00	0.00	
NA#2	459	FF 511	0	0	0	0	/ /	0	0.00	0.00	
FELICAN	136	R	0	0	0	0	/ /	0	0.00	0.00	
HUNY	23	R	0	0	0	0	/ /	0	0.00	0.00	
SNOW ROAD	5	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN
SweetR	110	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN

Vegetation Monitoring

Grazing is the primary grassland management tool on Valentine National Wildlife Refuge. Grazing treatments are generally geared toward maintaining the growth and vigor of native grasses and forbs, while suppressing non-native grasses (see discussion of grazing treatments). In 2003, 202 random transects were established across Valentine NWR to monitor vegetation. These transects are designed to monitor long-term vegetation changes and to gauge if refuge management objectives are being met. In 2010, none of these random transects were completed as staff time was put into conducting belt transects to monitor Kentucky bluegrass in anticipation of assessing the use of fall prescribed fire as a tool to target bluegrass. Kentucky bluegrass is an invasive grass in the Nebraska sandhills, and is commonly found in subirrigated meadows across Valentine NWR. In some places, Kentucky bluegrass is invading higher upland sites, and prescribed fire and grazing are the primary tools available to combat the spread of this grass. Recent data from North Dakota suggests that dormant season burns can have a negative impact on Kentucky bluegrass. Since windows for conducting prescribed burns in the spring are limited, fall burns were suggested as a way that fire might be used to help control Kentucky bluegrass. Four habitat units were selected for sampling, with two units planned for prescribed fire (2A and 16C), and two for use as unburned control units (10A1 and 31B1). This Before-After Control-Intervention (BACI) design allows for a simple ANOVA analysis, and changes occurring not related to the treatment are accounted for by measuring in control units. These units were selected non-randomly because they were observed to have Kentucky bluegrass encroaching into higher upland sites, and because logistically it was feasible to burn HU 2A and 16C. In each of these 4 units, 40 transect locations were randomly generated using Hawth's tools in ArcGIS. This random location was used as the starting point for each 25 m transect. A random compass bearing (not corrected for declination) was then used to determine the direction from the point to run the transect. Six additional transects were placed in each unit. These transects were placed in areas that visually appeared to be dominated by Kentucky bluegrass, and were subjectively selected by the biologist. On each of these transects, vegetation was classified into predefined categories each half-meter on the transect, providing 50 vegetation classes per transect. These data are then summarized to represent the frequency that each vegetation category occurs on the transect. Vegetation categories used are found in Appendix 1 and on the biologist computer (C:\Documents and Settings\nennemanm\My Documents\mel\Work files\Vegetation monitoring\FTN_VLT belt transect plant associations 22Sept2010.doc).

Transects were done by two individuals between 12 Oct and 2 Nov 2010, and took 12 days to complete. Data were entered into Excel spreadsheets on Trimble GPS units in the field. There was no statistical difference in the occurrence of Kentucky bluegrass in the units sampled, although the percentages recorded varied from 10.1% to 25.3% (Table 7.1). The number of random transects in any one unit that had segments dominated by Kentucky bluegrass ranged from a low of 10 to a high of 15. Thus, most transects did not have Kentucky bluegrass, but it is noteworthy that in upland units with mostly sands and choppy sands range sites that random transects had 10-25% Kentucky bluegrass cover. HU 10A1 had more cool season native grasses and less warm season native grasses than the other three units, and was lacking in forb cover. Shrubs comprised very little of the recorded cover on the belt transects.

HU	KY Blue	Native Cool	Native Warm	Forb	Shrub	Yucca
2A	12.8 (3.6)	18.4 (2.1)	53.7 (3.7)	4.9 (0.8)	0.9 (0.2)	6.1 (1.1)
10A1	25.3 (6.3)	32.6 (4.9)	33.8 (4.5)	0.8 (0.3)	0.4 (0.2)	3.6 (1.0)
16C	10.1 (3.6)	24.7 (3.0)	50.1 (3.9)	4.4 (1.3)	<0.1 (0.1)	7.5 (0.7)
31B1	23.3 (5.4)	9.8 (2.1)	50.0 (5.5)	5.0 (1.2)	0.1 (0.6)	3.9 (0.8)

In the Valentine NWR CCP, specific grassland structure objectives are provided for both upland and meadow habitat types, in both disturbed (e.g. grazed, burned, hayed) and rested units. In uplands, the acceptable range for visual obstruction readings (VOR) is 1-10", with an average of 3" for disturbed units. In units rested for 1 or more years, the range goes to 1-18", with a mean greater than 6". For disturbed meadows, the desired VOR range is again 1-10", with a 3" average. In meadows with one or more years of rest, the VOR range increases to 2-24", with a average of 10-12". The CCP also provides some recommendations for the amount of treatment (disturbance) for uplands and meadow. In the 48,755 acres of upland, the CCP suggests that about 45% of those acres should be grazed, mowed or burned. For the 13,106 meadow acres, about 40% should be disturbed on an annual basis. These guidelines provided for about 50% of the refuge acres remaining as undisturbed cover. Recommended composition of plant cover for subirrigated meadow is 75-85% grass, 5-10% grass-like plants, 5-10% forbs, and 5% shrubs. In sands and choppy sands range sites (uplands), guidelines for plant species composition include providing 80-95% grass, <5% grass-like plants, 10% forbs, and less than 5% shrub cover.

The belt transect sampling conducted in 2010 did not include measures of VOR, so no information is available to compare to CCP objectives. Anecdotal observations suggest that VORs in both upland and meadow habitat probably meet or exceed objective levels, based on transects conducted in previous years. The amount of disturbance in the uplands was considerably lower than the CCP objective of disturbing approximately 45% of the acres on an annual basis. In 2010, only about 26% of upland acres were disturbed. In meadow units, the amount of habitat disturbed by grazing was about 31%, which is about 10% less than the objective for meadows. Recent declines in the number of permittees grazing on the refuge have made it difficult to disturb acres at the CCP objective levels, especially in the uplands. Belt transects done to monitor Kentucky bluegrass did provide some measure of plant species composition for the year to compare to CCP objectives (Table 7.2), but only in upland habitats. These transects indicate that the cover of grass and grass-like plants (primarily sedges) in the four units sampled in 2010 was about 89%, which falls in the range of objective values established in the CCP. In the belt transect sampling, grass-like plants are not separated from grasses, so the percent grass cover is higher than it would be if grass-like plants were considered separately; however, grass-like plants in the uplands generally comprise only a small percentage of the total cover, despite being widespread. Forbs comprised only about 4%

of the segments measured on transects, which is somewhat lower than the objective of 10% forb cover in upland units.

Table 7.2. Vegetation monitoring transects were not accomplished in 2010. Belt transects were conducted in Habitat Units 2A, 10A1, 16C, and 31B1 to measure the effects of prescribed fire on Kentucky bluegrass. These transects provided the percent cover values shown for hills in the following table.			
		CCP objective	2010 Sample
Hills	VOR Grazed	3" (1-10")	NA
	VOR Rest	>6" (1-16")	NA
	Disturbed acres	~45%	~26%
	% cover grass	80-95%	89%
	% cover grass-like	<5%	NA
	% cover forb	10%	4%
	% cover shrub	<5%	1%
Meadow	VOR Grazed	3 (1-10")	NA
	VOR Rest	10-12"(2-20")	NA
	Disturbed acres	~40%	~31%
	% cover grass	75-85%	NA
	% cover grass-like	5-10%	NA
	% cover forb	5-10%	NA
	% cover shrub	5%	NA

Appendix 1. Plant associations used for belt transects in fall 2010.
Fort Niobrara-Valentine Upland Plant Associations (Belt Transect)
September 22, 2010

NATIVE SHRUB and TREE TYPES

low shrub (generally <1.5m tall)

- 11 Yucca
- 12 Western sandcherry
- 13 Poison ivy
- 14 Rose
- 15 Leadplant
- 16 Other (e.g. Snowberry, skunkbrush sumac, buffalo currant, dogwood, cactus, etc.) – user defined

tall shrub/tree (generally >1.5m tall)

- 21 Chokecherry, wild plum
- 22 Smooth sumac
- 23 False indigobush, sandbar willow, meadow willow
- 24 Cottonwood, peachleaf willow
- 25 American elm, green ash, hackberry, box-elder, ironwood
- 26 Bur oak
- 27 Ponderosa pine

NATIVE GRASS-FORB TYPES *

a = <10% non-native/invasive or *b* = 10-25% non-native/invasive followed by non-native/invasive plant code

- 31 Dry cool season (sedges, need-and-thread, prairie junegrass, western wheatgrass, forbs)
- 32 Dry warm season (little bluestem, sand bluestem, prairie sandreed, grama sp., forbs)
- 33 Mesic cool-warm season mix (big bluestem, switchgrass, Indiangrass, wildrye, forbs)
- 34 Meadow (reedgrass, prairie cordgrass, foxtail barley, wet sedges)
- 35 Wetland; robust emergent vegetation or open water (cattail, bulrush, phragmites)
- 36 Clubmoss/lichen
- 37 Forbs

NON-NATIVE, INVASIVE OR PLANTS OF MANAGEMENT CONCERN *

c = 25-60% non-native/invasive or *d* = >60% non-native/invasive followed by native grass-forb code

- 41 Kentucky bluegrass
- 42 Smooth brome
- 43 Cheat grass
- 44 Reed canary grass
- 45 Phragmites
- 46 Other grass – user defined
- 47 Leafy spurge
- 48 Canada thistle
- 49 Sweet clover
- 50 Other forb – user defined
- 51 Eastern red cedar
- 52 Locust (honey, black)
- 53 Russian olive
- 54 Other shrub/tree – user defined
- 55 Non-native mix

OTHER

- 91 barren, unvegetated (bare soil, gopher mound)
- 92 other (rock, manure, hole, ant hill)

* Use sub-code (*a*, *b*, *c*, or *d*) only if “non-associated” plant type is present in the belt segment. (e.g. 33a41; 43c32)

8. Haying

About 421 acres of sandy, sub-irrigated, and wetland range sites were mowed and yielded 564 tons of hay. All or parts of 9 habitat units were mowed and hayed. GPS based measurements for hayed acres were not obtained this year. GPS information from 2006 was used. The area hayed is fairly close from year to year.

The method of charging for permittee 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 \$24.00/AUM in the winter treatment. Thirty five large round bales of the refuge share of hay was hauled up to Fort Niobrara NWR for horse feed. Two hundred and twenty small bales were also hauled up to Ft. Niobrara NWR. These were cut on a 50/50 split.

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 they area not mowed. Haying may be of some benefit to the orchid as some of the plants found on the refuge are in areas that are annually hayed.

9. Fire Management

There were no wild fires on the refuge in 2010.

Four prescribed fires were conducted on Valentine NWR during April. On April 9 the Dewey Lake burn was conducted in Habitat Units 3D (41 acres) and 4 (48 acres). The area between the Little Hay Road and the lake was burned between the west and east boat ramps. The burn was conducted to reduce woody vegetation and Kentucky bluegrass. It appears that some deciduous trees were killed by the burn. We also plan on grazing these units in early June. Weather at the start of the burn at 11:00 AM was 53 degrees F, rh 22, and wind 16 mph out of the north. At 5:00 PM the weather was 57 degrees F, rh 21, and wind 8 mph out of the north. Quite a bit of time was spent mopping up burning limbs and logs along the road. Next time it may be better to bring a tractor in to push the burning debris into the interior of the fire.

The Center Lake burn was conducted on April 10 in the eastern half of Habitat Unit 32B2 (51 acres). The meadow area between the Pony Lake Road and Center Lake was burned to control numerous small cedar trees growing in the meadow. In past years this had been hayed and the trees were kept small. The area was wet but at first look it appears that we got a good kill on the trees. Weather at the start of the burn at 11:00 AM was 53degrees F, rh 49, and wind 8 mph. At the 5 PM the weather was 59 degrees F, rh 36, and wind 3 mph.

The McKeel Lake burn was conducted on April 15. Most or all of Habitat Units 16B1 (164 acres), 16B2 (245acres), 16B3 (39 acres), 16B4 (164acres), 16E2 (minimal acres), 16E3 (25 acres), and 16E4 (171 acres) were burned. Acres burned are in parenthesis. Much of the area on the interior of the burn around the lake did not burn as it was very wet. This includes large areas of cattail and rushes. The area burned is bounded by Little Hay Road on the north, the School Lake Cut Across Road on the west, Calf Camp Road on the south, and a mow line at the base of the hills on the east. The burn was conducted to control cedar and deciduous trees and reduce Kentucky bluegrass. Smaller cedars were controlled but some larger trees did not burn. These larger trees were later cut. Weather at the start of the burn at 11:00 AM was 55 degrees F, rh 50, and wind 5 mph. At 5:00 PM the weather was 62 degrees F, rh 28, and wind 11 mph.

The Natural Area 2 burn was conducted on April 27. Five hundred and eleven acres of the Natural Area was burned to control invasive cedar trees and Kentucky bluegrass. Smaller cedars burned but the larger trees were not consumed. Some started to burn but did not sustain fire for long. Some may be killed by the scorching. Warmer temps and a lower relative humidity may be needed to kill the cedar trees, especially the large trees growing in the moist areas along lakes. Weather at the start of the burn at 11:00 AM was 54 degrees F, rh 42, and wind 11 mph. At 5:00 PM weather was 57 degrees F, rh 27, and wind 7 mph.

Plans for fall burning in 2010 and spring burning in 2011 were discussed at a meeting of stations in the Sandhills Fire District. For Valentine NWR we discussed several fall burns for cedar control, a fall burn in a hill unit to experiment with this timing for bluegrass control, and a February burn to target large cedars. We talked about doing large burns using lakes and roads as fire lines.

At a second meeting for the Sandhills Fire District was held on October 28. Items discussed included cuts to the fire budget, using refuge funds for prescribed fire, prioritizing prescribed fire within the District, and the use of the Conservation Corps for prescribed fire.

Biological technician Ethan Teter conducted monitoring in the prescribed burn units that were conducted primarily to reduce woody vegetation. He looked at prescribed fire impacts on red cedar in HU 32B2 and Natural Area 2, and impacts on deciduous woody plants in the Dewey Lake prescribed burn. The report was written in 2011, so it also includes monitoring done in the Hackberry Lake burn conducted in the spring of 2011.

Prescribed Burns on the Valentine National Wildlife Refuge
2010-2011
Ethan Teter
04 August 2011

Introduction

Historic fires in the Nebraska Sandhills prairie occurred as frequently as every four to five years (Bragg and Steuter 1996). As in other mixed prairie types, fire causes an initial decline in plant standing crop although the decline may not persist longer than one to two years, depending largely on weather conditions (Bragg and Steuter 1996). The evolution of the mixed prairie resulted in biota well adapted to grazing and fire (Bragg and Steuter 1996). Fire reduces standing crop and litter, thus altering species diversity patterns, modifying grazing patterns, and variously affecting animals (Bragg and Steuter 1996). At present, invasion of undesirable species has been minimal in the sandhills (Stubbendieck 1990). More importantly, a nearly complete cover of prairie vegetation has developed and now protects the soil (Stubbendieck 1990).

Study Area

The Valentine National Wildlife Refuge is located approximately 25 miles south of Valentine, Nebraska in the north central part of the state. The refuge is 71,772 acres, and habitats consist primarily of sub-irrigated meadows, wetlands, lakes, and sand hills, with some areas of trees and shrubs. The terrain is primarily sand dunes, with wet meadows, lakes and marshes in the lower interdunes. Weather for the area can be characterized by having hot, wet summers and cold, dry winters. Average annual precipitation at Valentine NWR is 21.6 inches.

There were several prescribed burns completed on the Valentine National Wildlife Refuge in 2010 and 2011. Habitat Unit (HU) 32B2 is 51 acres of wet and sub-irrigated meadow, and was burned on 10 April 2010. HU NA2 is 511 acres of primarily dune prairie with smaller areas of sub-irrigated meadow, and is bordered by lakes on the north and south sides. This unit was burned on 27 April 2010. The Dewey Lake burn encompassed parts of HU 3D and 4, with habitat consisting of sub-irrigated meadow and wetlands. The prescribed burn was conducted on 09 April 2010, and burned 48 acres between the Little Hay Road and the north shore of Dewey Lake. The north Hackberry Lake burn included parts of HU 3B and Pony Pasture, totaling 187 acres; this area was burned on 06 April 2011. All of these grassland areas have been variously invaded by woody vegetation, and the objective of the prescribed burns in these grazing units was primarily to reduce the amount of the woody vegetation; i.e. Eastern Red Cedar (*Juniperus virginiana* L.), hereafter cedar; Peach Leaf Willow (*Salix amygdaloides* Andersson), Black Locust (*Robinia pseudoacacia* L.), Wild Indigo (*Amorpha fruticosa* L.), and Sandbar Willow (*Salix interior* Rowlee). The primary woody targets are cedar, black locust, and the larger trees. Cedar has greatly expanded in the sandhills since settlement due to tree planting and fire suppression. Black locust is not native to the sandhills, and was planted as the region was settled. Cottonwoods and peach-leaf willow are native trees, but have also expanded somewhat with changes in land use and fire suppression since settlement. While these trees provide habitat for a different suite of

birds, they also have negative impacts on birds and other wildlife native to the prairie. Removal of woody vegetation should provide positive benefits to native prairie wildlife.

Methods

Data were collected to determine if the prescribed fires had the desired impact on woody vegetation. In burn units NA2 and Dewey Lake, data were collected in the form of a sample of fire impacts on selected woody plants within these units. In NA2, trees were non-randomly selected, and trees were assessed as they were located in each size and slope/aspect. For the Dewey Lake burn, random points were generated for the unit, and the nearest woody plants in each height category to the random point were monitored. In HU 32B2 and the north Hackberry Lake burn, an attempt was made to inspect every tree in the unit to determine the impact of the fire. In all grazing units, tree height was estimated into one of three categories: category “0” 0-3 feet, category “3” 3-6 feet, and category “6” 6 feet plus. The condition of the tree was also placed into one of three levels of burn severity: dead, partial burn, or alive. Trees were considered dead if the tree had only dead leaves or no leaves remaining at all. Trees were categorized as partial burn if 25-75% of the canopy was leafless or dead leaves, with the remaining percentage green leaves (in the case of peach leaf and sandbar willow, the live portion consisted of new shoots sprouting from the burned tree crown). Trees with $\leq 25\%$ canopy damage or exhibiting no burn damage were placed in the “alive” class.

