Wildlife

1992

A major emphasis of WNT is restoration and preservation of the biodiversity of the prairie/savanna landscape. The holistic approach to land management addresses restoration of natural communities consisting of plant and animal populations and their physical environment rather than the managing for the needs of an individual animal species or group of species. As a consequence, however, habitat will be created for a large number of wildlife species that lived on the landscape 175 years ago on what is now WNT. This wildlife diversity spans the spectrum from bison to butterflies.

Endangered and/or Threatened Species - The federally endangered Indiana bat, Myotis sodalis, was discovered on WNT in the spring of 1992. Two bats were mist netted by Dr. John Bowles, a professor at Central College in Pella, Iowa, several of his students and John Stravers, a raptor researcher. The presence of the bats indicates that one or more nursery colonies exist on WNT and is of special significance because this is the northwestern most record for this species.

Additional studies are being planned to gather information about population size and distribution of the bats. Changes in Indiana bat population and distribution will be monitored as prairie and savanna restoration progresses. It has been suggested that savanna could have been a historic Indiana bat habitat.

Waterfowl - Open water on the refuge is limited primarily to small artificial farm ponds and stock tanks. Waterfowl populations are being limited by the lack of existing or potential habitat. A few of the common species have been observed such as mallards, teal, and wood ducks. They are abundant on the ponds in the spring. Of note is the appearance of a few ringnecks and canvasbacks in stock ponds that would seem too small to offer enough water surface to get airborne again. Future survey work is expected to reveal the presence of additional species

Raptors - Red tailed hawks, marsh hawks, kestrels and barred owls have been observed on WNT. A formal raptor survey is planned for the future.

Other migratory birds - WNT is in its infancy and as such, there is much work to do. A concentrated effort to begin bird surveys will being in 1993. A preliminary bird study compiled as part of the EIS process by Dr. Jim Dinsmore of Iowa State University indicates that at present, about 174 bird species are likely to occur on WNT. As ecosystem recovery proceeds, the potential list could easily exceed 200 species. Of these, approximately 77 will probably use WNT for nesting and 87 migrate through the area without nesting. An additional 23 species permanently reside in the area and are winter residents as well as nesters.

Wildlife

Of the many species listed as neotropical migrants, 48 of these species has been seen on WNT, 18 are believed to nest here and an additional 30 are migrants through the Refuge.

Prairie and Savanna development will undoubtedly cause shifts in species diversity. In the northern portion of WNT, for example, prairie historically dominated the landscape. As such, woodlots and fencerows will be removed in this area and converted to prairie, improving habitat for neotropical migrants such as Dickcissel, Bobolink and Upland Sandpipers. Additional species such as Prairie Chickens, Short-eared Owls and Harrier Hawks could also begin to utilize WNT for nesting.

Although not observed in initial surveys, an Upland Sandpiper was heard on the Refuge by WNT staff in late spring, 1992. Although not endangered, there in concern about the status of this bird in the Midwest, so hearing their distinctive song was a special treat.

Prairie development could cause some species to decline in the northern half of the Refuge. Among these species are Yellow-billed Cuckoo, Eastern Wood-Pewee, Great Crested Flycatcher, Red-eyed Vireo and Wood Thrush. Populations of these migrants are usually associated with forested interior and could shift to the southern portion of the Refuge where savanna restoration and reconstruction is concentrated. These species are all uncommon on the Refuge and probably, at present, WNT only supports a few breeding pairs.

Other neotropical migrants well adapted to the relatively open canopy of savanna found at WNT include Black-billed Cuckoo, Ruby-throated Hummingbird, Gray Catbird, Warbling Vireo, Yellow-throated Vireo, Yellow Warbler, Common Yellowthroat, Rose-breasted Grosbeak, Indigo Bunting, Orchard Oriole and Northern Oriole. These species could increase with savanna development in the southern portion of the refuge.

These migrants expected to be nesting at WNT but were not observed in initial surveys after the migration season included Whip-poor-will, Blue-gray Gnatcatcher and American Redstart.

1993

3 Indiana bats were caught, confirming the presence of both adult females and survival of at least two offspring. Additional species netted included red bat, big brown bat, and evening bat.

Netting was attempted at 3 sites in 1993, though only the original 1992 site yielded bats. Activities were hindered by heavy rains, with flooding of Walnut Creek resulting in loss of nets and poles on one occasion. On many other occasions, wet weather resulted in poor conditions for bat netting activities.

Wildlife

In addition to capture activities, a study of woody species in a savanna likely to be a nursery colony site was conducted. Baseline data regarding the species diversity, DBH and frequency of woody species was collected in several permanent plots.
Second year data from a study by Bruce Menzel et al; A REGIONALIZED ASSESSMENT OF THE INFLUENCE OF RURAL NONPOINT SOURCE POLLUTION ON THE ECOLOGICAL INTEGRITY OF STREAM ECOSYSTEMS AND AN EVALUATION OF ASSOCIATED POLLUTION CONTROL MANAGEMENT was gathered this year. This three-year study of water quality on 14 watersheds in Iowa, Nebraska, and Kansas is jointly sponsored by Iowa State University and the EPA. The work involves monitoring of aquatic invertebrates and vertebrate populations, as well as characteristics of hydrology and water quality. Preliminary data analysis indicates that although Walnut Creek watershed was of median size and flow among 14 watersheds studied, it was among the three lowest in terms of fish diversity and biomass. In addition, Walnut Creek ranked highest in terms of atrazine and metolachlor levels, both of which are herbicides not used on the Refuge since 1992.

Two bird studies were carried out in 1993. Both of these Iowa State University projects were conducted by Timothy Bergin et al; THE EFFECTS OF LANDSCAPE STRUCTURE ON AVIAN COMMUNITIES IN AN AGRICULTURAL LANDSCAPE and EFFECTS OF LANDSCAPE STRUCTURE ON NEST PREDATION. Both studies focused on agricultural landscapes and included sites on WNT as well as off-refuge sites. Results are not available at this time.
An informal survey of earthworms on WNT, conducted by Dr. Samuel James, Fairfield, Iowa, revealed the presence of five native and five exotic species on the Refuge. This may prove important because native earthworms are apparently absent in northern Iowa, Minnesota, and much of Illinois. WNT appears to be on the northern edge of the range of native worm species. This suggests some interesting ecological issues, including the nature and degree of competition between native and exotic species and differences in historic and current nutrient cycling patterns in natural areas. It also points out the gaps in our knowledge of tallgrass prairie and savanna ecosystems.

Efforts to develop a framework for long-term research and monitoring program culminated in a meeting facilitated by the Service's National Ecology Research Center (NERC), Fort Collins, Colorado. The resulting report, MONITORING AND RESEARCH AT WALNUT CREEK NATIONAL WILDLIFE REFUGE, by James Roelle and David Hamilton, identified several factors important to effective restoration and reconstruction management. The report also contained initial suggestions for specific research questions to further the process of ecosystem reconstruction and restoration.

Walnut Creek NWR held its first official Audubon Christmas Bird Count on Sunday, January 2nd, cataloguing 33 species of birds (for details see 1993 Annual Narrative Report, page 33). Twelve people took part in this survey.

Wildlife

1994

Endangered/Threatened Species – Indiana Bats – Indiana bat work was limited to development of methodology for long-term studies of Indiana bats this year. A document entitled "Suggestions For Long-Term Bat Emphasis On The Federally Endangered Indiana Bat" was submitted in fulfillment of a 1993 study performed under Dr. John Bowles' direction. In this document, Dr. Bowles recommends methodology and general schedules for mist-netting, telemetry work, roost tree exit counts and micro- and macro-habitat study of Indiana bat summer habitat.