Results

32B2

The prescribed burn of HU 32B2 was conducted on 10 April 2010 from 1130 hours until 1830 hours. During the burn, winds were out of the north, with some slight east and west shifts. Wind speeds decreased from 16 mph at the start of the burn to 7 mph at the completion (see Appendix 1 for hourly fire weather). No precipitation was recorded on the day of the burn, and the most recent precipitation fell on 08 April 2010, with 0.19” recorded. Much of the unit was composed of saturated soils, and in places along the lake/marsh edge, fire carried across vegetation that was in standing water. Only Eastern red cedars were monitored in this burn unit; a small wetland pocket with a half dozen peachleaf willows growing in it occurs within the unit. Most cedars in this unit fell into height category “0”, with only a few cedars reaching the taller height categories. The only taller cedars found were located in or around wet depressions, and most of these were not completely consumed by fire. Of the 1834 eastern red cedar recorded in the 32B2 burn, 98.47% of those trees were effectively killed and only 1.53% was alive or showed sufficient amounts of live growth to survive (Figure 1).

The west portion of HU 32B2 was burned to control cedars in April 2008, although fire impacts on these cedars were not assessed. Anecdotal observations from the west portion of this HU suggest that the impact on cedar from the 2008 fire were similar to the results found in 2010, with virtually all of the smaller cedars killed by fire.

NA2

On 04 April 2010, HU NA2 was burned on a day with temperatures between 55 and 63°F, with winds from the south at 5-12 mph. Relative humidity decreased from 50% at time of ignition to a low of 25% near the end of the burn (Appendix 1).

HU NA2 is a peninsula surrounded by water on its north, east, and south sides. Cedar trees occurred on three primary slope/aspect combinations in this unit; relatively level meadow, steep north-facing lakeshore, and on rolling sandhills with varied aspects. An attempt was made to sample 25 trees of each height category in each slope/aspect combination, although there were not enough trees to meet this objective for all heights and slope/aspects. For cedars across all height categories in meadow areas, 48% were dead, 37% were partially burned, and 15% were alive (Figure 5). On lakeshore areas, 33% of the cedars were dead, 30% were partially burned, and 36% were alive (Figure 4). In sandhills areas, 51% of the cedars were dead, 29% were partially burned, and 6% were alive (Figure 3). In all three slope/aspects, cedars in height category “0” were most likely to be fire-killed, and trees in category “6” were most likely to remain alive (Figure 6). Of the three slope/aspect areas, cedars were least likely to be fire killed on the lakeshore (Figure 4).

Dewey Lake (3D & 4)

On the day of the burn the temperatures ranged from 52 - 62°F, and north winds were steady from 5 to 10 miles per hour. Relative humidity varied from 49% at ignition (1100 hrs) to 36% from 1700 to 1800 hrs (Appendix 1). The objective of the Dewey Lake burn was to remove tall shrubs and trees in order to begin to return the area back into grassland and meadow. Cedar is not prevalent in this area, with woody vegetation consisting primarily of Peach Leaf Willow, Black Locust, Wild Indigo, and Sandbar Willow.

Of the snowberry (*Symphoricarpos occidentalis* Hook.), sandbar willow, choke cherry, and buffalo currant recorded in the height category “0”; 96.97% were recorded alive, 3.03% were partially or top killed, and none were dead (Figure 7). In the height category “3”, wild indigo, sandbar willow, choke cherry (*Prunus virginiana* L.), and buffalo currant (*Ribes odoratum* Wendl.) were recorded, with 37.8% of the sampled plants recorded as alive, 51.4% were partially or top killed, and 10.8% were dead (Figure 8). Wild Indigo, Siberian Elm (*Ulmus pumila*), Peach Leaf Willow, and Black Locust were recorded within the height category “6”; and of those species 22.2% of the sampled plants were alive, 55.6% were partially burned or top killed, and 22.2% of them were dead (Figure 9).

Hackberry Lake (3B and Pony Pasture)

On the day of the Hackberry Lake prescribed burn the temperature varied from low 50’s to 60°F, with north winds steadily decreasing and switching to the south during the burn. Winds were out of the north at 11 miles per hour at the time of ignition (1100 hours) and at 6 miles per hour out of the south at 1900 hours. Relative humidity was at 42% at the time of ignition and decreased to a low of 24% at 1600 hours and began steadily rising through the remainder of the burning (Appendix 1).

The weather conditions on the day of the Hackberry Lake burn proved to be highly effective. Across all tree height categories, 88% of the cedars were dead, and the remaining 12% were alive; no cedars were recorded as partially burned (Figure 2). This fire killed cedars estimated to be 30’ tall, although most of the trees recorded as alive were among the taller trees in the unit.

Discussion and Management Implications

Data collected to monitor fire impacts on woody vegetation at Valentine NWR occurred across two years, and the protocol varied slightly from 2010 to 2011. However, data collected could be classified into the three height categories and three burn severity categories described in the methods for both years. Based on data on these prescribed burns, it is apparent that the best time to use fire to control cedar is when a majority of the trees fall into the 0-3' category. Cedar trees in the 3-6' and >6' tall categories were more likely to survive in all prescribed burns examined. With the right combinations of weather and topography, it is possible to burn cedars in the taller height categories, as evidenced in the Hackberry Lake and HU NA2 burns. Cedar trees showing the least impact from prescribed fire were those on the steep north facing slopes in HU NA2, which was burned with a south wind. Slopes in this unit likely prevented a hot head fire from reaching these trees, making them less likely to ignite. Cedar trees on a steep north slope probably need to have winds from a different direction to carry head fire into the trees, or have ladder fuels placed so that fire can carry into the canopy. It has been noted that for most effective cedar kill in prescribed burns that the temperature be above 60°F and the relative humidity be below 40% (Stueter 2010). During all of the prescribed fires that took place in 2010 and 2011 the relative humidity was at or below 40% by 1:00 p.m. leaving ample time through the remainder of the fire to have adequate conditions for killing cedars. Burn monitoring in the Dewey Lake unit showed that most of the deciduous shrubs are apparently fire adapted, as the prescribed burn seemed to have little impact on "0" class shrubs. Many shrubs resprout vigorously following fire, and this seems to have occurred with much wild indigo in this unit. Some woody vegetation in the taller classes was killed by fire, and repeated fires may well provide some measure of control of these woody plants. After a century of fire suppression, it will probably take a couple of decades of active fire management to achieve significant reductions in woody vegetation through the use of fire.

Acknowledgements

I would like to thank Mark Lindvall, Mel Nenneman, and Charles Butterfield for allowing me to use this project in my internship hours as well as the help and direction along the way.

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Steuter A. 2010. Personal Reference. Effective weather conditions for burning Eastern red cedar.

Stubbendieck J. 1990. Range Management pgs. 227-233 in A. Bleed and C. Flowerday, Eds. An Atlas of the Sand Hills.

Figures

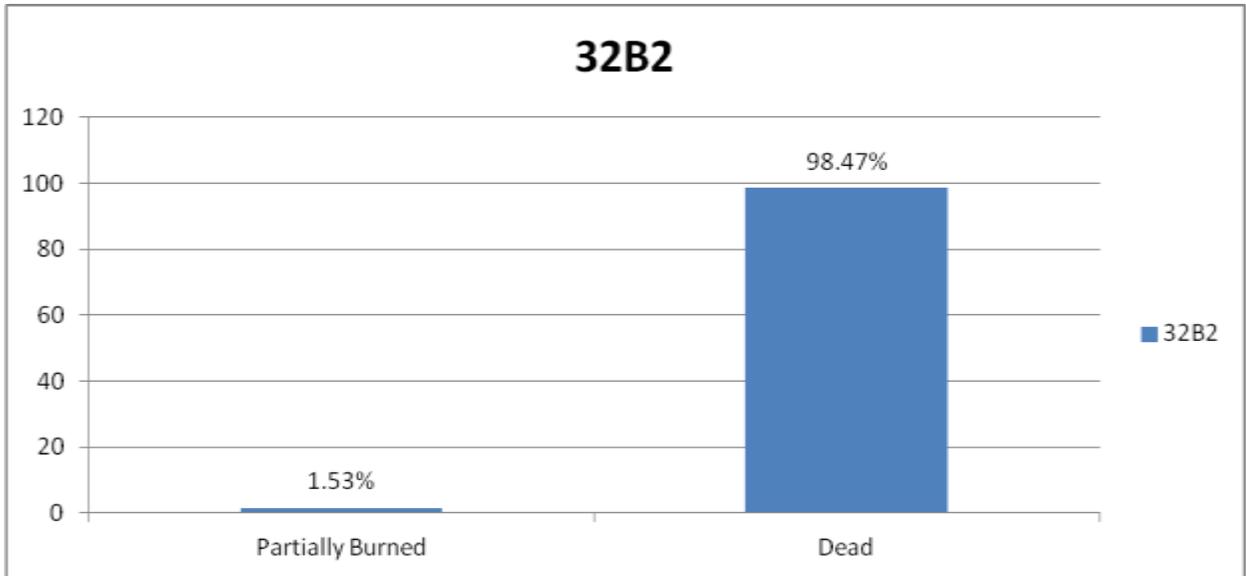


Figure 1. Percentage partially burned and dead cedar resulting from prescribed fire in HU 32B2.

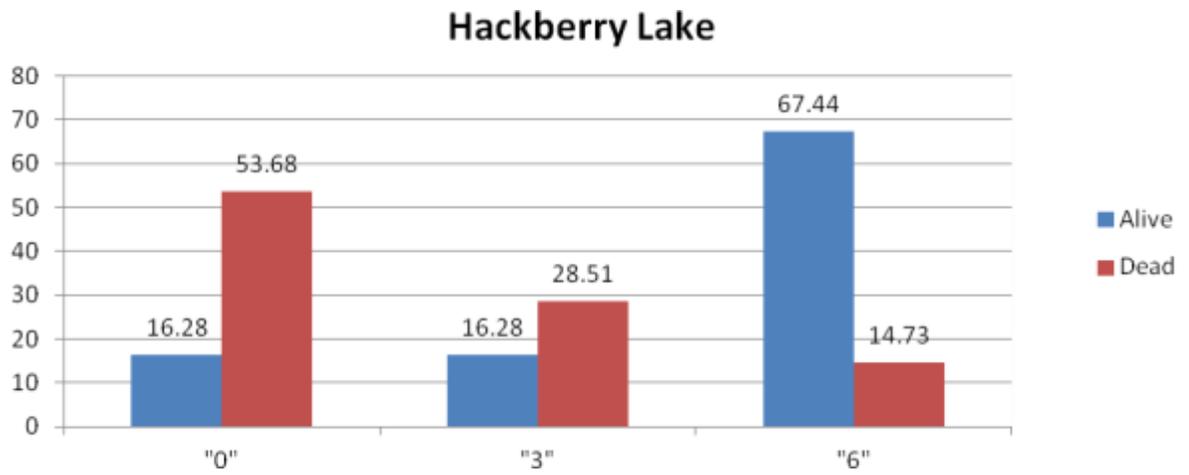


Figure 2. Percentage of alive and dead cedar from Hackberry Lake prescribed burn.

Natural Area 2 "Sandhills"

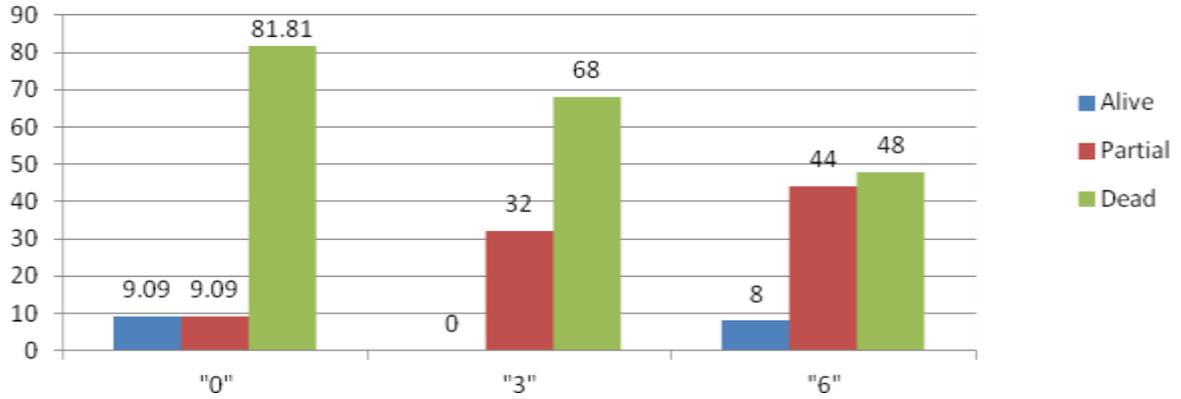


Figure 3. Percentage of dead, partially burned, and alive cedar resulting from prescribed fire in HU NA2 sandhills. Sample sizes in each height category were "0" = 22, "3" = 25, and "6" = 25.

Natural Area 2 "Lake Shore"

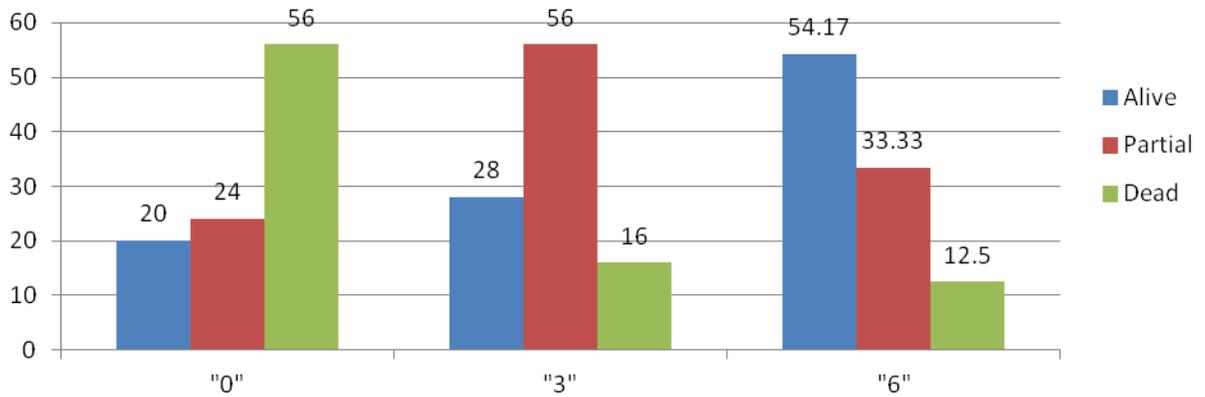


Figure 4. Percentage of dead, partially burned, and alive cedar resulting from prescribed fire on HU NA2 lake shore. Sample sizes in each height category were "0" = 25, "3" = 25, and "6" = 24.

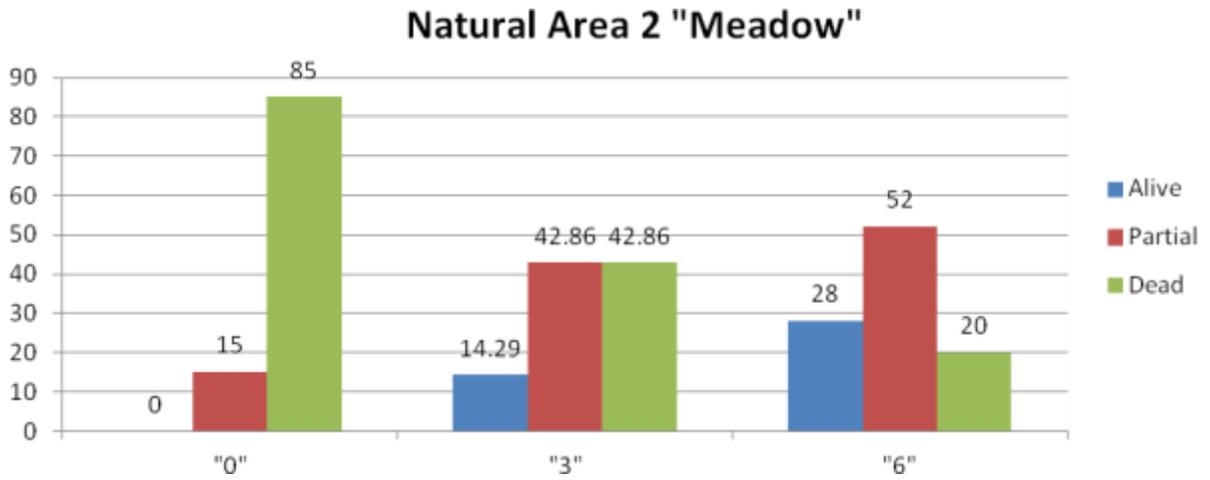


Figure 5. Percentage of dead, partially burned, and alive cedar resulting from prescribed fire in the HU NA2 meadow. Sample sizes in each height category were "0" = 20, "3" = 7, and "6" = 25.

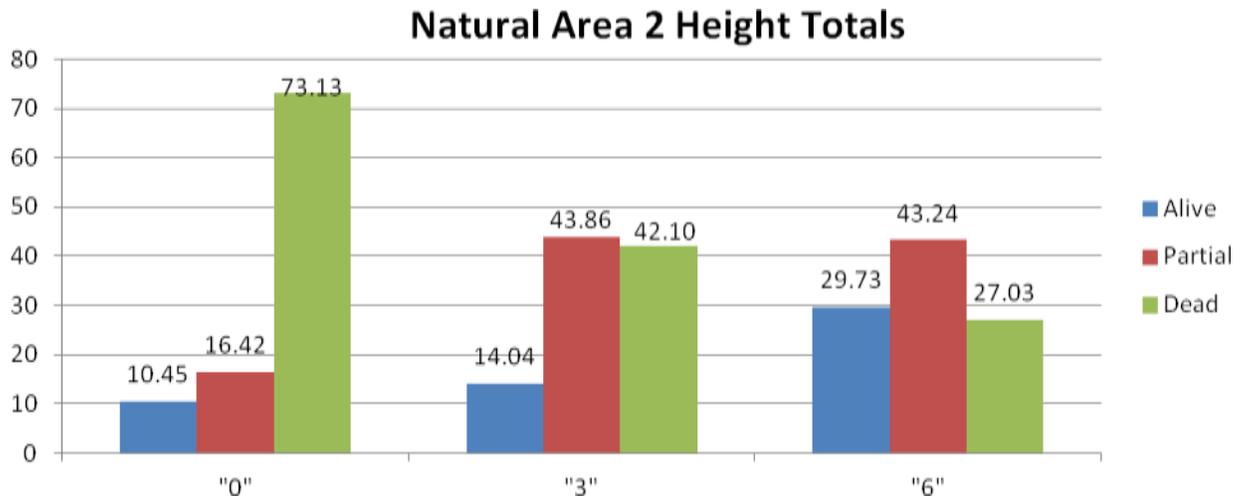


Figure 6. Total percentages of dead, partially burned, and alive cedar (n = 198) from HU NA2 sandhills, meadow, and lake shore.

Dewey Lake

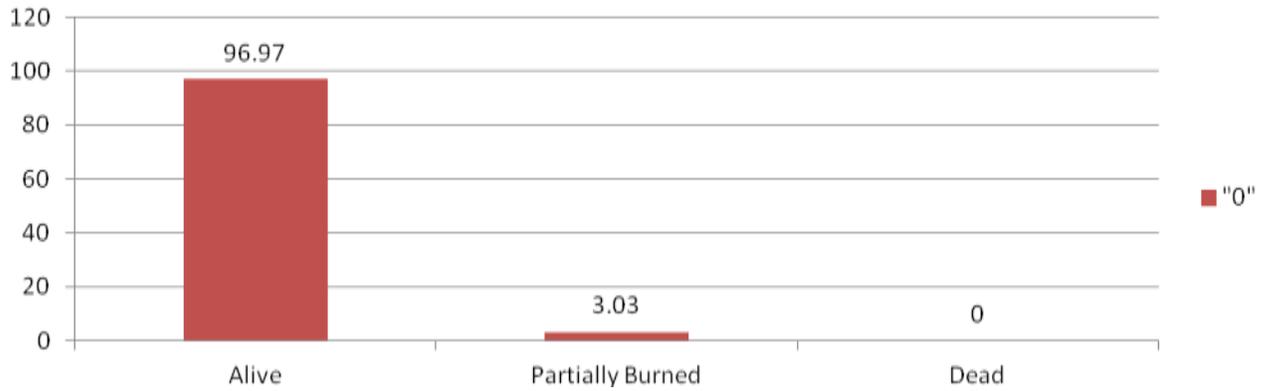


Figure 7. Total percentages of alive, partially burned, and dead woody vegetation from 0-3 feet tall in the Dewey Lake prescribed fire.

Dewey Lake

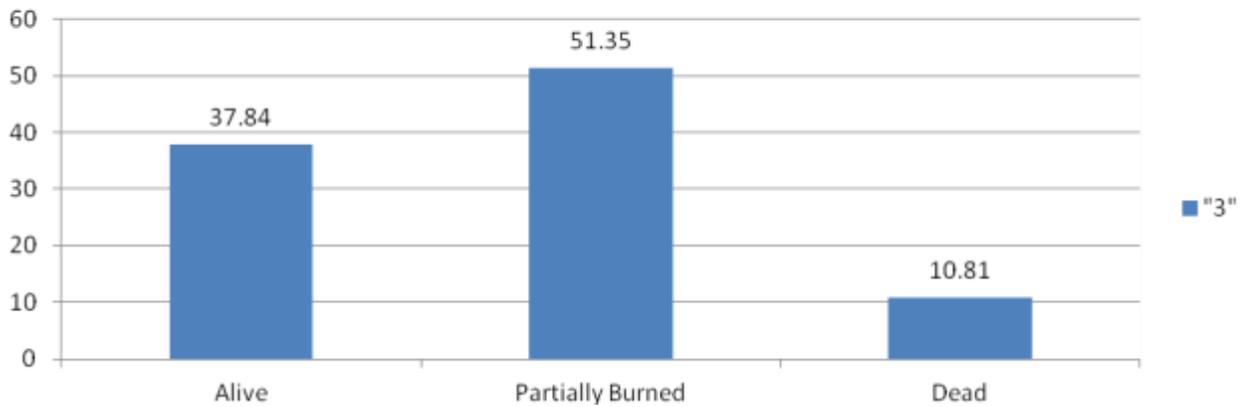


Figure 8. Total percentages of alive, partially burned, and dead woody vegetation from 3-6 feet tall in the Dewey Lake prescribed fire.

Dewey Lake

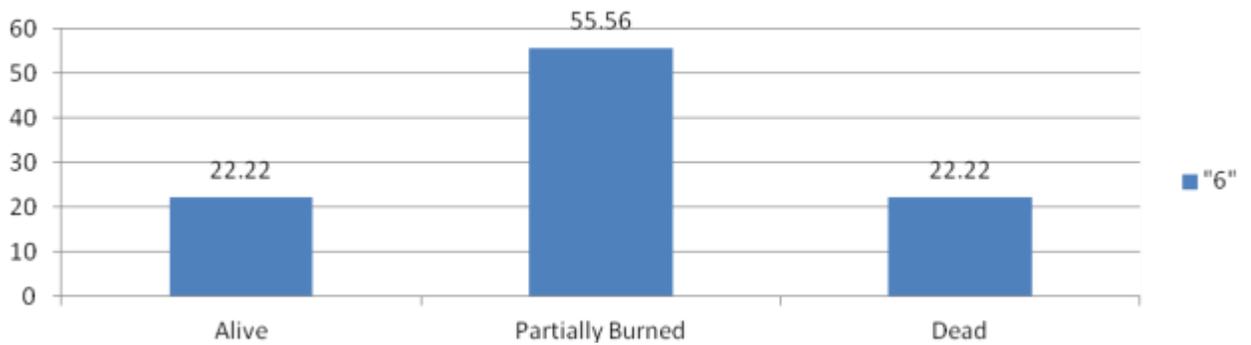


Figure 9. Total percentages of alive, partially burned, and dead woody vegetation 6 feet and taller in the Dewey Lake prescribed burn.

Appendix 1.

<p>Hourly weather readings taken during prescribed fires conducted on the Valentine National Wildlife Refuge during 2010 and 2011.</p>	<p>Natural Area 4/27/10 2</p>								
	Time	Temp	RH	Wind Dir	Wind Spd				
	11:00	55	50	162	5				
	12:00	56	40	208	5				
	13:00	57	38	217	9				
	14:00	60	34	204	8				
	15:00	60	32	210	10				
	16:00	63	29	197	11				
	17:00	62	28	194	11				
	18:00	61	25	183	12				
	19:00	56	26	174	7				
4/10/10 Center Lake (Unit 32B2)	5/5/11 Watts Lake (Unit 2A)								
Time	Temp	RH	Wind Dir	Wind Spd	Time	Temp	RH	Wind Dir	Wind Spd
11:00	53	49	43	8	11:00	57	35	310	12
12:00	56	45	65	8	12:00	58	31	316	11
13:00	59	41	39	8	13:00	61	25	299	12
14:00	58	36	94	4	14:00	64	25	296	9
15:00	62	36	72	4	15:00	65	21	316	7
16:00	58	32	51	6	16:00	65	18	287	5
17:00	59	36	50	3	17:00	65	17	306	9
18:00	56	36	132	4	18:00	65	17	261	5
19:00	52	44	128	6	19:00	62	18	235	2
4/6/11 Hackberry Lake (Unit 3A)	Dewey Lake (Units 4/9/10 3D & 4)								
Time	Temp	RH	Wind Dir	Wind Spd	Time	Temp	RH	Wind Dir	Wind Spd
11:00	54	42	336	11	11:00	53	22	342	16
12:00	57	37	338	8	12:00	53	21	1	13
13:00	58	34	4	6	13:00	55	21	355	12
14:00	58	31	300	5	14:00	58	21	17	10
15:00	60	26	279	9	15:00	58	19	357	7
16:00	60	24	275	6	16:00	58	20	14	9
17:00	57	27	212	7	17:00	57	21	27	8
18:00	58	29	178	7	18:00	55	21	28	8
19:00	49	39	171	6	19:00	48	30	28	7

10. Pest Management

An update of the Valentine NWR Integrated Pest Management Plan was completed and sent off for signature. The plan proposed using herbicides, grazing, and prescribed fire to control a variety of invasive plants. The plan also proposed researching koi herpes virus as a carp control method, trapping of carp, and using northern pike to control carp recruitment. Bullfrog control was also proposed. Only parts of the plan will be implemented unless additional staffing and funding is obtained. A Section 7 Consultation was also prepared to assess impacts on the threatened prairie fringed orchid. Grand Island signed the Section 7 as concur.

Revisions suggested by the Regional Invasive Species Biologist were made to the draft plan. Revisions included more information on koi herpes virus as a biological control for carp, use of Habitat and Garlon 3 for tree control rather than Rodeo, and consistent buffers around orchid areas while spraying. It was decided to send the plan onto the Washington Office for approval because of the possible controversy over the use of koi herpes virus for carp control. The Washington Office objected to the koi herpes virus plan so we revised the plan by removing all sections relating to the use of koi herpes virus for carp control and forwarded it on for another round of review and hopefully approval. We had not received approval by the end of the year. The plan was never approved and now an IPM plan is not required.

Pesticide use reports and proposals were completed. At Valentine NWR we put in proposals for leafy spurge, Canada thistle, tree, phragmites, and exotic cool season grass control. In 2010 we applied herbicides to Canada thistle, invasive phragmites, purple loostrike, and leafy spurge.

A contractor was hired using grazing receipts to spray both leafy spurge and Canada thistle. The contractor sprayed all known locations of spurge and used 512 ounces of Plateau herbicide at a rate of 8 ounces/acre. At this rate, 64 acres were treated. The spraying was done in the fall. The contractor sprayed Canada thistle in late summer/fall and used 1,088 ounces of Milestone herbicide at 5 ounces/acre. At this rate, 218 acres were treated.

Tree limbs were cleared up and stacked for burning in Habitat Units 34C and 34E trees. The large number of downed limbs had made effective spraying for leafy spurge difficult in these tree groves.

In the spring, we went back and looked at 15 of the patches of the invasive phragmites that we sprayed with Rodeo in September of 2010. All were on the Marsh Lakes. Eleven were all dead, 3 had only a few live plants on the edge, and one had a lot of plants left. On September 24 we sprayed 21 patches of invasive phragmites on the Marsh Lakes with a 2 percent solution of Rodeo. We used a total of 3.5 pints of Rodeo. The patches ranged in size from 400 to 3,750 square feet and totaled an estimated .7 acres. We visited the 19 places we sprayed last year and found no invasive phragmites at these locations. We had

more difficulty locating and identifying the invasive phragmites as the cattails appeared much taller this year and some of the invasive phragmites had not produced seed heads.

Common mullen plants were hand pulled in the following locations. One common mullen plant was pulled along the road near the Old Duck Hospital at Hackberry Headquarters, 14 in Habitat Unit 32B2 by the culvert at 21 Lake, 46 at the Clear Lake Parking Lot, 18 at the Watts Lake West Parking Lot, 3 along the Watts Lake West Access Road, 5 along the road in 3C1, and 30 in Habitat Unit 15A. This invasive is not common on the refuge. If we pull them before they produce seed wherever they are encountered we may be able to keep them from becoming established. Areas where we have pulled the plants in the past have shown good reduction in numbers. An example is this year we pulled 5 plants in Habitat Unit 3C1 where we pulled 50 plants in 2009.

One clump of yellow bedstraw, a new noxious weed for the refuge, was found along the Pony Lake Road in Habitat Unit 31A (N42 28.952 W100 30.338). A specimen was collected and the plant sprayed with herbicide. This weed is found in other parts of the county but is not yet widespread.



Figure F10. A new invasive plant, yellow bedstraw (*Galium verum*) was found on the refuge, immediately adjacent to the Pony Lake Road east of the Pony Lake sub-headquarters. Patch was sprayed with Rodeo. MLL

On August 19 a large clump of purple loostrife was found on Valentine NWR at the east boat ramp on Hackberry Lake in Habitat Unit 3C1. It was sprayed with Rodeo and the seed heads cut off and bagged. If this plant becomes established on the refuge it will be very difficult to control. Three purple loostrife plants were noted on private lands about 11 miles north of Valentine NWR along US Highway 83. The plants were in T32N R28W Section 36 along the north fence and Section 24. The landowner was contacted and we sprayed the plants with Rodeo on August 17. The loostrife north of the refuge on private lands of the west side of Highway 83 near mile marker 201 that were hand pulled last year were sprayed with Rodeo this year. Hand pulling killed some of the plants but not all. Some sprayed this year were not seen or present last year. Loostrife is common along the Niobrara River and is starting to move out into the Sandhills.

Cedar trees continue to increase on the refuge and other prairies in Nebraska. We probably have a head start on the number of cedar trees due to plantings made on the refuge by the Civilian Conservation Corps and others. Cedar control was done using prescribed fire, shearing, and shredding. Prescribed fire information can be found in Section F-9 of this report. The tree shredder and Bobcat borrowed from LaCreek NWR was used to remove invasive cedar trees in Habitat Units 22B3, 22B4, 22A3, 22A4, Pony HQ, and some of 30A(trees). About 550 acres were treated.

The Iowa Conservation Crew cut cedar trees in Habitat Unit 5B1. They were here for 8 days and cut quite a few trees. They placed some of the cut trees against the tree grove in a technique known as cut and stuff. We went back with a trees shears and a loader and cut more cedars and stuffed them in the tree belt. All together we got about 1 mile of the 1.5 mile tree row treated. The cut trees will hopefully act as ladder fuels to burn the cedars in the tree grove. We plan on burning this area in March of 2011.

Groves of locust trees were planted by the Civilian Conservation Corps. These groves are slowly getting larger and invading more of the grassland. There are quite a few of the groves. The centers are decadent and dying but the new trees on the edges are expanding. The forestry cutter and Bobcat were used to shred the east locust grove in habitat unit 3D. The cutter works well on the smaller trees up to 3 inches in diameter. It is slower going on trees above this size. It took 16 hours to cut and shred the about 1 acre patch. A team of 2 skid loaders, one with a shear and one with a cutter, might be more efficient. We planed on treating the re-sprouts with herbicide this fall. The trees sprouted very little from the time of cutting until freeze up, so we did not spray. We will monitor the grove and spray as needed.

11. Water Rights

In 2009 letter from our Regional Office was sent to the Nebraska Department of Water Resources requesting that the Calf Camp water storage permit be negated. We now receive storage opening and closing notices for water storage here. The notices are based on flows in the Niobrara River. The calls for water are mute since the water would only leave the refuge at times of unusually high precipitation. At other times the water goes

out of the Calf Camp Marsh and flows into the Marsh Lakes which is normally a closed basin. We have not yet received a reply.

12. Wilderness and Special Areas

The refuge became a Registered Natural Landmark in 1979. National Landmarks were designated by the old Heritage Conservation Recreation Service. The program is now administered by the National Park Service (www.nature.nps.gov/nnl).

In 2005, Valentine National Wildlife Refuge was designated a Nebraska Important Bird Area by the Audubon Society. The IBA program is an inventory of the key sites within a state that support significant numbers and high diversity of birds. The IBA program is a conservation and education effort of the National Audubon Society and has no regulatory authority. Our application was reviewed by a technical committee which commented on the high diversity of species and the large population of greater prairie chickens found on Valentine National Wildlife Refuge.

The refuge is also recognized as an Important Bird Area by the American Bird Conservancy (www.abcbirds.org).

The south west part of the refuge is also a proposed wilderness area. The area designated is about 15,937 acres in size. A Minimum Requirements Worksheet was prepared for the use of mechanized equipment in the proposed wilderness for invasive control and appended to the Integrated Pest Management Plan.

13. Easement Monitoring

Four FmHA easements (Mead – 2 parts, Wagner, Yellowthroat (aka Tower), one development easement (Colburn) are managed out of Valentine National Wildlife Refuge. We also have a road easement to access the Yellowthroat Wildlife Management Area (fee title parcel). All were visited during the year.

Mead FmHa Easement 221 acres (Keya Paha County)

On July 28 the Mead Easement in Keya Paha County was visited and repairs made to the boundary fence. The entire fence was gone around and we cleared cedar trees from the west half of the fence. Many trees remain on the east part of the fence. A follow up treatment will be needed to control small cedars that were under the larger trees.

The trespass grazing case for this easement was closed when the defendant paid the fine in court. See section H-17 and the 2009 Annual Narrative for more information.

Wagner FmHa Easement 349 acres (Knox County)

We have been working with the NRCS to improve this grassland through planned grazing, tree cutting, and prescribed fire. They have provided cost share payments to the landowner for doing this work. The easement was visited on April 29. The boundary fence on the part of the easement north of the county road was repaired. Parts of it were in bad shape due to the age of the fence and the large amount of snow in the area last winter. The planned prescribed burn was not yet completed. A large number of Siberian elms have been cut, stacked, and will be burned later. The area looks much improved due to the tree clearing. Based on grass growth it appears that the cattle were in the area longer than the period specified in the special use permit during 2009.

A second visit was made on July 21. A crew worked on repairing and upgrading the fence on the quarter section that is north of the county road. The fence still is in poor to fair condition. Grasslands on this part show improvement from the spring grazing treatment applied this year. There was little Kentucky bluegrass and the brome looked somewhat reduced. Tree piles need to be burned and sprouts treated with herbicide.

The easement area south of the county road was inspected and we found no violations.

Yellowthroat FmHA easement also known as Tower Easement 440 acres (Brown County)

This easement is adjacent to the Yellowthroat WMA that USFWS owns in fee title. The land was enrolled in the Conservation Reserve Program and was only grazed when CRP was released. The CRP contract expired in September of 2010. The landowner who owned the Yellowthroat easement passed away and the land was sold by his heirs. Several calls were received from prospective buyers. The prospective buyers were provided copies of the easement document. The easement allows for limited grazing and most of the questions revolved around the amount of grazing to be permitted. Following the sale, the new land owner called and we will be working with him to set up a grazing plan as called for in the easement.

Yellowthroat Access Road Easement 17 acres (Brown County)

We also have an access easement from the highway into the Yellowthroat WMA. This easement was purchased so the public could access the WMA. Land adjacent to the WMA was sold for recreational use and we informed the landowner several times that he could not use our road and easement to access his property. He continued to use the road this year. He has a separate access easement that is separate from our easement but there is no road on it.

Colburn Burying Beetle Easement

The Fish and Wildlife Service also has an easement on 1,324.25 acres of land that was formerly part of Valentine NWR. This land was traded away for other lands in what we refer to as the Colburn exchange. The easement was habitat units 24B1, 24B2, 12B3, 24D (N), 24D(S), 12B4, and 12B5 which were traded for habitat units 38A, 37B, and

37C which are now part of the refuge. The easement was placed on the land to protect the endangered American burying beetle. The easement restricts development on the site. We go by this land as we do refuge work and noted no developments.

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, and a partial buffalo skull was found during the renovation of Hackberry Lake in 2004.

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

Two Bald Eagle nests were located on or near Valentine NWR in 2010. The bald eagles nest on Vreder's Marsh just south of Valentine NWR was visited on several occasions in April. The nest does not appear to be active this year. Last year a pair of eagles fledged 3 young here. A report on the nest was provided to the Nebraska Game and Parks Commission.