Prairie bush clover – on July 11th, 1994, material containing prairie bush clover seed (Lespedeza leptostachya), that was harvested from Flaherty Prairie (Clark County, IA, T73N, R27W, Section 35, SW4, NE4) under Threatened and Endangered Sub-permit number 93-38-R was delivered to WNT. This material was stored in a dry metal pole building until planting on the 29th of July and planted using an air seeder at a rate of 38 pounds per acre and an estimated rate of 50 seeds per square feet on 26 acres.

The site was located on WNT Planting Unit 22 (T-78 N, R-21-W, Sec. 16, SW4, SE4). Edaphic and topographic conditions on this site were matched as nearly as possible to conditions documented on sites in Iowa that support prairie bush clover. In a study of several site including Flaherty Prairie (sometimes known as Madison Prairie), prairie bush clover occurred on silty clay loams that are moderately to strongly sloping. On three sites in Clarke County, prairie bush clover populations occurred in clay loams with slopes of 14-18% or 18-25%. On a fourth site, this species occurred on clay loam with a slope of 9-14%. Planting Unit 22 on WNT included Tama silty clay loam, Ladoga silt loam, Judson silty clay loam, Ackmore silt loam, Matrisburg silt loam, Gara loam, and Alluvial land, Nodaway complex. Four of these soil types include slopes between 9 and 25%.

Other Migratory Bird – Avifauna – This year's Christmas bird count was conducted by volunteers and WNT staff on December 31st. Thirty-nine species and 3,038 birds were observed. The day was snowy with temperatures ranging from 28-35 degrees F.
A migratory bird count was conducted on May 14, again with volunteers and WNT staff. Sixty-six species and 778 birds were recorded.

A Breeding Bird Count was conducted in June and July. Relative abundance of 70 species of breeding birds were observed on three replicate 10-minute counts made on 106 circular plots at WNT by the ISU Cooperative Research Unit.

Results of the Christmas Bird, Migratory Bird and the Breeding Bird Counts are recorded in Table B (see 1994 Annual Narrative for Table – page 35).

Wildlife

Scientific Collections – Duplicate collections of butterflies, moths, ants, and terrestrial invertebrates which were taken on the Refuge during monitoring efforts occurring during the 1994 growing season are housed at Iowa State University.

Duplicates sets of plant collections made this summer are housed the University of Northern Iowa.

One of each of these duplicate sets will be available for use at WNT when the facility opens.

Refuge Ranger Shelly Sentyrz participated as FWS representative in the development of the Iowa Watchable Wildlife Guide. IDNR wildlife biologist coordinated development with Jim and Steve Dinsmore. The guide is due for publication in late ’95 or early ’96.

A small group of volunteers and Refuge staff participated in Christmas & Migratory bird counts.

1995

Endangered/Threatened Species – Indiana Bats: In 1995, an Indiana bat (*Myotis sodalist*) telemetry study was initiated by the Iowa Department of Natural Resource’s Dr. Daryl Howell. He was assisted by Biologist Drobney and volunteers. Mist netting and telemetry work was conducted in July. Capture of a lactating female would have enabled researchers to potentially track the female to a nursery tree. Unfortunately, the only bat captured was a male. Information is not available regarding the relationship of male bats to nursery colonies in Iowa.

Other Migratory Birds – A Christmas Bird Count scheduled for December 30th was cancelled due to the federal government furlough of WNT staff.

A Breeding Bird Count was conducted between May 15th and July 6th. A total of 88 species were recorded on 103 plots, six of which were not recorded during a similar study in 1994. These included: Belte4d Kingfisher, Ovenbird, Ruby-throated Hummingbird, Rufous-sided Towhee, Tufted Titmouse, and Woodcock.

Game Mammals – 1995 produces a bumper crop of pheasants on the Refuge. General observation of staff and visitors concluded a tremendous increase in population over previous years. Information from the Iowa DNR indicated that overall there was a decrease in the population, however Refuge staff felt this was not a good survey due to the timing and weather conditions and a slight change in the route due to construction activities.

Wildlife

Other species of game animals fared well during the year. There was a slight increase in the numbers of Bobwhite Quail on the Refuge. This was documented by an increase in the number of calls heard in various locations. Visual sighting of Quails were also up, although numbers bagged during hunting remained the same.

White Tail deer numbers continued to be stable or rose slightly on the Refuge. With the changes in the habitat, there is an anticipated decrease in use of the Refuge. This does not seem to have been the case yet. Numbers taken during hunting, from Iowa DNR figures, have dropped since the first year. This may be due to the fact that most hunters in this area do not hunt deer in the grass areas and stick to the timber areas. It has been noted by staff that an increase in numbers of deer utilizing the grass as cover occurred even when hunting pressure in the woods was heavy.

Wild turkey have seemed to increase on the Refuge with two broods of young birds reported to the office. Last year we had a report of a destroyed nest but no sightings of successful nesting were reported. Actual numbers of birds were not surveyed; however several anecdotal reports were turned in. There was one report in November of "several" birds being flushed near one of the prairie remnants in the northern portion of the Refuge. This was the first time a sighting had been made in this area.

Refuge Ranger Sentyrz served on the steering committee of the *Iowa Wildlife Viewing Guide* published in 1995 by Falcon Press. Walnut Creek NWR is one of the 77 wildlife viewing sites around Iowa in the 100 page guide.

"Summer Habitat Requirements of the Indiana bat (*Myotis sodalis*) in Iowa" - Daryl Howell of Iowa DNR directed a study of the federally endangered Indiana bat with funding through Service Section 6 money. This study involved mist netting, telemetry work, and habitat description of roost trees on WNT. Such work would be used to develop guidelines for identification and protection of summer habitat for Indiana bats.

"Incorporating the Insect Community into Prairie Restoration Efforts: A Case Study of the Regal Fritillary Butterfly (*S. idalia*) at Walnut Creek National Wildlife Refuge in Iowa" – Dr. Diane Debinski of ISU and graduate student, Liesel Kelly, began an ecological study involving introduction of the regal fritillary (*Speyeria idalia*) and their larval host plant, the bird's foot violet (*Viola pedata*) to the Refuge. In addition to studying larval food preference, and reintroduction success, relationships between insect mortality and timing of prairie burns will be investigated. During the summer, prairie violets (*Viola pedatifidia*), a potentially critical larval food host for the regal fritillary was successfully introduced to WNT at four sites. In each site, a plot containing 200-300 plants each were established. Regal fritillary butterflies were captured from Iowa remnant prairies in an attempt to induce reproduction in the lab. The intent was to introduce lab-reared butterflies into the field and track survival. This is the first year of a two-year Master's project, and a long-term regal fritillary study, and as such, data is not yet available to report. However, researchers are modifying methodology to accommodate difficulties in successful lab rearing of the butterflies.

Wildlife

Survey of Breeding Birds, Walnut Creek NWR
This project is funded by Regional non-game funding using the same methodology as the 1994 survey to monitor the activity of breeding birds. A report was submitted by Dr. Erwin Klaas, National Biological Service, Iowa Cooperative Fish and Wildlife Research Unit, Iowa State University and is available at WNT.

In 1995, a volunteer made a potentially meaningful scientific contribution in the process of seed collection for WNT. Rayford Ratcliff, a retired carpenter and keen ecological observer, noted that the gentian population he had harvested from last year and was preparing to harvest again this year had unusual looking individual. He brought this information to the attention of Biologist Drobney, who visited the site. Drobney believes the unusual individual may be a new state record for Iowa that is a hybrid of the creamy gentian (*Gentiana alba*) and the downey gentian (*Gentiana puberulenta*). The hybrid is named *Gentiana curtisii*.