A second Bald Eagle nest was located on Valentine NWR, in a large cottonwood tree in HU 34C trees. The nest was first observed in mid-April, and two other visits did not detect any sign of young this year. Two adults were seen near the nest in mid-May, and it is hoped that the pair will return next year. A report on this nest was also provided to the NG&PC.

In March, 8-12 Bald Eagles were observed in the 24C2/24C4 hay meadow, presumably feeding on carp that froze out in the shallow water covering parts of the meadow.

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). None were observed in 2010.

c. Whooping Crane

On April 2, two adult whooping cranes were observed by Refuge Manager Lindvall. They were seen off the refuge on a hayed and grazed meadow just north of Big Alkali Lake (NE, Cherry County, T31N, R28W, sec 21 and across the road in sec 16). They were observed feeding in reed canary grass and courting. No bands were seen on the birds. A complete report was provided to the Grand Island Enhancement Office.

No Whooping Cranes on Valentine NWR in 2010. These cranes are sporadic refuge visitors, stopping occasionally at refuge wetlands and meadows during migration.

d. Western Prairie Fringed Orchid

Western prairie fringed orchid (*Platanthera praeclara*) survey on Valentine National Wildlife Refuge (S. Magstadt, July 2010).

INTRODUCTION

The western prairie fringed orchid (*Platanthera praeclara*) was federally listed as a threatened species on September, 28 1989. It has experienced rangewide population decline of about 60% from historic levels. This decline can most likely be attributed to the conversion of native grasslands to cropland. The fertile wet meadows where orchids grow also have soil that is ideal for agriculture. Currently there are 175 known sites of western prairie fringed orchids in North America. These locations occur in six states and Canada.

Western prairie fringed orchids have been counted on Valentine National Wildlife Refuge since 1981, when the first orchid was documented in the habitat unit 32B2 of

Pony Valley. For a few years after, sites were documented where orchids were found but numbers of plants were not counted. In 1998, orchid plants and blossoms were inventoried in Sweetwater Valley in cooperation with Marge From, UN-L/Henry Doorly Zoo, to determine pollination rates and development of seed capsules.

STUDY AREA AND METHODS

Valentine NWR occurs in the Sandhills of Nebraska. This area is mainly native grasslands with rolling sand dunes and interdunal valleys. The refuge is also has many scattered lakes and wet meadows. The majority of the surrounding landscape is in private ownership, which is mainly used for cattle ranching.

Western prairie fringed orchids were surveyed on Valentine NWR by one to four refuge staff members. All known locations of plants occurring on the refuge were surveyed, along with a few other areas of suitable habitat. Plants were found by systematically searching these meadows. Refuge staff spread out approximately 30 meters apart and walked back and forth until the entire habitat unit was searched. Due to the thick and tall reed canary grass and prairie cord-grass, some areas were difficult to search and the possibility of not locating all flowers exists. The flowers mostly occurred in wet meadows with some flowers occurring in up to 25 cm of water.

All vegetative and flowering western prairie fringed orchids on the refuge were counted. The height of each plant was measured and the total number of flowers and buds were counted on each flowering plant. GPS coordinates were also taken at all orchid locations. In meadows that are hayed, a painted wooden lath was placed next to the plant so the permittee could see where to hay around the orchids. This helped ensure that flowers were not destroyed and the immediate habitat was unaltered.

RESULTS

The survey for western prairie fringed orchids took place in mid July of 2010. It took approximately four days for refuge staff to complete the orchid counts. There were a total of 221 plants located on Valentine NWR. There were 194 flowering plants and 27 vegetative plants (Figure 1.). This was a decrease in 80 orchids from 2009 (Figure 2.) Orchids occurred in nine different habitat units (Figure 3.), with a total of 176 plants occurring in H.U. 24C4 of Sweetwater Valley.

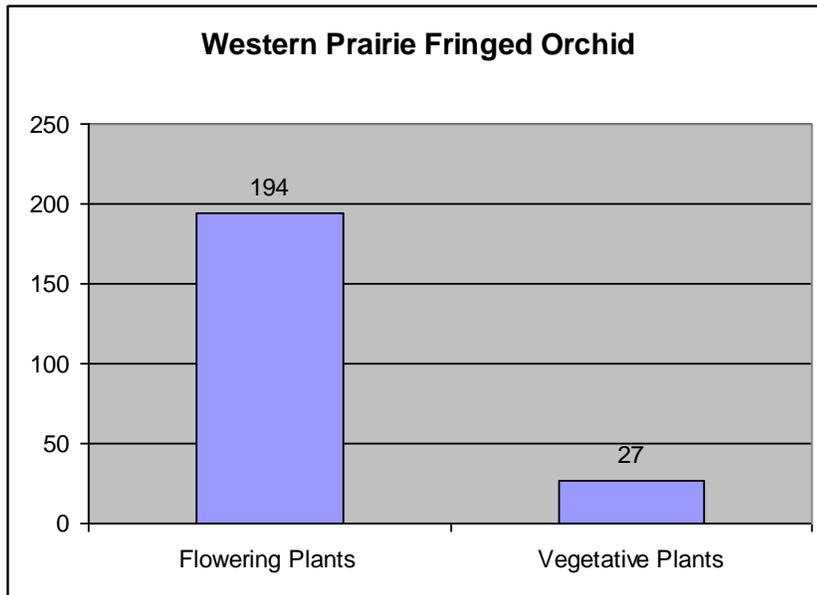


Figure 1. shows there was a total of 221 plants found on Valentine NWR. There were 194 flowering plants and 27 vegetative plants.

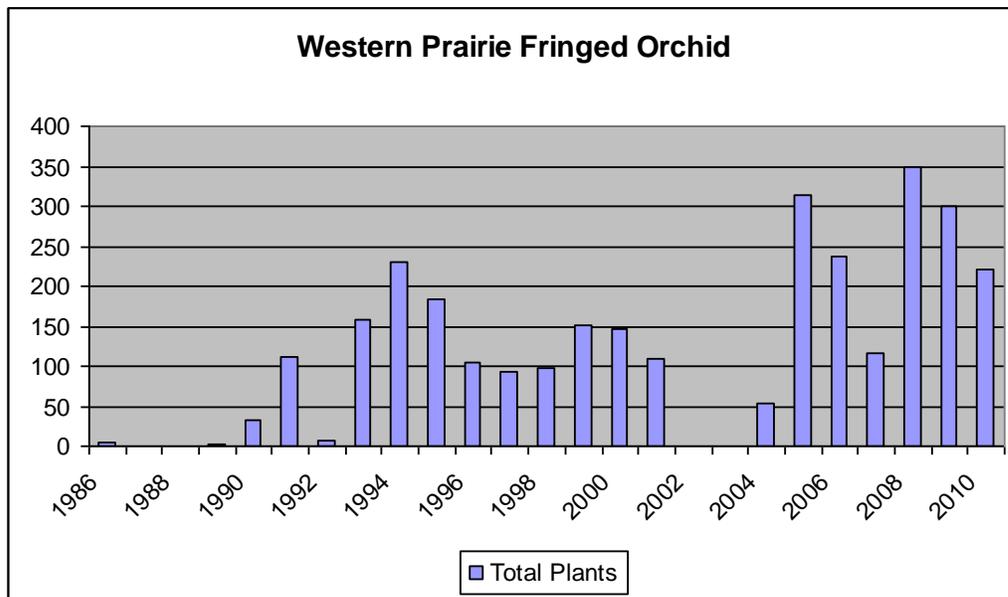


Figure 2. Total number of western prairie fringed orchids located on Valentine NWR over the past 24 years.

Table 1. Total number of orchids located on Valentine NWR from 1986-2010. The number of orchids located is likely a good representation of the fluctuation in orchid numbers throughout the years, although direct comparisons are difficult since search effort has not been standardized, and new locations have been added through the years.

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Flowering Plants	4		1	3	33	112	8	158	230	183	105	93	98
Vegetative Plants													
Total Plants	4		1	3	33	112	8	158	230	183	105	93	98
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Flowering Plants	152	146	110		1	54	314	225	114	341	297	194	
Vegetative Plants								13	2	8	4	27	
Total Plants	152	146	110		1	54	314	238	116	349	301	221	

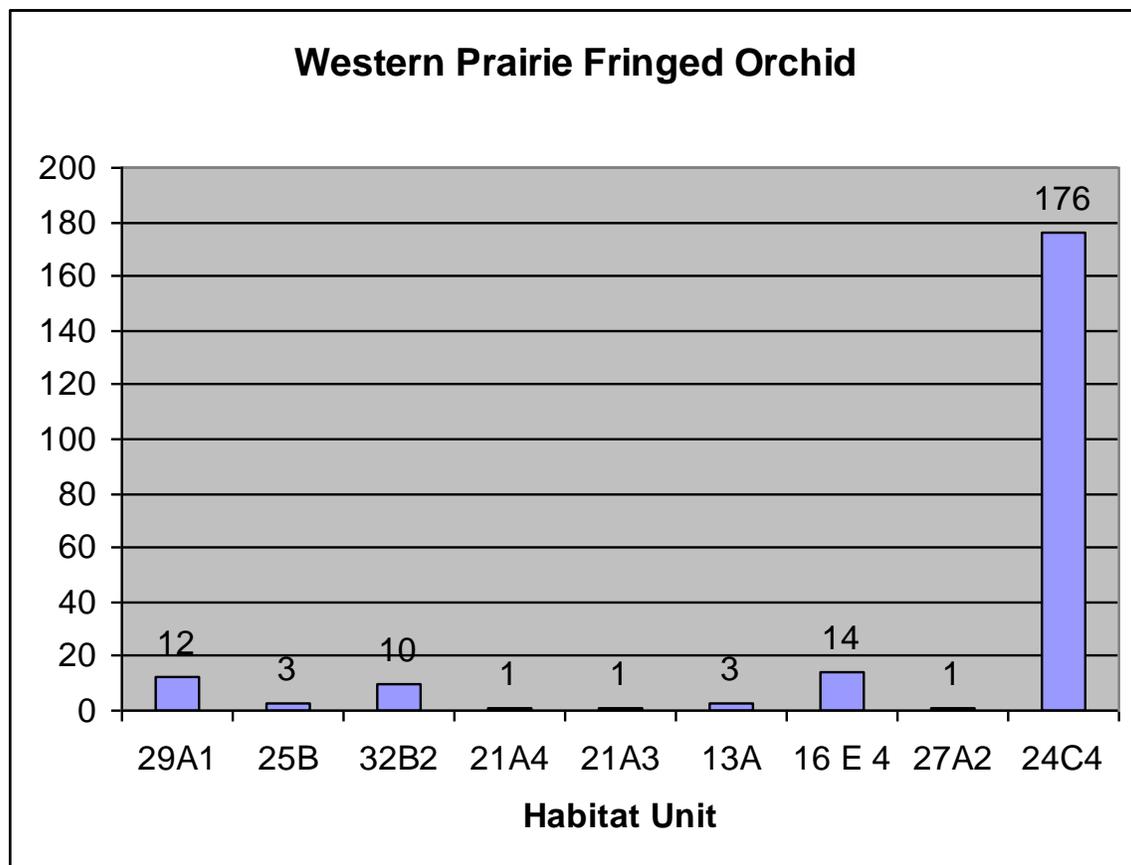


Figure 3. Valentine NWR habitat units and total number of western prairie fringed orchid plants located by unit during the 2010 blooming period.

Table G2d1. Location, number of orchids found in the last 5 years at each site.					
Habitat Unit	2006	2007	2008	2009	2010

32B2	101	22	64	1	10
29A1	3	8	9	42	12
24A2	NA	NA	2	12	0
24C2	NA	NA	3	1	0
24C4	22	25	133	220	176
25B Sweetwater	1	0	2	2	3
25B Cow Lake	0	0	0	0	0
Hackberry HQ ROW	0	0	0	0	0
Hwy 83 ROW/29A1	8	5	6	7	4
18B7	3	0	15	0	2
36A	0	0	0	0	0
21A3	9	0	16	0	1
21A4	0	2	3	0	1
16E4	78	39	75	3	14
7A2	0	0	0	0	0
15C3	NA	5	1	0	0
13A	NA	8	12	13	3

e. Blowout Penstemon

Survey of blowout penstemon (*Penstemon haydenii*) on Valentine National Wildlife Refuge (S. Magstadt, June 2010).

INTRODUCTION

Blowout penstemon (*Penstemon haydenii*) was declared an endangered species on September 1, 1987. It is only found in the Sandhills of Nebraska and an isolated area in Wyoming. Blowouts and sand ridges are the only habitat in which this plant grows. Its waxy leaves make it possible to thrive in this sand-blasted environment. Along with blowout grass, it is one of the first plants to grow and start stabilizing these blowouts. Once other grasses start growing and stabilizing the blowout, the penstemon usually start to decline because it is no longer suitable habitat. This is a concern because it may be eliminating some of its own habitat where it can grow.

Transplants of blowout penstemon on Valentine NWR were started in 1996, with 2000 seedling plants transplanted into three blowouts. Seedlings were grown by Dr. James Stubbendieck at the University of Nebraska-Lincoln. Blowout penstemon has continued to be transplanted since 1996, with only a few years where transplants did not take place.

Over the years, penstemon seedlings have been transplanted by Stubbendieck, students, and refuge staff. In recent years, transplanting has been done by refuge staff and some volunteers. The most recent plantings were done with help from a group of students from Walnut Middle School in Grand Island, NE. A total of 72 different blowouts across the refuge have had penstemon transplanted since 1996. Transplant blowouts have been monitored annually since 1999, with the number of vegetative plants, flowering plants, and flowering stalks recorded for each blowout.

STUDY AREA AND METHODS

Valentine National Wildlife Refuge lies in the Sandhills of Nebraska. This area is mainly grasslands with rolling sand dunes and interdunal valleys. With blowing sand and choppy hills, many blowouts occur across the landscape. The majority of the surrounding landscape is in private ownership which is mainly used for ranching, so grasslands are mostly left intact.

Blowout penstemon was surveyed on Valentine NWR by seasonal biological science technicians. All known locations across the refuge were surveyed during the month of June. Each blowout containing penstemon was systematically searched and flowering and vegetative plants were counted. The blowout was divided between the bio-techs and usually searched from the bottom towards the top. The number of flowering stems was also counted on each flowering plant. When the blowouts were finished being searched, all plants and flowering stalks were totaled.

It took between one and three seasonal bio-techs approximately five days to complete the survey on the refuge. Due to a restriction on ATV's and UTV's at this time, all blowouts had to be accessed by foot. This dramatically increased the amount of time and limited the number of blowouts that could be surveyed in a day.

RESULTS

There were a total of 74 blowouts that were searched on Valentine NWR in 2010. There were 72 blowouts that had transplanted populations and two blowouts that had naturally occurring populations. Of the 72 transplanted populations, there were a total of 1,162 plants, which consisted of 416 vegetative and 746 flowering plants. The flowering plants also had a total of 3,241 flowering stalks (Figure 1.). For the two naturally occurring populations, there were a total of 17 plants. There were 12 vegetative and 5 flowering

plants. The flowering plants also had a total of 24 flowering stalks (Table 1.). The population of blowout penstemon has continued to decline over the years. There was a decrease of 118 plants from 2009 to 2010 (Figure 2.).

Of the 72 blowouts that had transplanted populations, there were a total of 14 blowouts that no longer had any plants present. There were also two blowouts that were searched on adjacent private lands. One of the blowouts had two vegetative plants and the other no longer had any plants present.

The data for blowout penstemon occurs on the GIS computer, in an Excel file named 'Blowout penstemon database' (C:\RLGIS\Vegetation Monitoring\Penstemon\Blowout penstemon database). There is also spatial data in RLGIS under Endangered Species Critical Habitat Designation. This data is also located in (C:\RLGIS\Vegetation Monitoring\Penstemon\penstemon2010). This spatial data shows where all the blowouts occur on the refuge, what their acreage is, and what their respective names are.

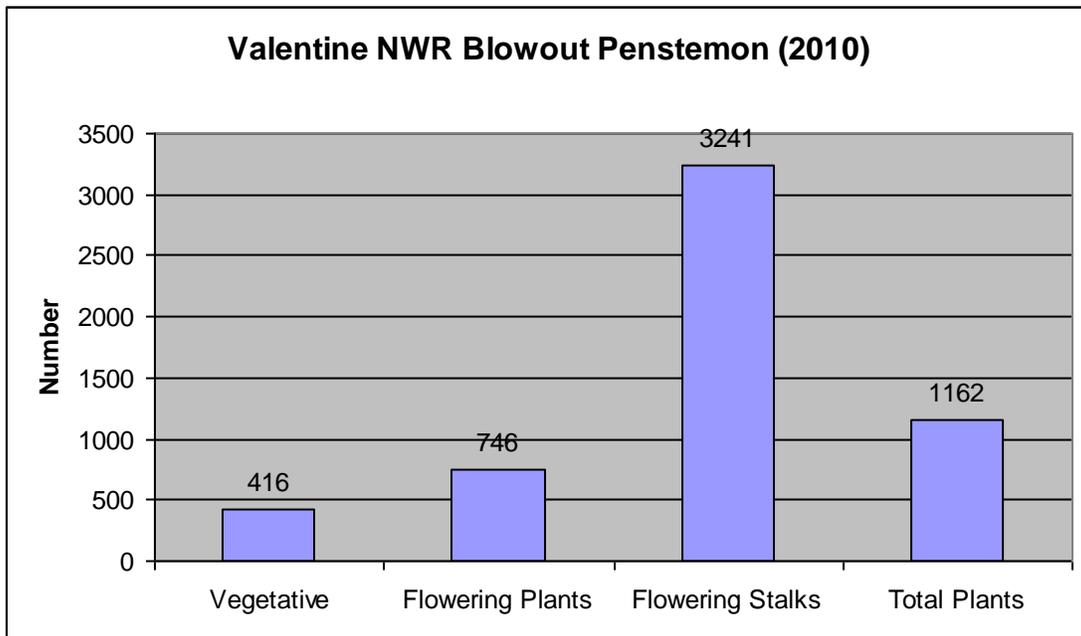


Figure 1. shows the total numbers of blowout penstemon on Valentine NWR in 2010.

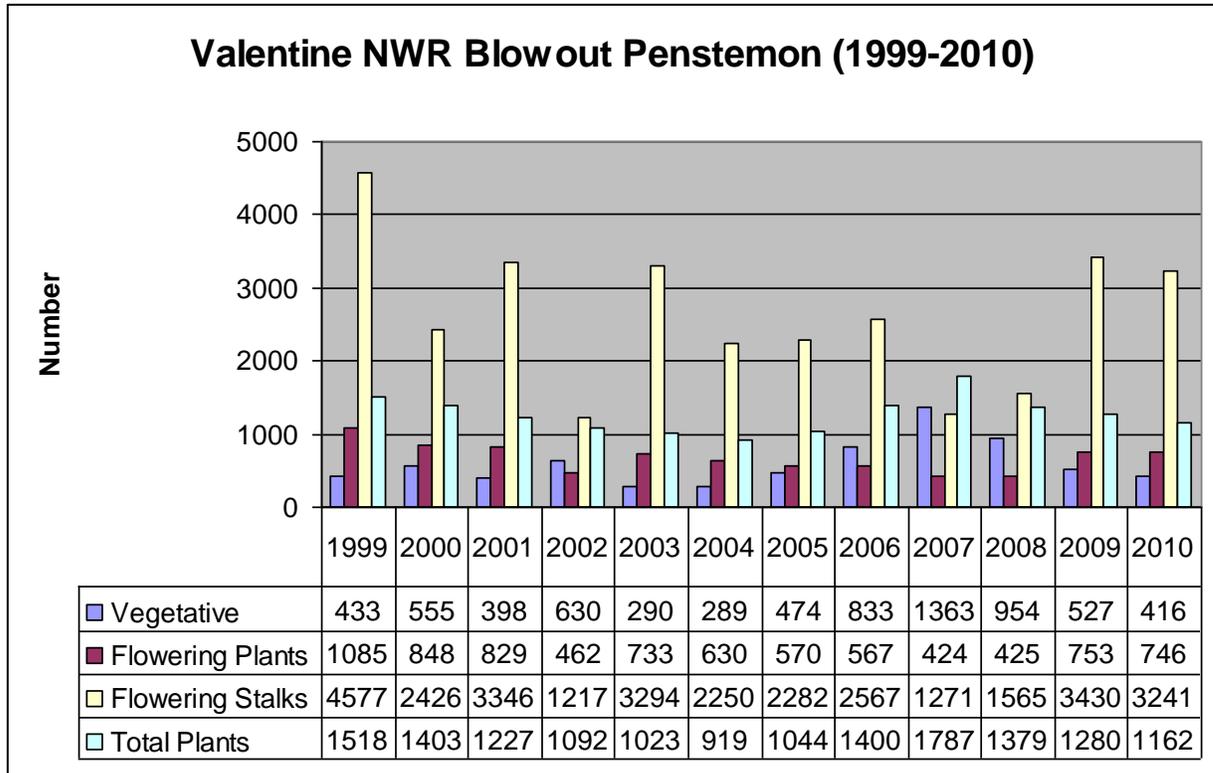


Figure 2. shows the yearly totals of blowout penstemon on Valentine NWR for the last 12 years.

		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
34A2	Vegetative Plants									3	0	13	10
	Flowering Plants									8	0	23	2
	Flowering Stalks									42	0	57	4
	Total Plants									11	0	36	12
22B2	Vegetative Plants		N.C.	N.C.	7	6	1	0	3	0	3	2	2
	Flowering Plants		N.C.	N.C.	4	12	12	19	12	5	0	4	3
	Flowering Stalks		N.C.	N.C.	8	76	75	88	139	9	0	16	20
	Total Plants	3	0	0	11	18	13	19	15	15	3	6	5

Table 1. shows the totals of the two blowouts that have naturally occurring populations on Valentine NWR. Blowout 22B2 was not checked (N.C.) in 2000 or 2001.

f. Wolves

Wolves were extirpated from Nebraska in the mid- to late 1800's. There is an occasional wolf sighting documented in Nebraska, but none near the refuge.

g. American Burying Beetle

A survey of carrion beetles on Valentine National Wildlife Refuge (Nenneman, August 2010)

INTRODUCTION

Members of the carrion beetle family (Silphidae) are an interesting and useful group of insects. Beetles in this family are very efficient recyclers of dead animal carcasses, and the genus *Nicrophorus* is of additional interest to scientists because of their semisocial behavior (Ratcliffe 1996). The Silphid family is large worldwide, with 570 known species. There are 31 species represented by the family in North America, and 18 species in Nebraska. The genus *Nicrophorus* has 70 known species worldwide, with 15 occurring in North America. The genus is represented by 11 species in Nebraska, and 7 of these have been documented in Cherry County. The American burying beetle (*Nicrophorus americanus*) is the largest North American member of the carrion beetle family, and is listed as a federally endangered species in the United States.

N. americanus were a wide-spread species in North America, with collections from 35 states in the eastern and central United States and three provinces in southern Canada (Ratcliffe 1998). A decline in the species was noted in specimen collections in the eastern U.S. as early as the 1920's, and declines appear to have progressed into the Midwest and western parts of the range during the 1940's and 1950's (U.S. Fish and Wildlife Service 1991). These declining numbers prompted the Department of the Interior to list *N. americanus* as an Endangered Species under the provisions of the Endangered Species Act in 1989 (Federal Register Vol. 54 (133):29652-5). While the ultimate causes of the species decline are unknown, habitat fragmentation and associated changes in vertebrate competitors for carrion has been suggested as the most likely proximate cause (Ratcliffe 1996). Habitat fragmentation may have led to a complex interaction of factors that has led to a reduction in *N. americanus* numbers. Increasing urbanization has increased the amount of artificial light, which may disrupt the activity of nocturnally active insects. Habitat alteration has affected populations of species that may have been a primary carrion source for *N. americanus*, and many vertebrate predators that compete with the beetles for carrion (e.g. raccoons, crows, foxes, opossums, and skunks) have increased as land use has changed. Additionally, as populations declined, genetic flow among increasingly isolated beetles may have dramatically declined.

In 1992, six *N. americanus* specimens were documented on Valentine National Wildlife Refuge (NWR). Prior to this, the refuge was considered outside of the range of the *N. americanus*. Since 1992, 10 additional records of the beetle have been made either on or near the refuge. Monitoring and documenting use of the refuge by *N. americanus* was included as an objective in the Valentine NWR Comprehensive Conservation Plan in 1999. Since little is known about *N. americanus* or other carrion beetles on the refuge, a survey was conducted during August 2005 to better determine the relative abundance and spatial distribution of these beetles on Valentine NWR.

STUDY AREA AND METHODS

Valentine NWR lies in the Nebraska Sandhills, one of the largest grass-stabilized regions in the world (Bleed and Flowerday 1989). The rolling sand dunes and interdunal valleys are predominately vegetated by native grasses and forbs, with shallow lakes and wetlands interspersed in the lower valleys. Most of the surrounding landscape is in private ownership, but the grasslands have remained largely intact since the primary land use is ranching (Bleed and Flowerday 1989).

In 2005, a survey was conducted with a goal of better understanding the spatial distribution of *N. americanus* on the refuge. To this end, 5 widely separated sites were selected for sampling. At each of these five sites, one pitfall trap was placed in each of three habitat types: dune hilltop, subirrigated meadow, and under a tree canopy (Table 1). All of these sites were >2 km from one another so that it would be unlikely to catch the same beetle at more than one site. In 2010, this survey was repeated as a way to monitor *N. americanus*.

Each pitfall trap was 15 or 19 liter (4 or 5 gallon) bucket buried so that the lip of the bucket was flush with the ground. Approximately 12 cm (4-5 inches) of sand was placed in the bottom of each bucket to allow beetles an escape from one another in the trap. Traps were baited with a chunk of road-killed white tailed deer. The deer was cut up into approximate 1 to 2 kg (2 to 4 lb) pieces, and all baits were allowed to ripen on a flat roof for 3 to 4 days before use. Although Kozol (1990) recommends not allowing beetles access to the bait, beetles were allowed access to the bait in this trapping effort. Andy Bishop (personal communication) indicated that larger baits provided a better attractant and also allowed the beetles to feed after expending considerable energy to reach the trap. Traps were covered with chicken wire, and a piece of masonite was placed on top to provide shade and keep out water (Figure 1). Two pieces of lathe propped the plywood up so beetles could crawl in, and a brick held it in place.

Traps were visited as soon as possible each day, and all beetles, spiders, and other insects were removed from the trap. Many beetles were buried in the sand, so each check involved carefully checking all of the sand in the trap to insure that all carrion beetles were removed. If possible, observers identified carrion beetles were to species (Figure 2), and a tally was kept for each trap. Beetles were not collected and were released on site as they were identified. No markers were placed on captured beetles. Other insects were released as they were removed from the trap.

RESULTS

Each trap was operated for 2 nights on 17 and 18 August 2010 for a total of 30 trapnights. The overnight temperature on the 17th was 60°F, while on the 18th the overnight low was 62°F. The minimum temperature recommended for trapping is >16°C (>60.8°F), (Kozol 1990), so both nights were near the minimum recommended overnight low. There was a heavy fog on the morning of the 17th, and 0.52” of rain fell overnight.

At least six species of *Nicrophorus* beetles were captured and identified during the survey period (17 and 18 Aug). Two other carrion beetles were also identified (Table 2). *N. marginatus* and *N. carolinus* were by far the most abundant carrion beetles captured, and both were least likely to be captured under a tree canopy (Table 2). *N. americanus* were captured at four of five sites (Table 3), and 6 of the 15 traps caught at least one *N.*

americanus. Most (63%) of *N. americanus* captures occurred in subirrigated meadows, with lower numbers encountered in the tree and hill habitats (Table 2). This result mirrors the 2005 survey, in which the majority of *N. americanus* were also captured in meadow sites. The number of *N. americanus* captured in 2010 (minimum of 8, maximum of 10 if assume no recaptures) was considerably lower than captures in 2005 (minimum of 58, 92 if assume no recaptures; Figure 3). *N. marginatus* was the most commonly captured carrion beetle in the 2010 survey (Figure 3), and these beetles were common in both hills (42%) and meadows (55%). *N. carolinus* was most commonly (83%) captured in the hills, while *N. orbicollis* was most frequently (83%) captured in tree sites (Table 2). *Necrophila americana* were rarely captured in hills sites, and were most often captured on meadow sites (69%). A minimum of 2001 carrion beetles were captured in this survey, or 66.7 carrion beetles/trap night. *N. americanus* were captured at a rate of 0.27 beetles/trap night, compared to nearly 2 beetles/trap night in 2005.

Site did not seem to play a large role in the number of carrion beetles captured or in species composition captured (Table 3). Five of the eight species encountered were captured at all five sites, and the three species not captured at all sites were the least commonly encountered species (<30 individuals captures for each species). The Dad's Lake traps did produce about twice as many beetle captures as the other four sites, which was driven mostly by increased numbers of *N. marginatus* and *Necrophila americana* at these traps.

DISCUSSION

This trapping effort documented six of the 13 species of Silphidae that have been recorded in Cherry County (Ratcliffe 1996), two less species than were captured in 2005. Ratcliffe (1996) indicates that three species of *Nicrophorus* beetles (*N. guttula*, *N. marginatus*, and *N. obscurus*) cannot be readily separated based on overall appearance. This may explain why *N. guttula* was recorded in 2005, but not in 2010, while *N. obscurus* was recorded in 2010, but not in 2005. *N. marginatus* appears to be the only one in this group that has orange markings on its head, so it is likely that this species was correctly identified by our novice observers.

Several species of *Nicrophorus* have exhibited habitat preferences in past trapping efforts (Hoback et al. 2002), and captures on Valentine NWR indicate similar preferences. *N. orbicollis* generally prefers heavily forested areas, and most on Valentine NWR were captured under a tree canopy. *N. carolinus* have exhibited a preference for areas with loose sandy soils, which corresponds well with the largest number being caught in hill sites. *N. marginatus* is considered a habitat generalist with a strong preference for meadows and open grassy areas. In this survey, most *N. marginatus* were captured in meadows, followed by hill sites. *N. americanus* is considered a habitat generalist, but in this survey and the 2005 survey, there seemed to be a distinct preference for meadows. While *N. americanus* occurred less commonly than several other species of *Nicrophorus*, they were captured at most of the trapping sites across Valentine NWR. The number of *N. americanus* captured in 2010 did drop rather sharply from the 2005 survey, and reasons for this observation are not known. The trap site near Pony Lake did produce at least 15 *N. americanus* in 2005, and none in 2010, while all other locations saw a decrease in captures. The Pony Lake meadow trapping site was prescribed burned in

2008, so it is possible that there was some change to this location that made it less attractive to *N. americanus*. Although *N. americanus* captures were down during August trapping on Valentine NWR in 2010, another trapping effort conducted by Jessica Jurzenski from UN-L in June seems to indicate that the beetle is still relatively abundant across the refuge. The June trapping included 25 traps spaced 1 mile apart on the Little Hay Road and Hwy 16 B, starting at Hwy 83 and ending with two traps on Hwy 97. These traps were run for 5 days, and produced 133 *N. americanus* captures, or 1.1 *N. americanus* per trap night. (J. Jurzenski, personal communication). Eleven of the 25 traps were on Valentine NWR, and these traps produced 41 *N. americanus*, or 0.75 *N. americanus* per trap night. Given the variation in the number of *N. americanus* captured in 2005 and 2010, it appears that monitoring should be done on a more frequent basis (annually) to establish trends in the population for the refuge.

Observations made during this survey suggest that carrion beetles are a very important part of the Sandhills ecosystem. The capture rate observed indicates that small vertebrate carcasses are likely quickly utilized by carrion beetles.

The criteria for downlisting *N. americanus* in a region are to have three populations with a minimum of 500 adults in each population. A population is identified as interbreeding members of a species isolated or separated from others (U.S. Fish and Wildlife Service 1989). This survey suggests that *N. americanus* in north central Nebraska may meet the criteria to qualify as a population under the Recovery Plan guidelines. Future work should include mark-recapture to determine the population size of *N. americanus* on Valentine NWR and in the surrounding area. This work could also include a determination as to whether *N. americanus* in north central Nebraska and South Dakota are distinct from those described by Payton (1997) on the Platte River in central Nebraska. Nebraska could prove to be an ideal study site for understanding the factors that lead to the decline in *N. americanus* across its range. Habitat fragmentation and the changes that came with it are thought to have caused the decline in *N. americanus* populations, and the Sandhills have remained a largely intact ecosystem. This could allow researchers to better understand the interplay of factors thought to affect *N. americanus*.

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Site	Habitat Unit	Habitat	UTM coordinates	
			Northing	Easting
Dad's Lake	8B1	Hills	4708314	360394
	9A2	Meadow	4707586	360261
	9A2 trees	Trees	4707308	360181
Duck Lake	5A	Hills	4711632	359663
	2B1	Meadow	4712053	359656
	7A2	Trees	4712042	358726
Dewey Lake	16C	Hills	4710644	367584
	16C	Meadow	4710826	367685
	16C	Trees	4711116	367258
N. Marsh Lake	19B	Hills	4709907	375087
	18B6	Meadow	4710250	374426
	18B6	Trees	4710058	375194
Pony Lake	32A	Hills	4703810	376927
	32B2	Meadow	4704372	376880
	32A trees	Trees	4704092	376864

Species	Habitat type			Total
	Hills	Meadow	Trees	
<i>Nicrophorus americanus</i>	1 (1)	5 (7)	2 (2)	8 (10)

<i>N. carolinus</i>	406 (433)	56 (67)	26 (27)	488 (527)
<i>N. marginatus</i>	352 (390)	460 (528)	21 (35)	833 (953)
<i>N. obscures</i>	0 (0)	15 (15)	12 (12)	27 (27)
<i>N. orbicollis</i>	3 (3)	39 (62)	206 (290)	248 (355)
<i>N. tomentosus</i>	7 (7)	30 (30)	21 (21)	58 (58)
<i>Necrophila americana</i>	3 (3)	231 (271)	99 (125)	333 (399)
<i>Necrodes surinamensis</i>	0 (0)	0 (0)	1 (1)	1 (1)
Total	772 (837)	838 (982)	391 (516)	2001 (2335)

Table 3. Carrion beetle captures by site on Valentine National Wildlife Refuge. All trapping was conducted 17-18 August 2010. Numbers represent the minimum number of beetles captured (total number captured, assuming no recaptures).

Species	Site name				
	Dad's	Duck	Dewey	N. Marsh	Pony
<i>Nicrophorus americanus</i>	5 (7)	1 (1)	1 (1)	1 (1)	0 (0)
<i>N. carolinus</i>	132 (137)	115 (131)	103 (106)	17 (18)	121 (135)
<i>N. marginatus</i>	291 (347)	196 (225)	155 (173)	103 (113)	88 (95)
<i>N. obscurus</i>	27 (27)	0 (0)	0 (0)	0 (0)	0 (0)
<i>N. orbicollis</i>	113 (175)	30 (33)	65 (94)	12 (12)	28 (41)
<i>N. tomentosus</i>	30 (30)	16 (16)	6 (6)	4 (4)	2 (2)
<i>Necrophila americana</i>	184 (240)	12 (15)	30 (33)	23 (23)	84 (88)
<i>Necrodes surinamensis</i>	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)
Total	787 (968)	371 (422)	360 (413)	160 (171)	323 (361)

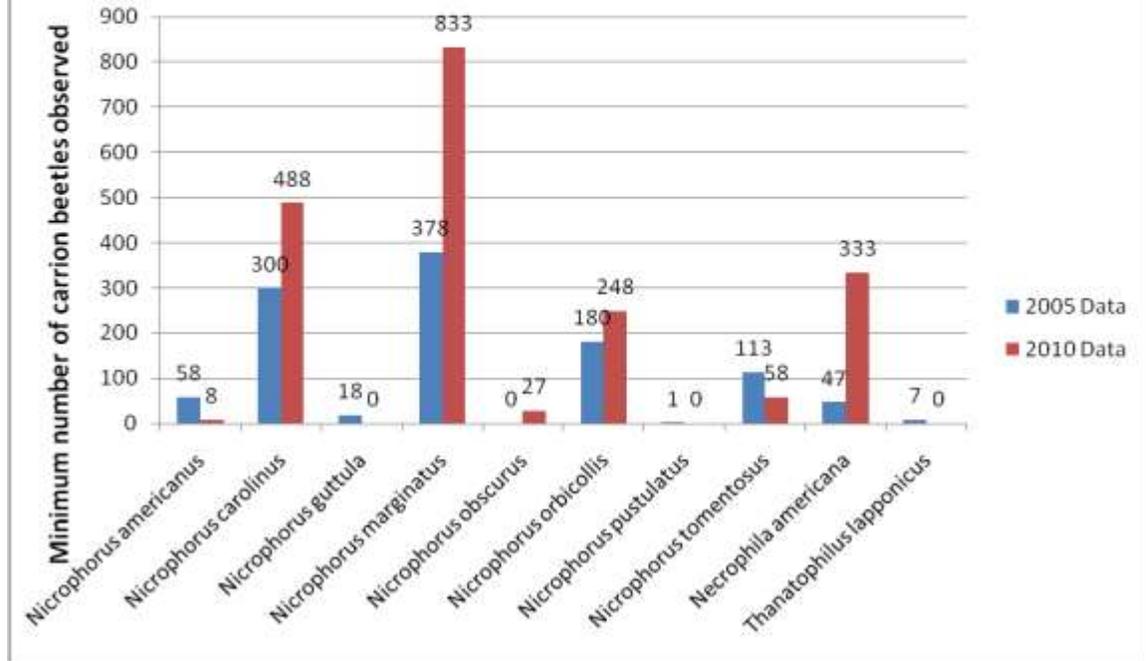


Figure 1. Carrion beetle pitfall trap at a meadow site on Valentine NWR. MN



Figure 2. Carrion beetles captured in a pitfall trap. Species that can be identified in the photo include *Nicrophorus americanus*, *N. carolinus*, *N. marginatus*, and many *Necrophila americana*. ET

Figure 3. Carrion beetle trapping results on Valentine NWR in 2005 and in 2010. Captures are the result of 15 pitfall traps operated for 2 trap nights (30 trap nights).