Several prairie violets (*Viola petadifida*) were planted on the site as a part of a research project involving introduction of the regal fritillary butterfly. It is hoped that this remnant could be a good introduction site for the regal fritillary because it is dominated by prairie species and species important for the butterfly should be relatively easy to introduce. In addition a large populations of whorled milkweed exists on the north half of the prairie, and the green milkweed (*Asclepias viridiflora*), and common milkweed (*Asclepias syriaca*) exists occasionally on the prairie.

1996/7

The Breeding Bird Survey was supported by a $2,500 grant from the Non-Game Bird Program in 1996 and $2,800 for 1997.

Walnut Creek National Wildlife Refuge Winter Bird Monitoring. Erwin Klaas, Unit Leader of the Iowa State University Research Cooperative Unit.

A winter bird monitoring project was designed and implemented using volunteer observers to monitor temporal changes in occurrence and relative abundance of wintering birds following prairie and savanna restorations and WNT, and provide recreational opportunities for area birders to enjoy WNT and participate in the acquisition of important data.

The Refuge is divided into polygons of about 160 acres. Observers census two polygons once for each month from December through February. The total 28 polygons on the Refuge are surveyed three times (once per month) using a minimum of 14 observers. Observer bias is avoided by randomly assigning two plots to observers each month such that no observer surveys the same polygon twice in one season.

Wildlife

In October 1996 WNT received the first eight bison for the WNT starter herd! Of the initial eight animals, four were bulls (a three-year-old, a two-year-old, and two yearlings) and four were cows (2 three-year-olds and 2 two-year-olds).

To increase genetic diversity six bison from Wichita Mountain NWR in Oklahoma, were introduced in 1996. Of these animals three were bulls and three were cows (all six-month olds).

Four bulls (a two-year old, a yearling, and two six-month olds) and four cows (a two-year old, a yearling, and two six-month-olds) were introduced from Ft Niobrara NWR on October 8, 1996. On April 26, 1997 another six-month-old cow was introduced to the herd. In that same spring the first bison calf was born on the Refuge from a cow that was pregnant at introduction time.

Addition of bison to the Refuge has resulted in several media events and a great deal of interest from visitors and staff alike. Former Congressman Neal Smith, who obtained the congressional appropriation that initiated the Refuge, witnessed initial introduction of bison with other dignitaries and Refuge staff. Cars have begun to regularly travel through the bison enclosure and bison-watching has become a popular sport.

On February 20, 1997, four bull elk were introduced in the 750-acre enclosure with the bison. There was some concern that the elk may jump over the fence when released or within several days of release, and as such, two of the animals were fitted with radio collars in order to more effectively locate and retrieve the animals in such a case. However, all elk seemed content to remain in the enclosure.

Bison enclosure – In preparation for the arrival of the bison, a contract was let in 1996 to construct 30,000 linear feet of 8-ft high, high tensil woven wire fencing. This contract was let in late May and completion was in late September. The fence encloses approximately 740 acres. Further preparation for the bison arrival was completed with construction of the two cattle grates, one at each end of the bison enclosure drive-thru. These grates are 24 feet wide and 16 feet long each. The contract for this work was let in August and completion was in October. Care had to be taken to make these grates strong enough to handle the traffic of farm machinery and loaded grain wagons as this road is the current farm-to-market road, serving this section of Jasper County.

1998

Reintroductions – Regal Fritillary Butterfly Habitat Development – A total of 800 prairie violets were planted in 10 experimental plots at the Refuge during May, 1998. These plots will provide habitat for regal fritillary butterflies being introduced as a part of a research

project at WNT. And will serve as the basis of a new experiment on Regal Fritillary reintroduction.

A total of 1,000 nectaring plants were planted around prairie violet plots to augment existing nectaring sources.

1999

During summer 1999, Craig Olawsky, NSNWR's Operations Specialist, observed five singing male Henslow's sparrows (Passerherbulus henslowii). Within a week, he also spotted a female.

During the summer of 1999, three nine week internships for college students were sponsored by the Friends of the Prairie Learning Center. Work of the students focused on ecological restoration and research at the Refuge, but included environmental education and operations-type work as well. Interns participated in the following activities:

-Planted 990 prairie violets (Viola pedatifida) in 10 plots (5 bison area, 5 south of PLC) and provided follow-up care of plantings as a part of the regal fritillary butterfly reintroduction project

-Participated in the control of exotic species including Canada thistle (Cirsium arvense) , musk thistle (Carduus nutans), bull thistle (Cirsium vulgare), tall thistle (Cirsium discolor), reed canary grass (Phalaris arundinacea), and sweet clover (Melilotus alba and M. oficionalis).

-Propagated prairie plants from seed and from vegetative cuttings, transplanted seedlings to 8-inch conetainers, and transplanted several species of greenhouse grown plants to prairie plantings. Learned and performed greenhouse care including fertilization, and kept records of care.

-Collected prairie seeds in prairie remnants and dried and processed seed. Interns participated in developing the 1999 seed inventory, also learned and performed techniques of prairie interseeding.

-Assisted in planning and installing a misting system in the propagation greenhouse.

-Provided leadership by interpreting the ecology of the Refuge and by leading stewardship activities during two Friends Stewardship Saturdays, and during Buffalo Days

-Led teachers participating in Iowa Corps in stewardship activities

Wildlife

-Participated in breeding bird point-counts with Refuge staff member, Craig Olawsky.

Reintroductions – Past wildlife reintroductions provided Neal Smith NWR staff with the first bison gathering on November 3rd, 1998. Two of our bison have been vaccinated for brucellosis as part of a federal research project. A member of the project from Montana assisted with our roundup. We put the entire herd (with exception of one bull too large to fit down the alley way) through the handling facility; checking their weight and overall health. This year proved to be very interesting concerning the bison. To the best of our knowledge, one adult cow and four calves died due to apparent natural causes. However, six calves did prosper and, at the time of this narrative, our herd was up to 42.

Finally, after approximately 16 months, our four lonely bull elk were joined by five cows and a yearling bull. On April 28th, 1999, we received six elk from the National Bison Range at Moiese, MT. Again, similar to the bison herd, we lost a bull to natural causes. One of the cows had a calf, so our elk herd now stands at ten.

ISU professor, Dr. Diane Debinski, will be beginning efforts to reintroduce the Regal fritillary butterfly (speyeria idalia) in summer 2000. This rare prairie species was formerly listed as category 3 on the threatened and endangered list. In preparation for this project, plots of prairie violets (Viola pedatifida) totaling approximately 1000 plants were transplanted to prairie sites in June 1999. Together with plots planted in previous years, approximately 2,000 violets have now been planted for this project. The violets are the only food source for Regal fritillary larva and are essential to the reintroduction.

2000

Henslow's Sparrow Observations – 2000: The Henslow's Sparrow (Ammodramus henslowii) was again observed on the Refuge this year; however, this was the first time the birds were seen outside the bison enclosure; in this case, on the north end of the Refuge. The Henslow's is a species of special concern to the FWS and is listed as an uncommon resident in Iowa. Only a few places in the state offer reliable annual sightings. It is more common at lower latitudes and habitat preferences have been documented in those regions, but in Iowa, such data are patchy. They appear, however, to prefer areas with vast expanses of grassland adjacent to wet meadows. The areas also typically consist of a substantial amount of dead vegetation as well as a few scattered shrubs. We look forward to more observations in following years and hope to add to our growing database on this intriguing species.

Butterfly transects were established in all remnant prairies, savannas and wetlands for long-term butterfly monitoring, first established in 1994.

Wildlife

Coneflower Prairie is a 15 acre prairie remnant dominated by rough dropseed (*Sporobolis asper*). This year, new or relatively new species recorded on Coneflower Prairie include turtlehead (*Chelone glabra*), prairie phlox (*Phlox pilosa*), cardinal flower (*Lobelia cardinalis*), Indian turnip (*Cacalia tuberosa*), and downey gentian (*Gentiana puberulenta*). These are all conservative species (species that have a high fidelity to good quality prairie) and indicate that this prairie remnant is attaining greater floristic quality.

Dogleg Prairie is a 16 acre prairie remnant overgrown with woody species that has relatively high native plant species diversity. This remnant has been "adopted" by a Drake University course entitled "The Walnut Creek Watershed Experience". Under the direction of Dr. Richard Wacha and Biologist Drobney, students have participated in monitoring and stewardship activities including brush cutting and seed collection.

Regal Fritillary Internship June-July, 2000 - Jen Bovie, Biology Senior at Luther College. This on-going project is an attempt to reintroduce the rare Regal Fritillary butterfly (*Speyeria idalia*), a prairie endemic species under the direction of Dr. Diane Debinski of ISU and Biologist Drobney. Duties of the intern included survivorship counts of violet plots and upkeep of violet plots. Also, capture of Regal Fritillary adults from other Iowa locations, construction of butterfly cages, and placement of gravid females over violet plots. Other activities performed included the installation of butterfly transects throughout the Refuge, and the creation of an interpretive brochure and display for visitors. Jennifer worked in conjunction with Kristan Price, research assistant for Dr. Debinski. Though Kristan was working through research funding, she participated in many of the same activities as the interns. Kristan's position added power to get work being performed by interns done, in exchange for the collective effort that the entire group of interns contributed to accomplish butterfly collection and maintenance, prairie violet plot establishment, and enhancement of Regal Fritillary butterfly habitat in the vicinity of prairie violet plots.

Our bison population increased to 53 animals, as a result of 13 births and 2 deaths. These herds are on a continuous grazing regime within a 750 acre enclosure which is estimated to produce approximately 1,125,000 - 1,500,000 pounds of forage annually. Combined forage consumption by the animals is estimated to be no more than 450,000 pounds each year. The newly established prairie within the enclosure is capable of sustaining the current herd size at a 35 to 40% utilization rate, without slope corrections. Bison herd reductions will be made in 2001 and as needed to prevent habitat damage while still playing a vital role in the establishment and ecology of the prairie.

The Refuge currently supports 13 elk. During Spring 2000, radio collars were removed from 2 of the bull elk initially introduced to the Refuge. Of interest in the second event was the fact that after several hours of chase, the animal finally was successfully sedated and went down between two segments of the bison herd. The bison surrounded the elk and provided some challenge to Refuge staff and to the veterinarian who were attempting to remove the collar and revive the animal. Staff responded well, however, and the elk was up and running soon thereafter.

We also observed higher survival rates and more vigorous growth in the experimental plots of prairie violets (*Viola pedatifida)* on the burned sites. These small plants bloom in mid-spring and benefit from the fire-induced duff reduction. Regal Fritallary butterfly larvae use the violets as host plants and actively feed on them in spring, which raises an intriguing management question: while a spring burn increases violet survival, does it also inhibit butterfly larva survival?

Wildlife

No new animals were introduced to the bison or elk herd this year. The bison herd of 38 increased to 53 with the births of 15 calves which survived through the summer into the fall when they were counted during the round up. No further re-introductions are planned at this time.

Neal Smith NWR staff will conduct its second bison round up on November 1, 2000. ROS Smith is coordinating the effort with Montana State University, the National Bison Range in Montana and Fort Niobrara NWR in Nebraska. Maintenance Mechanic Boot and ROS Smith are making all the necessary repairs and preparations to the bison handling facility and ROS Heisler is working with and preparing the horses. Dr. Tom Roffe, DVM from Montana State University will collect genetic data. The bison will also be tested for various common bovine diseases and treated for eye injuries sustained from the tall grasses.

A total of 10 elk were introduced to Neal Smith NWR in 1997 and 1998. One mature bull died shortly after its release. Four calves were born during the spring of 2000 increasing the herd to 13. The herd remains healthy and moves throughout the enclosure. They can often be seen from the auto tour route.

House sparrows have been an intermittent problem in the seed storage facility and trapping is an on-going effort. Birds are able to enter the building through open doors and other small openings. Sparrow traps are baited with seed and water. The use of water escalates the success of the traps during the summer and the building remains relatively bird free for short periods of time.

Mice are a continual problem and are dealt with through the use of bait stations and pellets of zinc phosphite. Zinc phosphite has no carryover properties so secondary poisoning is not a problem.

2001

First annual butterfly count accomplished with 209 individuals counted Henslow's sparrow population is on the increase.

Breeding Bird Point Count - The breeding bird point count data on the Refuge has been collected for the last 8 years, starting in 1994. Over 120 randomly selected points were established with an approximate equal number of points in each of the 4 habitat types defined on the Refuge: riparian, crop, woody, and grassland. Eighteen of the points are in the bison confinement area. The observer stands at the point for 10 minutes documenting the birds seen and heard within 0-25, 25-50 and >50 meter distance of the point.

As the crop ground is converted to prairie plantings, the birds associated with crop ground are becoming less common and prairie or grassland birds are becoming more prevalent. For example, there were very few horned larks and vesper sparrows seen or heard in the crop areas this year. Conversely, Henslow's sparrows have been recorded on two new grassland points. The increased number of Henslow's observations suggests the prairie plantings are developing well into what was once pristine Iowa landscape. Also, the fact that this species is not common makes this trend more important to document.

The red-winged blackbird (RWBL) is such a generalist that it appears in all 4 habitat types and is consistently the most abundant species present. For the 2001 count, there were 122 RWBL

counted on 53 different points. A grassland bird, the dickcissel, was also quite common and also the American goldfinch. The most common introduced bird on the Refuge is the ring-necked pheasant. However, they were not recorded very frequently this year and sitting broods were also down from the previous year. A harsh winter and a cool, wet June were the likely reasons numbers appeared to be reduced. Ten species were detected only on a single count: American crow, cedar waxwing, eastern meadowlark, eastern phoebe, great-crested flycatcher, horned lark, loggerhead shrike, purple martin, rufous-sided towhee, and red-tailed hawk. There was a total of 55 species identified in this year's count.

Fourth of July Butterfly Count - On July 22, 2001, the first Fourth of July Butterfly Count was taken at the Refuge by Erma Selser and Stephanie Shepherd. This survey was part of a volunteer nationwide count similar to the Christmas Bird Count, and is conducted to contribute to a nationwide overview about the numbers of butterflies and butterfly species present from year to year. By identifying butterflies at the Refuge, we hoped to update the list of butterflies present and increase the public's interest in insects and other invertebrates.

Specific rules and reporting of the data can be found at www.naba.org. Sites surveyed on the Refuge included the Savanna Trail, Tallgrass Trail, Basswood Trail and Lone Oak remnant. Participants walked these trails and areas noting any butterflies and numbers present over a four hour period on one of the hottest days of summer. There were 209 total individuals found. This included: 5 Papilionidae (swallowtails), 51 Pieridae (whites and sulfurs), 90 Lycaenidae (hairstreaks), and 63 Nymphalidae (brushfoots). No Hesperidae (skippers) were found.