3. Waterfowl

a. Ducks

Spring Migration – No waterfowl were spotted on the refuge until March 4th, when common mergansers, common goldeneyes, and trumpeter swans were all seen on Hackberry Lake. No other observations were noted until March 26th, when American coot, American wigeon, and blue winged teal were noted. Undoubtedly, other waterfowl moved back into refuge lakes throughout the month. No surveys are conducted on total waterfowl use during the spring migration, but observations indicate that overall numbers have steadily increased during March. Peak numbers of waterfowl and total species generally occurs around the 2nd and 3rd week of April.

Waterfowl pair and brood counts were again conducted on West Long, Hackberry, Pony, Center, and “21” lakes, the Marsh lakes, and at Yellowthroat Wildlife Management Area. Pair counts were conducted 14-24 May, while two brood count surveys were done 24 June – 8 Jul and again 21-30 July. On the refuge portion of the survey, there were 202 indicated pairs of blue-winged teal

observed, 88 indicated pairs of mallards, 405 indicated pairs of dabbling ducks, 70 pairs of diving ducks, and 31 pairs of American coots. A simple extrapolation of these numbers based on the percentage of wetland area surveyed provides an estimate of 1492 dabbling duck pairs and 258 diver pairs for the refuge. While these estimates do not account for observer differences and the problem of ducks present but not detected, they do provide a basis for comparison from year to year, and serve to show that waterfowl breeding populations are well below desired levels. Valentine NWR CCP objectives for waterfowl include providing habitat to support greater than 4000 pairs of dabbling ducks, and 700 pairs of diving ducks, with a brood:pair ratio greater than 20%. Across the six refuge lakes surveyed, only 2 duck broods were observed. A simple extrapolation of this number for the refuge provides an estimate of 8 total broods, with a brood:pair ratio of 0.5%. While data collected on waterfowl pairs and broods very likely have problems associated with different observers and detection biases, they still serve as an index of current waterfowl use and production. Comparison of observations on the Marsh Lakes in 2010 to past data indicates that the number of pairs and number of broods has declined rather dramatically over the years (Table G3a1). It is thought that the entry of common carp into the lakes has greatly impacted the suitability of Marsh Lakes for waterfowl through the reduction of available invertebrate biomass, changes in and loss of submergent and emergent aquatic vegetation, and decline in water quality. However, other lakes included in the surveys also have fewer duck pairs and lower numbers of broods seen than in past surveys, so carp may not be the only factor driving the reduced waterfowl use.

	BWTE	MALL	Dabbling	Diving	Coot	Broods
2000	420	560	1406	53	196	87
2001	190	338	732	42	214	NA
Average*	397	222	805	135	300	NA
2008	39	41	125	18	4	1
2009	75	79	156	4	1	7
2010	75	59	157	4	3	2
*Average is pair counts on Marsh Lakes from 1968-2001, excluding 1972-1977						

Fall migration – Based on observations of waterfowl made during avian influenza surveillance on the Marsh Lakes and Dewey Lake, there were not many migrating birds on the refuge until the first part of Oct. Duck numbers steadily increased through Oct into Nov. The total number of ducks on the Marsh lakes and Dewey Lake peaked at almost 3000 birds on 12 Nov. Duck numbers on the refuge then fell to almost none as the lakes and wetlands froze over around 23 Nov.

b. Geese

No surveys were conducted specifically for Canada geese in 2010. General observations indicated that pairs of Canada geese have spread out across the

refuge as holes open up in the ice. With the return/rebound in muskrats on the refuge, muskrat huts are providing an abundance of suitable nesting locations for geese. Three goose tubs and one swan nesting platform were hayed in prep for the spring nesting season. Last year 2 of the tubs were used by Canada geese and one nest hatched. The swan nesting platform was used by Canada geese but the fate of the nest is not known.

Good numbers of goose broods were observed on West Long and “21” lakes during duck brood surveys. Canada geese, usually in pairs and family groups, can generally be found on the refuge throughout the year when there is open water, but large flocks were not observed using refuge wetlands in 2010.

c. Trumpeter Swan

Trumpeter swans began arriving back on the refuge in early March as open water became available in refuge lakes. The refuge staff keeps anecdotal observations of swans through the year. Two pairs of swans were observed with cygnets on the refuge in 2010 – a pair with 2 cygnets was seen on Center Lake in mid-Jun, and a pair with 5 cygnets was observed on Watts Lake in Jul. The pair of swans on Watts is the first time that a pair with cygnets has been seen on this lake.

4. Marsh and Water Birds

a. Sandhill Cranes

No Sandhill Cranes were observed 23-25 March during the annual spring crane survey. This annual survey is done to assess Sandhill Crane numbers, and is conducted to capture most of the birds while they stage on the Platte River. Cranes are usually not seen migrating through this area until the second week of April. In the fall, a steady stream of cranes was noted migrating south during mid-October, with cranes observed nearly every day from 14-26 Oct.

Higher water levels in the Marsh lakes have inundated the small island between Middle and South Marsh lakes that was used by nesting Double Crested Cormorants in 2008 and 2009. Some cormorants were observed nesting on the island (HU 18C2) and on mats of vegetation in the bulrushes. The colony of cattle egrets and black-crowned night herons that had nested in an island of phragmites in 2009 was abandoned due to higher water levels as well. A colony of about 20 black-crowned night heron nests was observed in a cattail stand near the 18C2 island.

A great blue heron rookery established in the cottonwood grove in HU 34E Trees. A complete count of nests was not attempted, but there was an estimated 50 to 60 nests in the trees, and young birds were seen in many of the nests.

5. Shorebirds, Gulls, Terns and Allied Species

6. Raptors

Three to four pairs of kestrels have been observed around tree groves on the refuge, and likely indicate breeding pairs. They have been seen at the 32A tree grove, north of Tom's Lake, by the Dewey Lake main boat launch, and at Hackberry HQ. It also looks like there is an active red-tailed hawk nest in the tree grove north of Tom's Lake. Four great horned owl nests were noted across the refuge – one in HU 33 east of "21" Lake, one in the trees south of Calf Camp road in HU 16E3, one in HU 2B, and in a cottonwood tree at Hackberry HQ.

Observations of raptors through the breeding season suggest that red-tailed hawks, Swainson's hawks, northern harriers, American kestrels, and great horned owls all breed on the refuge, although nests were not located for all of these species. Other secretive and less common species potentially breeding on the refuge include sharp-shinned and Cooper's hawks, long-eared, short-eared, and eastern screech owls. Short-eared owls are most often observed on the refuge during the non-breeding season.

7. Other Migratory Birds

In 1991-1992, a Breeding Bird Survey (BBS) route was implemented on Valentine NWR. This route has been completed every year since 2003. In 2010, the route was completed on 15 Jun, with 1361 individual birds of 60 species detected. The average number of individuals and species observed for this route is 987 individuals of 59 species. The most commonly observed bird was the Red-winged Blackbird, which comprised 50% of the total observations. Seven other species (Marsh Wren, Mourning Dove, Western Meadowlark, Brown-headed Cowbird, Dickcissel, Ring-necked Pheasant, and Yellow Headed Blackbird) had greater than 30 observations. BBS routes are useful for detecting trends in the more common species observed, and providing some information on the presence/absence of less common species. There were 28 species detected in the 1991-1992 surveys not detected in 2010, and nine species detected in 2010 not detected in 1991-92. At least 18 of the 28 species from the 1991-92 surveys not detected in the 2010 BBS route were known to be on Valentine NWR in 2010, and the remaining 10 species may have been non-breeders. Two of the species detected in 1991-92 (Least Flycatcher and Blackpoll Warbler) were likely detected as migrants. Of the nine species not detected in 1991-92, one is an undesirable exotic (European Starling). The Trumpeter Swan has been expanding its range in recent years, so the species may not have been on the refuge in 1991-92. Great Horned Owls are an adaptable species, and likely have expanded their range with human settlement, due to the increased availability of nest sites that accompanied settlement. Northern pintails are not readily detected by auditory cues in June, nor are waterfowl sampled well by BBS techniques. Chipping sparrows are not common in the Sandhills, and are restricted to areas with some coniferous trees. Dickcissels are a somewhat nomadic species that can vary

greatly in abundance from year to year, and have been fairly common at Valentine for the past 6 years.

8. Game Mammals

a. Deer

No refuge deer surveys were conducted in 2010. Aerial deer surveys were conducted annually from 1968-1988, and were not repeated until 2005 and 2008, when concerns about CWD prompted some funding to determine deer numbers across the state. During the aerial surveys, the average number of deer seen was 166 (range 70-280). In the first three years of the survey, mule deer outnumbered white-tailed deer by about 2 to 1. More recently, white-tails have become the more abundant species, outnumbering mule deer about 4 to 1.

Rifle deer hunting is a popular activity on Valentine NWR, with most hunters focusing on antlered deer (Table F8.1). Of the 92 deer reported as harvested on the refuge, 9 were mule deer and the remaining 82 were white-tails (one deer was taken during the archery season, but species and sex were not known; recorded as a white-tailed deer buck in table F8.1). Harvest pressure continues to be heavier in the Sandhills unit, with 65 deer coming out of this unit, and only 13 out of the Calamus West unit. Hunters are taking some nicer deer, as 19 bucks were recorded as 3.5 years or older, and an additional 15 bucks were unaged, but presumably were older deer that were being kept for taxidermy mounts. Many 2.5 year old deer are harvested, with 40 bucks falling in this age range. Given the hunting pressure, especially on opening weekend, it is not too surprising that many 2 year old bucks are shot.

Table F 8.1. Deer harvest on Valentine NWR during the 2010 deer season. Harvest information based on deer reported to the state check stations. Archery and muzzleloader deer are now checked via telecheck, so some deer harvested on the refuge may not be included in these totals. Refuge staff added eight deer to the harvest records based on archery, muzzleloader, and illegal take.

Unit	White-tailed Deer		Mule Deer	
	Buck	Doe	Buck	Doe
Calamus W	11	1	1	0
Sandhills	57	4	1	3
State buck	4	0	0	0
Muzzleloader	2	1	2	0
Statewide youth	2	0	2	0
Archery	1	0	0	0

b. Muskrat and other furbearers

Although muskrat house counts have been discontinued, the increase in muskrat activity observed in 2009 carried on in 2010. During avian influenza surveillance on the Marsh Lakes on 12 Nov 2010, 300+ muskrat houses were counted. Large numbers of rat houses were noted on “21” Lake and on Calf Camp Marsh west of

Highway 83. It is likely that the muskrats were responding well to increased water levels and the availability of food. Rat houses provide nesting sites for many waterbirds, as well as loafing areas. Muskrat feeding activity also serves to open up dense patches of cattail and bulrush, creating openings that other wildlife use.

10. Other Resident Wildlife

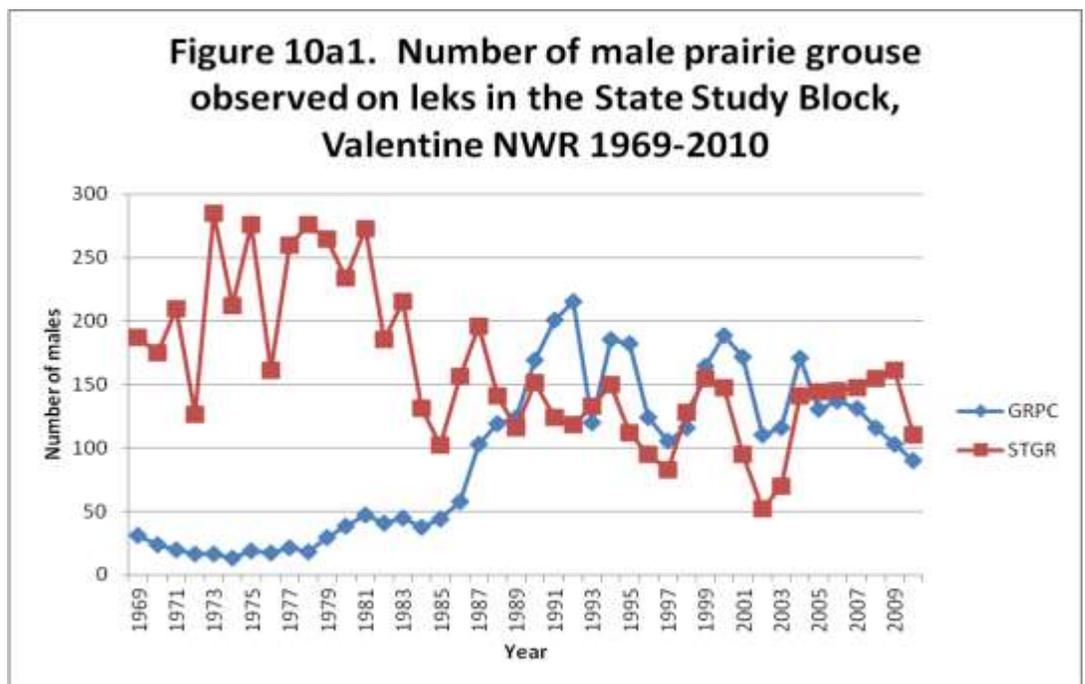
a. Prairie Grouse

Greater Prairie Chickens (GPCH) and Sharp-tailed Grouse (STGR) 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. Leks were checked in mid-March for placement of grouse viewing blinds, and blinds were placed on the east side of Tom's Lake in HU 30A2 (STGR), and to the north of McKeel Lake in HU 16B2 (GPCH). Comments on the sheet placed in the blind are generally very positive, and most people really seem to enjoy spending an early morning with the grouse.

In the Valentine NWR CCP, the established objective for prairie grouse densities is to maintain a 5 year average of 1 prairie grouse lek/1.6 mi² within the State Survey Block, with a total of 15 GPCH leks and 13 STGR leks. In 2010, the 5 year average (2006-2010) was 1 prairie grouse lek/1.55 mi², with 13 GPCH leks and 16 STGR leks. For 2010, there was 1 lek/1.9 mi² with 10 GPCH leks and 13 STGR leks. Thus in 2010 the lek density was lower than desired, and the number of GPCH leks was five short of CCP objectives. The total number of males observed on leks declined for both prairie grouse species in 2010 (Fig 10a1). Both grouse species saw low numbers on leks in 2002, which was an extremely dry year. STGR numbers increased quickly in the two years following, and then have shown a steady to slowly increasing count until this year. GPCH numbers also increased sharply in 2004, but then declined and numbers have declined over the last four years.

Wing boxes were placed out at 5 locations on Valentine NWR to allow hunters to voluntarily submit wings from harvested grouse. Wing returns provide some measure of hunting success and an indication of the grouse harvest (we have no way of knowing the percentage of hunters who don't submit harvest information). In addition, the wings are used to determine the species composition of birds harvested, and allows the ratio of juvenile birds:adult birds to be calculated as an index of grouse production for the year. The CCP objective is to achieve a minimum sample of 350 prairie grouse wings, with a harvest ratio ≥ 2.5 juveniles per adult. In 2010, there were 128 hunters reported on submitted envelopes, with 214 prairie grouse harvested (191 STGR, 21 GPCH, 2 unknown). The juvenile:adult ratio was 2.9:1. Overall harvest was well below the CCP objective, even with the hunting season extended by a month. This was the first season that grouse hunting was allowed until the end of January, which allowed for the harvest of an additional 24 prairie grouse. The juvenile:adult ratio for 2010 was

above objectives found in the CCP, suggesting that reproduction was good in this area, although juvenile:adult ratios on McKelvie and Halsey NF were only 1.2 and 1.6 juvenile:adult, respectively. A component of not meeting the CCP harvest objective is undoubtedly a reduction in the number of grouse hunters. In the 20 years leading up to the completion of the CCP (1980-1999), the average number of hunters was 321 and the average grouse harvest was 442. Since 2000, the average number of hunters dropped to 193 and the average harvest dropped to 249. The average number of birds/hunter during these two time periods has changed little (1.38 birds/hunter 1980-1999, 1.28 birds/hunter 2000-2010), so hunter success remains relatively unchanged. Changing demographics in grouse hunters and perhaps prairie grouse populations may make the CCP objectives for the sample of prairie grouse wings unattainable in most years.



b. Ring-necked Pheasant

Pheasant season was open on Valentine NWR through the end of the January, and opened on 30 Oct. No records of pheasant hunting are kept, but it is thought that the pheasant harvest may be similar to the grouse harvest numbers. Late in the season, pheasants seem to gather in large numbers in a few places on the refuge, generally where food resources are adjacent to good thermal cover. It is not uncommon to flush groups of 10 or more roosters in these areas. Anecdotal observations of pheasants through January seem to indicate that the pheasant population is faring well on the refuge.

c. Merriam's Turkey

Tom turkeys begin to strut and gobble in Mar. Turkeys are not overly abundant on Valentine NWR, and their activities are generally confined to areas where they have access to trees. They are most commonly observed on the south side of Hackberry Lake, near the Pelican Lake sub-headquarters, near the main boat launch on Dewey Lake, and in the vicinity of the Pony Lake sub-headquarters. No surveys are done to document turkey populations on Valentine NWR. Anecdotal observation would suggest that the turkey population has decreased somewhat in recent years.

d. Gray partridge and Bobwhite Quail

Bobwhite quail are not common on Valentine NWR, so seeing them is a noteworthy event for refuge staff. The refuge likely does not provide the best habitat for quail, as they probably fare better where there are more shrubs in the landscape. Two coveys of quail were observed in Oct, both of which had about 12 birds. One was seen on the north side of Pelican Lake, near the fence between HU 5B2 and the closed area around the Pelican Lake residence, and the second covey was seen just east of the handicap-accessible boat launch on Dewey Lake. Neither of these was seen again later in the year, so it is unlikely that they survived the winter

e. Reptiles, amphibians, and others

Very little information is available for reptiles and amphibians on the refuge in 2010. The trailside vocalization survey run in Aug of 2009 was not done in 2010 as was hoped. Some work still needs to be done to determine the best times to conduct these surveys to capture most of the frog and toad calling periods on the refuge. One survey needs to be done in April to catch the chorus and leopard frogs, then another should probably take place in Jun for woodhouse's toad, and another in Jul/Aug for bullfrogs.