The most numerous single butterfly species were the more common ones. Among the Pieridae were: *Eurema lisa* Little Yellow (21), *Colias philodice* Clouded Sulfur (11), *Pieries rapae* Cabbage White (10), and *Colias eurytheme* Orange Sulfur (9) were found. Among the Lycaenidae were: *Everes comyntas* Eastern Tailed Blue (68), and *Celastrina landon* Spring Azure (20). The most numerous species among the Nymphalidae was *Phycoides tharos* Pearl Crescent (37). Lower numbers of individuals were spread among another 6 species from the family. It was surprising that no Hesperidae were found. The fact that the count took place on a hot afternoon with the temperature above 95 degrees Fahrenheit probably affected the species and numbers seen. The data from next year's count will provide more information about species and number of butterflies present.

Refuge Butterfly Transects on Plantings - A second butterfly survey ran from May 19 through August 13, 2001, by Erma Selser and Stephanie Shepherd. This survey compared the difference in butterfly number and species from one reconstructed prairie site to others planted in different years. Because different butterflies may use different flower sources for food, there should be a difference in butterflies at different sites due to age.

Transects 100 meters long by 10 meters wide were established and flagged at 15 different planting sites. Two sites were set up for each year. Every 10 meters were marked so butterfly presence could be identified. The butterfly and flower association were noted. Photographs were taken to document butterfly presence and plant association when deemed necessary. Analysis of the results is ongoing and will be completed in winter, 2001.

Henslow's Sparrows - This was an exciting year for our bird enthusiasts working in the field as the rare Henslow's Sparrow (*Ammodramus henslowii*) made a record-breaking number of appearances. This secretive little grassland species did not show up on any yearly point counts

until 1999, when it was observed only once. In 2000, the annual count produced two observations,and this year that number climbed to three. These are the official results generated by the out-sourced point counts performed yearly by Bret Geisler from Des Moines. The remarkable news from this year, however, came from the many observations from Refuge employees, interns, and visitors.

Two territorial males were first observed in early spring just off the entry road northeast of the Learning Center. Over the next month, several more were heard along the entry road north of the first sighting. Throughout the rest of the season, Bio Tech Paul Charland and Biology intern Ron VanNimwegen continued to see and hear Henslow's Sparrows in several other parts of the Refuge. The old interim office produced several observations and one was heard near the Learning Center by visiting birder Don Hollsums from Colorado. Finally, the official point count found two individuals in the bison enclosure and one as far north as Highway 163.

No new animals were introduced to the bison or elk herd this year. The bison herd of 38 increased to 53 with the births of 15 calves in the spring of 2000. This count was confirmed during the fall roundup. No herd reductions were made during the roundup but genetics and other health information was gathered on each animal. All animals were checked for previously placed pit tags or given new tags. During Spring, 2001, an additional 15 calves were born bringing the herd size to 68 animals.

Neal Smith NWR staff conducted its second bison roundup on November 1, 2000. Operations coordinated the effort with Montana State University, the National Bison Range in Montana and Fort Niobrara NWR in Nebraska. All the necessary repairs and preparations to the bison handling facility were completed and the horses readied.

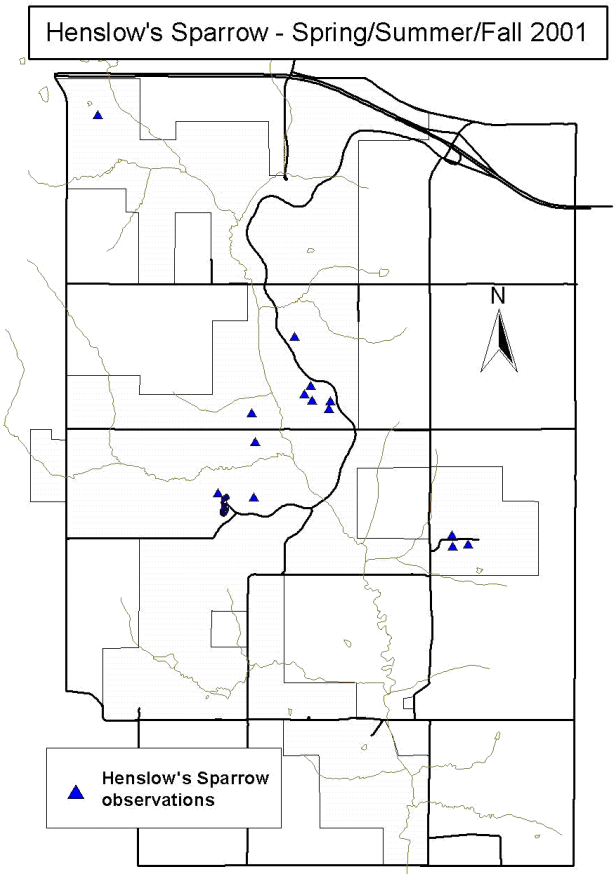
Dr. Tom Roffe, DVM and two assistants from Montana State University collected genetic data and gave the animals a general physical. The bison were tested for various common bovine diseases and treated for eye injuries sustained from the tall grasses.

The Bison Range sent Loren Clary and Fort Niobrara NWR sent Mark Purdy and Casey McPeak to lend us a hand. These cowboys joined ROS Heisler and used their horses to drive the herd into the handling facility. It was an exciting roundup with folks on horses and the rest of us closing gaps and getting up close and personal to the bison using an old Chevy Blazer and a Jeep Cherokee. It took only half a day to process all the animals once they were in the holding pens. The rest of the staff worked the handling facility gates and pushed the bison through the facility. It was a great experience and fun for all who were involved. Planning the next roundup began in August, 2001 with repairs and revisions to the handling facility. The temporary drive fence that was built before the last roundup was modified and strengthened with 8" diameter poles and 8' bison fencing. Since animals would be excessed for the first time, the biologist carefully went through the records and selected which animals would be removed from the Neal Smith herd. Approximately 25% of the animals would be donated to Native American tribes and the rest would be put out on auction to the general public. Letters for sealed bids were sent out and contacts were made with Native American Tribes including the Inter-Tribal Bison Committee for bison recipients. Fish & Wildlife Service herds have been genetically tested to be "pure" bison. This makes acquisition of FWS bison especially appealing.

ELK - The elk herd was diminished by the loss of a cow and an older bull at the end of winter. The cow was found with a fetus intact. Necropsy information showed that the animals died of no

exact cause. It is believed that this winter was colder with more snow pack than previous years and may have played a role in food availability. The last count on the elk herd in the fall of 2001 totaled 14 head.

House sparrows and mice have been an intermittent problem in the seed storage facility and trapping was an on-going effort. The purchase of plastic seed storage boxes has so far eliminated the need for this action by removing a food source. We will continue to monitor the situation.



Since we did not have this many eyes and ears tuned to the sparrow in previous years, we cannot know if the actual population has only recently increased. However, these birds have been shown to prefer large uninterrupted tracts of habitat, and it is safe to say that since the first plantings of 1992, we have greatly increased the extent of that very type of landscape.

Regal Fritillary Butterfly Reintroduction. Principal Investigator: Dr. Diane Debinski, Iowa State University. M.A. Graduate Researcher: Stephanie Shepherd. - Violet Plots: Until now, 20 violet host plant plots for the Regal Fritillary butterfly reintroduction had been established. Each plot consists of 99 plants and violet survival is being monitored under four treatments (burned, grazed, unburned sparse and unburned dense) across the Refuge. Initial results show that after three years, the violets are doing better on the burned as compared to the unburned dense, but the unburned sparse plots (violets planted into sparse prairie restoration plantings) are also doing very well. The bison-grazed sites seem to have fared the least well, but we think that this is more an effect of planting time rather than bison impact. During the spring of 2001, four additional

violet plots (of 99 plants each) were planted in the visitor center area. These plots will serve an important environmental education function given their close proximity to the visitor center trails.