Two marked Blanding's turtles were spotted on trail roads in mid-Jun. One was on the Little Hay Road where it crosses HU 18B1 (male AA B Q), and the other was at the Dewey boat ramp (sex not determined, C L Y). An unmarked Blanding's turtle was observed in HU 25A on 14 April.

Other observations are all anecdotal. Bull snakes, garter snakes, yellow-bellied racers were all observed on the refuge through the summer, with bull snakes and garter snakes the most commonly observed. A yellow mud turtle was seen on the Pelican Lake road in HU 5B2 on 16 April. Snapping and painted turtles are readily observed in June as they come ashore to lay eggs. During blowout penstemon surveys, prairie and earless lizards are often observed, as well as the occasional prairie racerunner.

11. Fisheries Resources

For information on carp control efforts see section G.15. Animal Control.

A fishery management meeting was held on February 19 at the conference room at Fort Niobrara. Eighteen people from Nebraska Game and Parks, USFWS, South Dakota State University, and the Great Plains Fish and Wildlife Conservation Office attended. The agenda included carp control, solar powered fish screens, research on game fish recruitment, access improvements for fishermen, results of refuge lakes fish surveys, hatchery activities on Fort Niobrara, and Niobrara River fish surveys.

Valentine Fish Hatchery Biologists conducted the following activities of the refuge. Ten trap nets were set in West Long on March 22 and pulled on March 26, 2010. Valentine Hatchery brought back 200 yellow perch pairs for spawning at the hatchery. All yellow perch were hauled back to West Long after the spawn. Several species were transferred to the Aksarben Aquarium from West Long; 50 bluegill, 15 largemouth bass, 55 yellow perch, 1 black bullhead. Bluegill spawners were also collected to replenish the brood stock at the Valentine Hatchery. There were 134 male and female bluegill transferred to the VFH. Only 1 largemouth bass was kept and transferred to Valentine for brood purposes. Northern Pike were removed from West Long and transferred to Pelican Lake. There were 4 females and 1 male. All 5 northern pikes were small (app. 15 inches). On March 26 all trap nets were removed.

Fifteen trap nets were set in Pelican Lake on March 22, 2010. A brief summary on daily catches follows.

	<u>males</u>	<u>ripe females</u>	<u>green females</u>	<u>spent females</u>
<u>3-23:</u>	58	16	15	4
<u>3-24:</u>	37	27	10	--
<u>3-24:</u> Spawned - took 18.9 quarts and sent to Calamus Fish Hatchery for hatching. One lot showed a 28% eye up another had 11% and the remaining 3 lots ended up with a 0% hatch. Unsure of percent hatch at this point.				
<u>3-25:</u>	93	48	--	--
<u>3-26:</u>	67	40	7	4
<u>3-26:</u> Spawned – took 25 quarts and sent to North Platte Fish Hatchery for hatching. Collapsed nets over the weekend. Out of 4 different lots, the eye up averaged 18.5 %. Unsure of percent hatch at this point.				
<u>3-29:</u> Reset 15 nets				
<u>3-30:</u> Did not count all the males but had 49 spent females and five ripe females. The spawn was over. However, we had northern pike from Merritt that we spawned on 3-30. One lot was all Merritt males and females. The second lot was Merritt males and Pelican females. The reason for using northern pike from Merritt Reservoir is due to the poor hatch from Pelican and Dewey Lakes on the Valentine Wildlife Refuge. At this point we suspect the male northern sperm has either low motility and or fertility. Other species removed for brood purposes at the Valentine Fish Hatchery included 57 bluegill, 4 largemouth, and 2 yellow perch. All traps were removed on March 30, 2010.				

Valentine Hatchery biologists took all the yellow perch (YEP) brood stock back to West Long Lake on 4/22. They met their egg requests and produced a few extra quarts. They put 10.5 quarts of YEP eggs in Duck Lake and 14 quarts of YEP eggs in W. Long on 4/22.

The Valentine Fish Hatchery took 57 bass from Watts Lake for brood stock.

Rice Lake which had been at low levels for several years, started to fill up this spring. We contacted the Valentine Fish Hatchery which stocked 81 bass in the 3 to 10 inch range and 42 bluegill about 9 inches long on June 17. They may stock perch later if they become available. It was noted that some small bass migrated from Duck down to Rice when the water was flowing between the lakes.

Biologist from the USFWS Great Plains Fish and Wildlife Conservation Office in Pierre, SD were down to survey the fishing lakes at Valentine NWR in both the spring and fall. They prepared a report "*2010 Fisheries Surveys Conducted on the Valentine National Wildlife Refuge, Nebraska*" by Greg Wanner. Summaries, for the lakes that were surveyed in 2010, follow.

Clear Lake

Increased water levels likely improved spawning and nursery habitats for common carp and a strong year class produced in 2009 recruited to the population. Relative abundance of northern pike substantially declined since 2009, but was not significantly different from all years since 1992. Clear Lake continued to have the highest abundance of preferred length (≥ 710 mm [28 in]) northern pike among the Refuge lakes. Black crappie appear to be successfully spawning with evidence of low recruitment and predation is likely limiting the number of fish > 200 mm (8 in). Largemouth bass, bluegill and yellow perch are present in low numbers and not growing into the larger size classes. Management recommendations include; continue the 28 in maximum size limit for northern pike, use Clear – Dewey ditch as a means for trapping and removing common carp, and continue moving northern pike from West Long Lake and Watts to Clear Lake to supplement the adult population.

Dewey Lake

Common carp – Relative abundance of common carp remained low and is dominated by large adults. The last strong year class was evident in 2006. A trend of decreasing relative abundance in northern pike since 2007 was evident. Size structure has remained unchanged from 2006 to 2010. Bluegills numbers are low as were largemouth bass. Multiple year classes of yellow perch were evident with excellent yellow perch angling opportunities. Management recommendations include; continue the 28 in maximum size limit for northern pike, continue to use Dewey - Whitewater ditch as a means for trapping and removing common carp, control water levels in Dewey Lake to improve fish spawning habitat. This may need to be performed every other year to produce strong year classes those years.

Hackberry Lake

All common carp are likely from the same 2006 year class. The northern pike population remained at a low abundance. Relative abundance of bluegill declined while size structure improved, which should provide excellent angling opportunities. Size structure of largemouth bass continued to improve in Hackberry Lake while relative weights substantially declined. Excellent angling opportunities exist for yellow perch. Management recommendations include; since the introduction of common carp and northern pike, continue annual surveys.

Pelican Lake

The common carp population in Pelican Lake has a low relative abundance made up of large adults. Northern pike – Relative abundance and size structure of northern pike remained unchanged since 2004. Relative abundance of bluegill decreased while the size structure improved. Relative abundance of largemouth bass substantially declined and the size structure is out of balance with the fishery dominated by quality length (≥ 300 mm) fish. Relative abundance of yellow perch substantially increased with a high abundance of preferred length fish providing excellent angling opportunities.

Duck Lake

The high abundance of largemouth bass was evident as bluegill relative abundance substantially declined with few bluegill < 200 mm. The relative abundance of stock length largemouth bass substantially increased in 2009 where it remained in 2010. Most fish were < 300 mm. Pumpkinseed are low in abundance and will likely provide low angler value. Although low in abundance, the yellow perch population is dominated by preferred length (≥ 250 mm) fish providing excellent angler opportunities.

West Long Lake

Only one northern pike was observed during spring electro fishing, spring trap netting, and fall gill netting. The relative abundance of bluegill substantially increased in 2010. The removal of northern pike has directly improved abundance and size structure of bluegill. Wr was the highest among the refuge lakes indicating an abundance of prey. Relative abundance of largemouth bass continued to be the highest among the Refuge lakes. The population was represented by multiple length categories with evidence of successful spawning each year. Mean Wr levels indicated an abundance of prey for largemouth bass. Relative abundance of yellow perch was the highest among the Refuge lakes. The size structure of the yellow perch population is out of balance, but does have one of the highest mean Wr for yellow perch found among Refuge Lakes. Management recommendations include; continue to remove northern pike to enhance size structure and abundance of bluegill, yellow perch, and largemouth bass; and high numbers of bluegill, largemouth bass, and yellow perch would allow for West Long Lake being a source for translocation stockings to other Refuge lakes.

14. Scientific collections

See section G17 for information on waterfowl collected for Avian Influenza surveillance.

15. Animal control

16. Marking and Banding

No activity to report

17. Disease Prevention and Control

A proposal for funding of avian influenza surveillance was submitted and funded. We propose did the same surveys as were done in 2009, that is searching the shorelines of Dewey and Marsh Lakes on a weekly basis from mid-August until freeze up. Sick and dead birds of target species were collected and sent in for testing. No avian influenza was detected.

On Valentine NWR, avian influenza surveillance monitoring on the Marsh lakes and Dewey Lake began on August 28th. This was the fourth year of avian influenza surveillance on these lakes. Surveys were conducted weekly through 12 Nov, as no surveys were run during the rifle deer season, and the lakes froze up on 21 Nov. During avian influenza surveillance, no major mortality was noted.

Two birds were collected during surveillance efforts, and shipped to the National Wildlife Health Center labs in Madison for necropsies. A western grebe was found dead on the Marsh lakes on 04 Sept, and a dead American coot was found on Dewey Lake on 23 Oct. The necropsy report on the western grebe indicated that it was a young of the year female in excellent nutritional condition. The grebe tested negative for botulism, West Nile virus, and avian influenzas. The diagnosed cause of death was acute myocardial necrosis, the cause of which could not be determined. There was no significant inflammation in the heart, which suggested possible toxic or metabolic cause of heart muscle necrosis. Findings on the American coot were less specific. The coot was an immature female, and the only findings were of pulmonary edema and congestion. Body condition was excellent, and results for further tests must not have turned up any significant findings.

H. PUBLIC USE

1. General

Five news releases were prepared and sent out to area news outlets. They were, *High School Students Help Out Refuge*, *Blinds for Viewing Grouse Dances Available at Valentine National Wildlife Refuge*, *Valentine National Wildlife Refuge 2009 Fisheries*

Survey and 2010 Fishing Forecast, and releases announcing the Kids Fishing Day and Marsh Lakes Overlook Open House.

David Ledan, a French naturalist who works at a preserve in the Brittany region, visited Valentine NWR to photograph prairie chickens and sharp-tailed grouse. He took some fine photographs and presented an excellent talk about his studies on leking birds and his work in France to about 14 people on the evening of April 8 at the Fort Niobrara NWR visitor center. The local paper ran a feature length article on his visit.

2. Outdoor Classrooms - Students

Lindvall, Hicks, and Frerichs served as judges for the Valentine High School Science Fair. The students had some interesting projects, some of which will go on to the district competition.

Refuge Manager Lindvall taught the muzzle loader safety section of a hunter education class on August 3. There were 24 students who went on to get their Nebraska Hunter Education certificates.

A Kid's Fishing Day was held at the corral pond at Fort Niobrara on September 11. We had about 35 children and quite a few parents come out for the event. Activities included fishing, fish prints, casting contest, photo with a fish, and cooking and cleaning. Seven volunteers contributed 42 hours of volunteer time. The Valentine Fish Hatchery provided trout, the Sandhills Prairie Refuge Association provided funding for prizes, bait, and snacks, and Nebraska Game and Parks provided loaner poles and tackle. Both the weather and fish cooperated.



Figure H2. Bill Stroup was one of seven volunteers that helped make a successful kids fishing day at Ft. Niobrara NWR. MN

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. There are 15 interpretive signs located along the trail. This year plant identification markers were put up along the trail. The Sandhills Prairie Refuge Association donated the markers to the refuge.

A handicapped accessible nature trail is located at the Marsh Lakes Overlook. This short trail goes from the Overlook to the top of a small hill which offers a great view of the Marsh Lakes, the largest wetland complex in the Sandhills. An outdoor viewing scope and bench were placed at the end of the nature trail at the new Marsh Lakes Overlook. The items were purchased by the Sandhills Prairie Refuge Association. Curbs were also added to the trail this year.

5. Auto Tour Routes

The auto tour route brochure was delayed and we did not get the route up and running this year. We have the signs up and have purchased the stop markers and should have everything for a spring 2011 start up.

7. Other Interpretive Programs

The Marsh Lakes Overlook was completed in 2008. The Overlook is designed to draw travelers from Highway 83 to the refuge. It has parking, a large open kiosk with places for displays, and offers a great view of the Marsh Lakes and Sandhills.

In 2010, the contractor was out and installed the 12 interpretive panels at the Marsh Lakes Overlook. This completes this project consisting of the overlook, interpretive panels, nature trail, viewing scope, bench, access road, parking, and highway approach. It is an attractive facility and is pulling people off of the highway for a visit.

The Sandhills Prairie Refuge Association hosted an open house for the recently completed Marsh Lakes Overlook. The event featured games for children, air boat rides, the nature trail, and cookies! The Association Board took an active part in pulling off the open house. Many compliments were received on the overlook and nature trail.



Figure H7. An open house was held at the recently completed Marsh Lakes Overlook on 27 June 2010. LV

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 2010 season was October 9 - January 12. There was not a split season this year. Only 2 hunters were out at Valentine NWR for the opener. Hunting pressure remained light during the season. The past several years the number of waterfowl hunters using the refuge has steadily declined.

Grouse season opened on September 18. It was a cool and rainy opener but those who go out and walked had fair success. We counted 12 groups of hunters but probably missed some. Participation in grouse hunting continues to decline and as in recent years, hunting pressure was light. The season was extended this year and ran through January 31, 2011 with a bag limit of 3. The season end date now coincides with the end date for pheasant. This extension will probably not result in many visits as most grouse hunters quit hunting in November. Most of the refuge is open to grouse hunting except the natural areas and around building sites. We do get quite a few out of state hunters. Hunter harvest is reported through voluntary wing collection boxes placed at five locations on the refuge. In 2010 we had 128 hunter days. Reported harvest was 214 prairie grouse including 21 chickens, 191 sharp-tails, and 2 unknown or hybrids. More complete information on grouse harvest can be found in section G10a.

Pheasant season opened on October 30. Twenty two groups were counted but there were probably more than that as all groups were most likely not contacted. We had hunters from Kentucky, Idaho, Iowa, Wisconsin, Colorado, and Nebraska. Success was fair with some hunters limiting but many with no birds. It seems as if interest in pheasant hunting is staying up even as interest in grouse hunting is declining. The pheasant season ran through January 31, 2011 with a limit of three roosters. 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 300 visits by pheasant hunters is made. Some people combine a pheasant hunt with a grouse, duck, or deer hunt.

The refuge is also open for dove hunting but few hunters come here specifically to hunt doves. A few are shot by grouse and pheasant hunters.

The Nebraska rifle deer season ran from November 13 through 23. We probably had more hunters this year than any year in the past. They also stayed longer. Most were from out of state and included hunters from Michigan, Minnesota, Wisconsin, Iowa, Colorado, South Dakota, North Dakota, Texas, Arizona, Alaska, Nevada, Utah, Kansas, West Virginia, Oregon, Louisiana, and Kentucky. Hunters noted the increase in hunting pressure and some said that they had lost access to private lands or had not been able to get permits in other states so were coming here. The Sandhills Unit which covers the west half of the refuge was especially busy. This year all rifle deer hunters were given a bonus white-tailed antlerless permit along with their regular permit. The bonus tags are not valid on the refuge. We spent quite a bit of time contacting hunters to inform them that the tags were not valid on the refuge. We gave out more than the usual number of warnings and tickets. Part of the problem is that hunters get their permit on-line and do not print out or read the information in the big game guide. Matt Fisher from Alamosa/Monte Vista came up to help with law enforcement. We wrote tickets for hunting in a closed area, shooting a mule deer on a white-tailed bonus tag, off road driving, speeding, drugs, and failure to cancel permits after shooting a deer.

A one page flyer was made up to inform deer hunters about deer regulations pertaining to doe harvest on the Refuge. In an effort to reduce crop depredations, Game and Parks has is selling October Antlerless and Seasons Choice whitetail doe tags. They also are including bonus whitetail doe tags with archery, muzzleloader, rifle deer, statewide buck, and statewide youth permits. The doe tags are being issued in an effort to reduce crop depredation. At our request, Game and Parks has not included the refuge as open to these doe permits. The refuge receives high hunting pressure, has low deer densities, and does not have a crop depredation problem on or adjacent the refuge. We also feel that additional doe harvest might reduce the herd and hunting opportunities on the Refuge.

A total of 86 deer was recorded as harvested during the rifle season. This includes deer taken under Sandhills and Calamus West general permits, state wide buck permits, and statewide youth permits. More complete information on deer harvest can be found in section G8. Numbers come from records obtained at Nebraska Game and Parks check station.

All of the refuge west of Highway 83 is in the Sandhills Deer Hunting Management Unit and all east of the highway is in the Calamus West Unit. In 1995 Nebraska Game and Parks removed Valentine NWR from the area where doe only Sandhills permits were valid. Starting in 1997, a statewide bucks only permit was also available. Starting in 2006 there were also youth statewide permits available. The refuge probably receives about the heaviest hunting pressure of any location within the units.