Regal Reintroduction: In late August to early September, 2001, three Regal females were brought to the Neal Smith NWR. The later date was used in response to this new information regarding time required for egg maturation and time of egg-laying. Two of these individuals were from Ringgold Wildlife Management Area and one originated from Rolling Thunder State Preserve. The females introduced at Neal Smith NWR were put in 6X6 foot cages on two of the violet plots. These plots will be surveyed for caterpillars starting in early May 2002 when the violet plants begin to grow. Two female Regals were also brought in from Ringgold Prairie to the insect zoo at Iowa State University to attempt captive rearing. Many of the caterpillars died at early instars, but we have learned quite a bit about captive rearing techniques and hope to attempt additional rearing next year.

Initial contacts were made with the Inter-Tribal Bison Cooperative (ITBC) for bison donations. Other contacts included tribes not affiliated with ITBC. Donations were open to all Native American Tribes that were interested in obtaining pure bison genetic stock for building tribal herds. Other organizations eligible as bison recipients included local county conservation boards and other educational facilities with the means to care for the bison to use them to educate the public about the history of the tallgrass prairie.

Approximately 871 Girl and Boy Scouts and Cub Scouts and Brownies participated in on-site activities in FY01. Most scout groups participated in programs that include: (1) Endangered Species (2) Animals and Habitat (3) Animal and bird migration (4)Conservation

Brownies participated in animal, habitat, and watching wildlife programs; Jr. Girl Scouts studied Wildlife and Ecology; Sr. Girl Scouts took part in Wildlife and Stewardship activities; Webelos came for forestry and naturalist badges; Bear Scouts learned about “Sharing your World” and craft projects; Wolf Scouts participated in “Your Living World” and bird programs; and Boy Scouts worked on stewardship activities and helped to develop a 10 kilometer trail with an Eagle Scout project on the Refuge.

2002

Regal Fritillary butterflies return to the Refuge.

Bison round-up a success

Breeding bird point counts continued on the Refuge for the ninth straight year. The value of the data collected increases each year as we statistically document the changes in the abundance of and distribution of birds around the Refuge. Brett Geisler performed the counts again this year. The total number of species counted increased form 55 in 2001 to 61 in 2002. Once again the red-winged blackbird was the most commonly counted species, but was present on the second highest number of points. The species observed on the highest number of points was the American goldfinch at 45 out of 109 points. Points were classified as being in one of four cover types: herbaceous, riparian, woody, or crop. More birds were counted on points within riparian areas than any other cover type, with 237 birds counted. Woody areas were second at 199 birds,

followed by herbaceous areas at 123 birds, and crop areas produced only 56. Three points produced no birds at all and they were all in cropland.

Species observed, either counted or between counts, which are on the Service's list of Species of Management Concern for the Upper Midwest include the northern harrier, upland sandpiper, yellow-billed cuckoo, red-headed woodpecker, northern flicker, sedge wren, wood thrush, loggerhead shrike, dickcissel, field sparrow, grasshopper sparrow, Henslow's sparrow, bobolink, and eastern meadowlark.

Despite a generally mild winter, the Christmas Bird Count day (December 28), was very cold and windy. Possibly as a direct result of the weather, both human and avian turnout were low. Eight counters saw a total of just 448 individuals from 27 species on the day of the count and added one individual of one more species during the count week period. No rare or unusual birds were encountered, but one bald eagle, one rough-legged hawk, and two northern harriers were included in the count. Dark-eyed juncos were the most frequently counted species at 95 individuals; American tree sparrows came in second with 71 individuals; and house sparrows were third at 50. Charland has been working hard at increasing awareness of the birding possibilities on the Refuge within the local birding community, so we hope participation increases in the coming years. During the summer, a Fourth of July butterfly survey was conducted at NSM. The sites included the Tallgrass Trail, the Savanna Trail and the Basswood Trail. The count was taken on July 13, 2002. Field notes and photographs were taken during the surveys at each site. Butterflies, plants and plant associations were noted. No butterflies were netted or taken as specimens. Unknown or hard to identify butterflies were photographed using close-up techniques for later identification. Butterflies were identified according to Scott (1980), Heitzman and Heitzman (1987), Shull (1987), and Glassberg (1999)

The most species and individuals noted were on the Tallgrass Trail, with 17 species and 100 individuals. The Savanna Trail had 5 species and 14 individuals, and the Basswood Trail had 4 species and 17 individuals. The greater species diversity along the Tallgrass Trail is expected because this trail is longer and has more habitat types. It is of interest that no butterflies were noted along Basswood Trail in the woods. In this area, butterflies were only observed within 20 yards of the parking lot along the trail, or in the parking lot itself. Eighteen different species were observed combining data from all sites.

The Eastern Tailed Blue was the most numerous butterfly along the Tallgrass Trail, and Clouded Sulfur was the second most numerous. On Basswood Trail, Clouded Sulfurs were the most numerous.

The American Painted Lady was not seen in 2002, though common in 2001. This butterfly, however, tends to have boom and bust years, and thus their lack this year is not concerning.
Regal Fritillary Butterfly Indroduction Research - *(Investigators: Diane Debinski and Stephanie Shepherd, Iowa State Univ., Ames, IA).*

The research undertaken in the summer of 2002 at Neal Smith NWR had two main objectives. The first was to characterize the butterfly community and its relationship to the plant community in 12 planting units on the Refuge property. The second was a component of a longer project and was aimed at evaluating our efforts to reintroduce the Regal Fritillary (*Speyeria idalia*), a declining prairie endemic butterfly, to the Refuge.

Wildlife

To accomplish our first objective, butterflies were surveyed in 12 planting units chosen for the diverse levels of vegetative quality they possessed. Two 100 meter long transects were established in each planting unit and were surveyed for butterflies three times between late May and mid-August. Butterflies seen within the transect were identified down to species, and numbers of each species, their activity when seen and nectar plants used were recorded. A list of species seen during the surveys is indicated below in Table 1. In addition, twelve 0.5 X 0.5 meter quadrats per planting unit were used to survey the plant community three times during the summer in conjunction with the butterfly community. Plants were identified down to species whenever possible and their percent cover within the quadrat as well as number of ramets in bloom for each species was recorded.

These plant data have been used to estimate plant diversity, and to establish a coefficient of conservatism value for each planting unit. These data in turn are being used to determine if butterfly communities, through their abundance and diversity are responsive to differences in the vegetative quality of a reconstruction site. Information on the number of ramets in bloom and on the nectaring preferences of butterflies is being used to determine if nectar availability is important in determining butterfly community structure. These analyses will help us understand, when compared to data collected at other reconstructions as well as native prairies, the nature of how reconstructions are promoting and affecting butterfly communities.

Our second objective was an outgrowth of a 5-6 year ongoing project to establish, at the Refuge, a population of the declining prairie butterfly, the regal fritillary. In the early part of the summer established plots of the regal fritillary's host plant, the blue prairie violet (*Viola pedatifida*) were surveyed. Survival and spread of the violets are being monitored. Survival has been good among all the areas except those established in the bison enclosure. We also noted some limited spreading this summer with approximately nine new plants being recorded.