The refuge is also open for muzzle loader deer hunting. The season ran from December 1-31. A muzzle loader permit allows the harvest of both bucks and does of either mule deer or white-tailed deer. This year Nebraska Game and Parks included a bonus tag for an additional white-tailed doe with every muzzle loader permit. Bonus tags were not valid on the refuge. We had many more hunters out for this season than in previous years. Many were out of state hunters. This year Nebraska allowed powered scopes to be used on muzzle loaders. This might be part of the reason for the increase. We will not know how many deer were harvested during this season as hunters must check deer in via the internet or by phone. Neither request information on where the deer was shot. This information was available from check station in the past. We know at least 5 deer were shot by muzzle loader hunters. Refuge Manager Lindvall hunted parts of 5 days on the refuge and saw 91 deer of which only one was a mature buck. The heavy hunting pressure during the rifle deer season appears to have thinned out the bucks 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. This year Nebraska archery permits included a bonus tag for an additional white-tailed doe. This bonus tag was not valid on the refuge. In 2009 regulations on deer check in for archery were also changed to allow hunters to check in deer on the phone or via the internet as well as at check stations. Hunters using the new method were not asked if the deer were harvested on public or private land or the name of the public land area. This information had been collected in the past at check stations. We know of 1 deer that was taken during the archery season. Next year it will be legal in Nebraska to use crossbows during archery season and to archery hunt during rifle deer season. This may also increase hunting pressure on the refuge.

Coyotes can be hunted on the refuge from December 1 through March 15. A free permit is required. The permit was a postcard that the hunter returned at the end of the season. The refuge coyote permit for the 2010 -2011 season was put on the new one size fits all OMB approved form. The form is not as good as the postcard format we have used in the past but it does satisfy OMB! There is no charge for the permit. Running coyotes with dogs is not permitted. For the 2009-2010 season, 43 permits were issued and 15 returned for a 35 percent return rate. Successful hunters reported taking 11 coyotes. It is felt that successful hunters are more likely to return the cards. Many of the coyotes on the refuge and in the surrounding area have mange. Some have only hair left on their heads.

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. The lake now has enough water in it to sustain a fishery and perch were stocked here in 2009 and fishermen started fishing the lake in the winter of 2010. Nice catches of perch were made. There as a partial summer kill on Rice Lake in 2003. Rice Lake went dry during the summer of 2007 and no one fished it from 2008 – 2010. The lake started filling this year and some fish were stocked. Hackberry Lake was renovated in 2004 and the fish are now large enough and fishermen have started fishing here again. Nice catches of good sized bluegill and perch are common. Not enough counts were made to provide a good estimate for fishing visits. An estimate of 15,000 visits is made.

There was sufficient ice for ice fishing from December 1, 2009 through March 20, 2010.

Refuge size limits remained the same 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. Nebraska Game and Parks will lower the panfish limit from 30 to 15 fish starting on January 1, 2011. The aim of the regulation change is to spread out the harvest in time and among anglers, to encourage fishermen to release smaller panfish, and to standardize regulations across the state. The fishermen we have talked to are mostly not in favor of the change. It may have some positive effects here on the refuge where a lake with good fishing can receive very heavy fishing pressure.

Firefighter Alex Peterson shot an archery state record common carp that weighed 50 lbs 5 oz. He shot the carp on Dewey Lake on 13 June 2010.



Figure H9. A rather dubious record from Valentine NWR – the archery state record common carp from Dewey Lake. LE

10. Trapping

The refuge has a trapping plan and is open to trapping. No recreational trapping took place on the refuge in 2010. Muskrat numbers and prices were up and several trappers inquired about trapping them. This is the first year we have seen any number of huts on the refuge for quite some time. We plan on restarting the trapping program in 2011.

11. Wildlife Observation

Blinds were placed for observation of both sharp-tailed grouse and prairie chickens. The blinds were put on leks in Habitat Units 30A2 and 16B2. People come from all over the country and even a few from foreign countries to watch the grouse display. We have a reservation system for the blinds. The two blinds were booked for 40 mornings. Several groups also used the blinds without reservations. We need to put up signs by the parking areas noting that reservations are required.

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.

17. Law Enforcement

Refuge Officer Lindvall attended the 40 hour law enforcement refresher held in Artesia, NM from January 31 – February 5 and the annual LE requals held at Kirwin NWR on August 25 and 26. The training included Taser qualification and issuance of Tasers.

Refuge Officer Lindvall completed the questionnaire for security clearance. The process is now done on line. He was also interviewed by a contract investigator from the Office of Personnel Management.

Law Enforcement stickers were put on the truck used by Refuge Office Lindvall.

The permanent LE Officer position for the Complex was vacant for most of the year as Officer Jim Neely transferred to Alaska in May of 2009. A replacement was hired but had not completed training by the end of 2010.

Special Agent Mike Damico was up one weekend to check fishermen on the refuge, one pike case

At our request, Lloyd French in surplus acquisition was able to locate and transfer 5 sets of night vision goggles to our zone for law enforcement use. The goggles are valued at \$35,100! They should help us with poachers whose motto is “Night time is the right time.” The goggles were shipped to the Zone Officer and we had not received our pair by year’s end.

Refuge Officer Lindvall logged 444 hours of law enforcement in fiscal year 2010. Logs were sent in to the zone officer.

All notice of violations written in 2010 at Valentine NWR were logged into IMARS, the refuge LE database.

In calendar year 2010, there were 12 Notice of Violations issued for violations occurring on Valentine National Wildlife Refuge and Yellowthroat WMA. Numbers and categories are listed below. Officers Lindvall, Fisher, and Damico made the cases.

Fishing with too many poles - 1
Fish size limit violation – 1
Possession of toxic shot – 3
Failure to properly tag deer – 1
Hunt in Closed Area – 2
Off road driving – 1
Shoot mule deer doe on white-tailed bonus tag – 1
Speeding – 1
Possession of marijuana - 1

Total fines, liquidated damages, and costs assessed by year's end \$2,275
Total fines, liquidated damages, and costs collected by year's end \$2,275

At the end of the year we also started issuing written warning using the FWS form. The following warning tickets were issued;

Improperly cancel deer tag – 1
No hunter orange - 3

The US Attorney negotiated the fine for the trespass graze that occurred in the summer of 2009 on the Mead easement and the case was closed. The defendant has paid \$2,363.13 and owes \$147.35 for trespass grazing. More information on this case can be found in the 2009 Annual Narrative.

18. Cooperating Associations

The Complex has a friends group, The Friends of the Sandhills Prairie Refuges, which does projects on Valentine NWR. The group sponsors the book and souvenir sales at the Fort Niobrara Visitor Center and has a quarterly newsletter. Refuge Manager Lindvall attended the quarterly board meetings and provided articles for the newsletter.

This year the Friends Group sponsored the Marsh Lakes Open House and the Kids Fishing Day that are reported on in other sections of this narrative. The annual membership meeting was held on October 28 at the Bunkhouse Restaurant. We had a nice turn out and a speaker who gave an interesting talk on light pollution.

I. EQUIPMENT AND FACILITIES

1. New Construction

The solar powered fish screens built last year were installed at the outlets of Pony and West Long Lakes. The screens were put in place to keep carp from moving upstream into the lakes. The screens rotate to clear debris. Completion certificates were mailed to the US Army Corps of Engineers notifying them that the work had been finished. Lots of rain in the spring raised the water levels in both West Long and Pony Lakes to

overflowing and gave the screens a good test. We had no problems with the units. When checked the screens were clean of debris and handled the heavy flows. We added a beaver guard using an electric fence charger at the West Long Lake unit. The fence charger is connected to wires that are suspended above the water on rods held up by floats. The electric dangle wires are placed out in front of the unit.



Figure II. Solar powered, self-cleaning fish screen working at Pony Lake. MLL

Two high school students drew up plans for the self cleaning solar powered fish screens that we built last fall. The plans are posted on the internet in the 3D warehouse of Googlesketchup. The plans proved useful as others decided to build similar screens. The plans were provided to Nebraska Game and Parks fisheries biologists, a USFWS private lands biologist, and one private individual. Information was also sent to the editor of The Wildlife Society's *Wildlife Professional Magazine* and they plan on publishing information on the screen in the Field Notes section of the magazine.

A beaver guard using a fence charger was also placed in front of the culvert at Calf Camp Marsh under Highway 83. Nebraska Department of Roads requested that we do this as the beaver plugged the culvert and flooded the ditch along the highway. They had requested that the beaver be removed but we prefer the guard as the beaver is doing tree control and making nice ponds for wildlife upstream of the culvert.

2. Rehabilitation

Cherry County graded and added gravel to the Pony Lake Road from the Pony Lake sub-headquarters to where the road leaves the refuge to the east. They did the repairs at the request of the landowner to our east. In the past they would not work on this road section without being reimbursed. On a related note, the person that leases the land where the road goes on to private land called and said that US Government employees would not be allowed to cross the land he leases. He stated that he has a clause in his lease that prohibits giving permission for us to cross.

Nebraska Game and Parks Biologists Zac Brashears and Al Hanson met with Manager Lindvall and visited all the water control structures on the fishing lakes. They are interested in putting repair or replacement of some of the structures into their next 5 year plan. They were most interested in the Willow Lake Water Control Structure that washed out in 1997. Replacement of this structure would require a survey to determine the water level stipulated in a 1952 court order, perhaps a water storage permit, a survey of lake depths, and testing of the lakes water for alkalinity to see if sport fish would thrive here.

The rehab of the Pelican Lake Water Control Structure was completed by the contractor. This was a deferred maintenance project completed with Recovery Act funds. The cost of the project was \$33,708. Work done included adding sheet piling wing walls on both the upstream and downstream sides of the structure, installing tie backs for the sheet piling, placing filter cloth and rip rap rock on both the upstream and downstream side, and placing rock on the dike where the structure is located.



Figure I2. Sheet piling wing walls and rip-rap were added to the Pelican Lake water control structure. MLL

A culvert was placed in the Highway 83 right of way at the Marsh Lakes Overlook. We received a permit to do the work from the Nebraska Department of Roads. The culvert should keep the entrance road from washing out.

Two miles of boundary fence was replaced using grazing fees. The fence is that adjacent habitat units 7C, 8G, and 8A.

3. Major Maintenance

Wet weather in the spring flooded the east part of the Calf Camp Road and the Willow Lake Cut Across Road. The roads were also badly rutted by vehicle traffic. They were closed until fall when water receded and repairs made. The East End Access Road also flooded and the entire length of the road closed all spring and summer. By the fall the western part of the road dried up and was open as far east as Habitat Unit 37C. The western section of the road remained closed all year. This road is the only public access to the eastern part of the Refuge. Extensive repairs were needed before the the east half of the Calf Camp Road and part of the East End Access Trail could be opened for public use. Low spots were filled, culverts added, and rock placed on the road in some places.



Figure I3a. Spring rains flooded refuge roads. MLL

A letter of intent to apply for Emergency Relief for Federally Owned Roads (ERFO) was prepared and sent in. We are requested assistance with the East End Access Road, School Lake Road, and part of the Calf Camp Road. These roads were flooded and

closed to public access. Cherry County was declared a disaster area making us eligible for funding. On August 3 Mike Daly from Federal Highways, Emergency Relief for Federally Owned Roads was out to look at our flooded roads. He determined that the roads were not eligible for ERFO funded repairs. The problem seems to be that they will not help if regular maintenance has not been done on the roads. With one maintenance worker it is impossible to keep up repairs on over 30 miles of refuge roads.

Regional Office staff and Washington Office and 2 contractors visited the Refuge on August 4 to get an idea of our needs for roads funds and the usefulness of the road inventory. Our main problem is a shortage of maintenance staff and funding to keep the roads we have in good condition. One full time maintenance worker can simply not maintain all the facilities we have here. The road inventory has many errors and differs from the information in SAMMS which is using an old inventory. In fact the information in SAMMS is extremely inaccurate.

Rock from stock piles was placed and graded in all the potholes on Little Hay, Clear Lake, and the west Watts Lake roads. Most of the potholes were pounded out to where the base rock was showing. This maintenance will keep the base from eroding.

All the potholes and some of the cracks in the asphalt at the Hackberry HQ entrance road and parking area were filled with patch material.

334 tons of crushed limestone 1" base course rock was delivered to Pony Lake and Hackberry HQ. The rock cost \$29.90 per ton and will be used to maintain existing gravel roads.

234 tons of 3" ballast rock was delivered to the Pelican Lake rock ramp parking lot. The rock cost \$42.00 per ton and will be used as a base for portions of the Pelican Lake Road that are not yet rocked. We plan on placing rock in the wheel tracks only.

Extensive repairs were made to the Watts Lake dock which had been damaged by ice heave. The walkway was leveled, toe boards replaced, vegetation cleared, and supports replaced. The dock was not useable at all before the repairs.

Extensive repairs were made to the Calf Camp Dike. The water control structure was plugged and the large difference between the up and down stream elevations caused erosion and piping to occur. We were concerned that if the dike breached the water could damage US Highway 83. Regional Office engineering was contacted for assistance and the following repairs were made.

1. At the site where piping was occurring we installed a French Drain perpendicular to the dike using filter cloth and gravel. We put a clay plug in the dike. We also added clay, filter cloth and additional rip rap on the up stream side of the dike above this site. We used the excavator to pack all materials.
2. On the downstream side near the outlet culvert there was a depression in the toe of the dike. We filled this depression with sand, placed filter cloth over the sand, and added

additional rip rap. We used the excavator to pack all materials. This looked like possible old beaver damage to the dike.

3. At two locations on the up stream side it looked as if muskrats had burrowed into the dike in the past. We added sand to these depressions and then placed additional rip rap. We used the excavator to pack all the materials.

4. We removed some of the sand that had been deposited downstream of the outlet culvert.



Figure I3b. A French drain was installed where piping had eroded the Calf Camp Dike. MLL

Modifications to the water control structure were also made to prevent plugging of the structure with vegetation. This has been a problem since the structure was first installed. There was never sufficient current to carry vegetation up and over the flash boards. To fix this we made the following alterations. Notes of these alterations were made on the plans for the water control structure that we have at the office.

1. We removed all of the water control structure, with the exception of the cover, that was upstream of the slots that hold the flash boards in place. This included the inlet pipe and the upstream half of the riser culvert.
2. We welded 2 partial widths of sheet piling to the riser. These pieces go from the top of the riser down to the cement base of the riser.
3. We drove sheet piling extending out 11 feet 5 inches on either side of the riser. The sheet pilings were 13 feet long, 10 gauge, 18 inches wide.

4. We placed 3 by 3 inch angle irons 10 feet long on the face of the sheet piling and tied them back into the dike with 2 pieces of 5/8 inch rod 10 feet long connected to concrete anchors that were 16 by 16 by 10 inches. The angle irons were located 2 feet down from the top of the sheet piling.
5. We back filled and compacted soil behind the sheet piling. We also placed filter cloth topped with rip rap at the ends of the sheet piling.



Figure I3c. The Calf Camp water control structure was modified so as to prevent plugging up with vegetation. MLL

The information kiosk located along the north entrance to the refuge along Highway 83 was no longer needed due to the completion of the Marsh Lakes Overlook. This kiosk was moved to the west entrance to the refuge on State Spur 16B.

The outside concrete walls were repaired and painted on Quarters 1 and 2, the pump house, the tuber cellar, the barn, the machine shed, and the office. The buildings look a lot nicer with a fresh coat of paint and the holes patched up.

About 100 boundary signs were replaced on the north boundary of the refuge and along US Highway 83.

The Hackberry base station was changed to a system that runs off the Beaver Tower repeater rather than the tower located at Hackberry. The line from the tower to the office has been a constant source of problems. Hopefully this will make our system more reliable.

New carpet was laid in the bedrooms and hall of the Quarters 2 bunkhouse.

All the windmills on the refuge were checked and minor repairs completed. Some mills need major work that will be done this fall or with a contractor next spring.

The tree grinder that attaches to the skid loader was taken to the dealer for repairs. The grinder was not grinding trees as well as the one we borrowed from La Creek NWR last year.

4. Equipment Utilization and Replacement

We received 50 rolls of barbed wire and 300 steel posts off surplus from the National Park Service in Gering, Nebraska. The value of the surplus is about \$4,500.

A small lot sale was held and items surplus to our needs sold. We got rid on a backlog of junk that had accumulated over the years. Our metal pile alone was about 25 by 25 feet and 10 feet high.

We received 4 large culverts (4.5 by 24 ft) and a riser on surplus from Lee Metcalf NWR. We may use the culverts at Willow Lake to replace a washed out structure.

6. Computer Systems

7. Energy Conservation

The house trailer and the Trappers Shack were all winterized. To save energy, we do not heat these buildings. We also turn the heat down in the office at the end of the work day and turn the air conditioning off when we go home for the day.

8. Other

At our request the Nebraska Department of Roads removed the large dirt and manure piles from the Highway 83 right of way near the Marsh Lakes Overlook approach. We requested that the stock piles not be put there again. NDOR said they would look for an alternate site or try not to store dirt there for long periods.

J. OTHER ITEMS

3. Items of Interest

The 480 acre Yellowthroat WMA in Brown County is managed from Valentine NWR. The area has an excellent mix of grassland and wetland. There is a water control structure located between the marsh and lake on the area. The land was acquired in fee title from the Farmers Home Administration. Much of the sandy soil on the area was farmed under center pivot irrigation prior to acquisition. All has been seeded back to native grasses. The area is open to public use including hunting and fishing.

We visited the area throughout the year and noted that an adjacent landowner continues to use our access easement road to get to his trailer located south of the area. He was sent a letter advising him that he is not to use the road and that future use may result in trespass charges. The fence around the WMA was repaired in the spring and the water gap put up. Water levels were high and water went around the water control structure which was plugged by beaver.

There is a water level gauge on the water control structure. The top of the gauge reads 10.12 and is even with the top of the angle iron on the structure. This is a reference should the gauge be destroyed. The gauge is not tied to an elevation above sea level. Readings for 2010 were May 4; 10.20 and October 8; 8.92.

Nebraska Game and Parks conducted a survey of the lake at Yellowthroat WMA and found average or above Sandhills lake catch for bass, bluegill and crappie, with average or above sizes for all. Not many perch, but some on the big end. Ice fishermen had good luck there with both crappie and bluegill.

4. Credits

Refuge Manager Lindvall wrote sections A; D-1 and 4; E-1,4,5,6,8; F-7,9,10,12,13; G-11, H- all; I- all; J-3; K: Biologist Nenneman wrote sections B; D-5; F-1,2,5, 7 (monitoring); G-1,2,3,4,5,6,7,8,10,17. Photo credits; Mark Lindvall - MLL; Mel Nenneman – MN; Laura Vroman – LV; Alex Peterson – AP; Lauren Eaton – LE; Ethan Teter - ET.

K. FEEDBACK

We intend on continuing writing the annual narrative even though it is no longer required. It is the only historical record of what is done on the refuge and will hopefully be useful to future managers. The numerous databases that we feed will surely not tell the story of what happened on the land. Reports will be filed and eventually get lost or thrown out. Over the years I have often told people to put it in the narrative if you want it to be available at some time in the distant future. We often refer back to old narratives to answer questions and I hope we can learn from those who went before us.