In the summer of 2001, three gravid regal fritillary females were introduced into two of the violet plots in two different areas. In mid-June of 2002 we began surveying those two areas for adult regal fritillaries. We caught and identified a male regal fritillary on one of the reintroduction sites. As we continued to survey various unrelated planting units as a part of the butterfly community study, we began seeing regal fritillaries in several locations around the Refuge, some of them removed a good distance from the reintroduction sites. We had also been finding regal fritillaries at a number of other new locations throughout central Iowa. We surmised from these observations that regal populations were high this summer and that individuals were probably dispersing to the Refuge naturally. It was decided to initiate a mark- release-recapture study at the Refuge and not to attempt the introduction of any new gravid females this summer.

The mark-release-recapture took place in three planting units where regal fritillaries were deemed to be most abundant. Seventeen individual regal fritillaries were caught, marked and released. All of these were males. Only two recaptures occurred and they were both of the same individual. In addition, we had 74 sightings of regal fritillaries in the three surveyed planting units. We marked three additional individuals outside of the three designated sampling areas and saw 20 more.

Table 1: Butterfly Species for Neal Smith National Wildlife Refuge, 2002.

Species Name	Common Name

Anatrytone logan	Delaware Skipper
Ancyloxypha numitor	Least Skipper
Cercyonis pegala	Common Wood Nymph
Chlosyne nycteis	Silvery Checkerspot
Colias eurytheme	Orange Sulphur
Colias philodice	Clouded Sulphur
Danaus plexippus	Monarch
Epargyreus clarus	Silver-spotted Skipper
Euptoieta Claudia	Variegated Fritillary
Eurema lisa	Little Yellow
Everes comyntas	Eastern-tailed Blue
Junonia coenia	Common Buckeye
Limenitis archippus	Viceroy
Lycaena dione	Gray Copper
Lycaena hyllus	Bronze Copper
Papilio glaucus	Eastern Tiger Swallowtail
Papilio polyxenes	Black Swallowtail
Phoebis sennae	Cloudless Sulphur
Pholisora catullus	Common Sootywing
Phyciodes tharos	Pearl Crescent
Pieris rapae	Cabbage White
Speyeria cybele	Great-spangled Fritillary
Speyeria idalia	Regal Fritillary
Thymelicus lineola	European Skipper
Vanessa atalanta	Red Admiral

Microhistological analysis of bison diets in Central Iowa on reconstructed prairie. -*(Summary of a presentation given at the 18th North American Prairie Conference by Smith.)* - Neal Smith NWR introduced bison to newly re-constructed prairie in 1996. The bison were released within a 700 acre enclosure in order to contribute to biotic interactions that would normally take place in tallgrass prairie habitats. Prairie that is in the process of reconstruction is fragile due to the lack of deep sod development and low diversity of plant species present. It is vital to closely monitor the impacts of bison on the prairie and to monitor bison activities and behavior, including diet preferences, within the enclosure. A scarcity of food habits information about bison within tall grass prairie habitats diminishes the efficacy of management decisions. Current literature that is available suggests that bison are grazers consuming primarily grasses and sedges with a preference for sedges when available. A vital aspect of managing bison within an enclosed area and protecting that area from degradation is a thorough understanding of seasonal food habits. Neal Smith NWR provides a unique opportunity to study the food habits of bison during tallgrass prairie re-construction and provide a sound basis for bison management in prairie environments.

Originally, the objectives of the 2 year study were to determine diets of bison within the 700 acre enclosure, identify key seasonal forage plants of bison within the 700 acre enclosure and to determine forage production and percent botanical composition within the 700 acre enclosure. However, due to illnesses and employee transfers, the project was changed to a 1-year pilot study.

Twenty-five fresh fecal samples, 50 grams each, were collected from bison each month for one year. A monthly composite sample was made from the twenty-five samples. Composite samples

were grouped by season and year for comparison: winter (December 22 through March 21), spring (March 22 through June 21) and summer (June 22 through September 21). Diet differences may exist between different age and sex groups so it was necessary to attempt to collect samples that represent the entire herd structure; calves/yearlings, cows and bulls. Fresh feces were collected immediately after animals had moved away from an observed area.

Diets were determined using fecal microhistological analysis. Each fecal sample was oven-dried then ground in a Wiley cutting mill using a 1 mm screen. A composite sample was made by measuring equal portions of each of the 25 samples collected each month. Five slides were prepared from each composite sample using the method developed by D. R. Sparks and J. G. Malechek using Permount Solution as a mounting medium. The slides were analyzed using 20 fields from each slide for a total of 100 fields. Percent composition and frequency of occurrence was determined for each plant species using the formula PC = A X 100/B where A is the occurrence of each plant species and B is the occurrence of all plant species. Final results of the diet analysis will be available in the 2003 annual narrative. (Literature citings are available upon request to the Refuge Manager.)

The effect of bison on prairie process rates and its significance for restoration. *(Principle Investigator: Dr. Brian J. Wilsey, Iowa State University)*. -The objectives of this project are to look at relationships between plant species composition and diversity, light and soil water availability, and net primary productivity and ecosystem carbon exchange as a function of grazing intensity. These objectives will be addressed by comparing processes within and outside of large exclosures built inside the bison enclosure.

Permanent bison/elk exclosures will be set up inside the enclosure. A variety of environmental data will be collected inside (no grazing) and outside (grazing) the exclosures. The plan is to build the exclosures so that they are big enough to allow for future small scale experiments and sampling to be added to the design. Within each grazed plot, estimate consumption and grazing intensity with small moveable exclosures (1 m x 1 m). By comparing the plant biomass in 0.25 m^2 subplots inside and outside the temporary exclosures, estimates of consumption (biomass in - biomass out)/time and grazing intensity (consumption/net primary productivity) can be made.

In each exclosure and grazed plot, the following environmental variables will be measured:

1. Soil water availability with TDR rods.
2. Net primary productivity, species composition, and diversity (species richness and evenness).
3. Canopy light capture.
4. Net ecosystem CO_2 exchange.

After some time has elapsed and differences begin showing up inside the exclosures, then seed addition experiments will be conducted. Seeds of several native, important species will be added to 0.5 m^2 subplots inside exclosed and grazed plots to look at how grazing might affect seedling establishment. Seedlings will also be counted in nearby control (no seeds added) plots. The diversity of the species pool will be varied by adding different numbers of species as seed to plots. Germination, elongation and establishment will be monitored.

During the summer, plots were established and time 0 data were collected. Sites were chosen to reduce visibility to Refuge visitors and those that remained visible will be the object of interpretive activities. Time 0 data were collected by clipping and weighing samples from all plots.

Preferential grazing of *Bison bison* and its contribution to erosion at Neal Smith NWR. - *(This undergraduate research project by Laura Elliot of Drake University in Des Moines, Iowa, will be completed next year.)* -Laura Elliot, a Drake University student has been conducting a bison behavior study involving observing time bison are using different areas of their 700 acre enclosure. Of special interest is the relationship of bison use of areas that have been planted to prairie within the last few years in drainages with varying degrees of erosion. These areas were mapped and plotted on a topographic map. Bison are being observed once per week for eight hours. Every ten minutes during observation periods, bison have been counted within and outside these drainages. Additional observations will be made this fall. All data will be analyzed to determine if bison are selecting areas randomly and if time spent in drainages is statistically higher than in other areas. If significantly more time is being spent in eroded areas, bison are probably greatly contributing to erosion problems in the enclosure. Such information can assist staff in adaptively managing to correct the problem.

Drake University Restoration Ecology Class, Instructor: Keith S. Summerville - In the fall of 2002, my (Summerville's) Restoration Ecology class participated in three major activities at Neal Smith NWR. First, students in the class conducted a short-term study to determine the effects of prairie age and management history on orthopteran communities (grasshoppers, crickets, and katydids). The class found that prairie age was a significant predictor of orthopteran diversity, but management history was the most important determinant of species composition. In addition, the class established a long-term experiment within one prairie patch to assess the effects of different management practices on populations of four thistle species. My students generated the experimental design in conjunction with Pauline Drobney and myself, and data collection is scheduled to begin in the spring of 2003. Furthermore, students in my class worked on the removal of woody species from a section of remnant prairie known affectionately by the USFWS employees as the "Dogleg". Management of the "Dogleg" remnant will likely become a regular component of the laboratory accompanying my Restoration Ecology class, particularly during months when the weather prohibits more formal experimentation.

Finally, I (Summerville) recently submitted grants to the Iowa Science Foundation and the National Geographic Society to fund summer research at the Refuge. The objectives of my proposed study are to inventory moth species diversity at Neal Smith NWR and test hypotheses for how variation in savanna size, isolation, and habitat quality affect moth communities. Moths will be sampled from savanna remnants in using blacklight traps, and relationships between the moth diversity and savanna area, isolation, and habitat quality will be examined using multiple regression. Thus, this research will generate baseline data on moth species occurrences in Iowa and provide insights on the value of degraded habitats in conservation efforts. Furthermore, data from this study will be used to identify critical thresholds in savanna size, isolation, and habitat quality below which lepidopteran diversity becomes significantly impoverished.

During spring 2001, an additional 17 calves were born bringing the herd size to 70 animals. The elk herd was diminished by the loss of a cow and an older bull at the end of winter. The cow was found with a fetus intact. Necropsy information showed that the animals died of unknown causes. It is believed that this winter was colder with more snow pack than previous years and may have played a role in food availability. A total of 11 elk remain in the herd from the original 10 that were introduced and 4 calves born during 2000.

Wildlife

Efforts focused on reintroduction of the rare prairie endemic regal fritillary butterfly, which have been on-going for the past eight years. This year a number of regals occurred on the Refuge. For more information, see Section 1.b. Studies and Investigations.

House sparrows have been an intermittent problem in the seed storage facility and trapping is an on-going effort. Birds are able to enter the building through open doors and other small openings. Sparrow traps are baited with seed and water. The use of water escalates the success of the traps during the summer and the building remains relatively bird free for short periods of time. However, with the on-set of very cold Iowa winters and heavy snow, the birds return. The water-proof heat mat placed under the trap last year did not improve trapping success.

Mice are a continual problem and are dealt with through the use of bait stations and pellets of zinc phosphite. Zinc phosphite has no carryover properties, secondary poisoning is not a problem.

Loren Lown, Polk County Conservation Board, contacted the Refuge inquiring about Federal guidelines for marking power lines to prevent bird strikes along a power line corridor that was being routed along the Carney Marsh County Wetland. Charland contacted Refuge volunteer and Friends' member Robin Fortney, Senior Environmental Coordinator for MidAmerican Energy Company (MEC), the utility company responsible for installing the power line. Charland also consulted with Bruce Ehresman of the Wildlife Diversity program within the Iowa Department of Natural Resources, who had recently mitigated a similar hazard involving white pelicans (*Pelecanus erythrorhynchos*) near a state-owned property, on possible mitigation techniques. Fortney, Lown and Ehresman collaborated to develop strategies for minimizing risk to waterfowl. MEC and the county eventually agreed on an action plan that involved line marking and post-construction evaluation. While no Refuge staff took an active role in the decision or installation processes, we were able to provide the necessary links that protected migratory waterfowl from a potentially hazardous situation.

2003

Bird Counts - The counts were done between June 7 and July 12. There were 120 point counts with 69 species in 810 entered data records and 1325 individual birds counted. Overall, the red-winged blackbird (RWBL) was the most common with 232 individual birds counted. Second was the common yellowthroat (COYE) with 90 birds recorded. The next three were the house wren (HOWR) 76, the American goldfinch (AMGO) 66, and the gray catbird (GRCA) 56. See the breakdown for all the species identified in the 2003 bird counts on Table 1.

There were 26 crop points, 34 herbaceous points, 30 riparian points and 30 woodland points. The crop points had 73 entered data records with 18 species. The most abundant were red-winged blackbirds (RWBL) and killdeer (KILL), both having been recorded at 16 of the 26 crop points. Herbaceous points had a total of 164 records with 31 species being identified. The most common species recorded was the RWBL with 25 records. The riparian points had the highest number of data records, 297, and the largest number of species, 53. The most common species recorded at the riparian points was the common yellowthroat (COYE) having been recorded at 24 of the 30 riparian points. The points in the woodland habitat had 43 species identified in 276 records. The house wren (HOWR) was the most common and had 27 records.

The bird numbers seemed to be high this year. By the middle of June, there were obvious groups of juvenile red-winged blackbirds flying around. The Henslow's sparrow (HESP) is steadily spreading out on the refuge. This year, HESP was recorded at 10 points with a total of 16 individual birds. The points range throughout NSNWR suggesting HESP, a grassland bird of special interest, is establishing itself well. Upland sandpipers (UPSA), another grassland bird of special interest, were recorded on 2 points in 2003. It has been recorded only on the north half of the refuge as it has traditionally over the past several years. That's not to say it doesn't inhabit the south portion of NSNWR, but UPSA, based on repetition of records at specific points over several years, is definitely an established breeding bird in the fields immediately south of Highway 163.

TABLE 1: Total Number of Points Observed and Total Number of Birds Recorded by Species

Common Name	Points Observed	Total Number
Red-Winged Blackbird	63	232
Common Yellowthroat	55	90
House Wren	41	76
American Goldfinch	39	66
Gray Catbird	42	56
Brown-Headed Cowbird	24	53
Northern Cardinal	33	42
American Robin	28	39
Dickcissel	28	39
Mourning Dove	27	36
Killdeer	16	32
Song Sparrow	26	31
Rose-Breasted Grosbeak	16	28
Blue Jay	13	25
Indigo Bunting	23	25
Barn Swallow	13	21
Downy Woodpecker	17	21
Sedge Wren	14	20
Black-Capped Chickadee	14	19
Grasshopper Sparrow	14	19
Eastern Kingbird	13	17
Northern Oriole	14	17
Eastern Wood-Pewee	14	16
Henslow's Sparrow	10	16
Yellow Warbler	13	16
Common Grackle	11	15
Red-Bellied Woodpecker	14	15
Unknown Meadowlark	11	15
White-Breasted Nuthatch	9	15
Willow Flycatcher	13	15
Bobolink	4	14
Cliff Swallow	6	14
Wild Turkey	1	14
Vesper Sparrow	11	13

Field Sparrow	9	12
Brown Thrasher	10	11
Ring-Necked Pheasant	4	11
Great-Crested Flycatcher	8	10
Red-Eyed Vireo	9	10
Eastern Meadowlark	9	9
Yellow-Billed Cuckoo	7	9
Northern Flicker	7	7
Orchard Oriole	6	7
Rufous-Sided Towhee	6	6
Horned Lark	4	5
Red-Headed Woodpecker	4	5
European Starling	2	4
Hairy Woodpecker	4	4
Tree Swallow	4	4
House Finch	2	3
Savanna Sparrow	3	3
Black-Billed Cuckoo	2	2
Cedar Waxwing	1	2
Cerulean Warbler	2	2
Upland Sandpiper	2	2
Western Meadowlark	2	2
American Redstart	1	1
Belted Kingfisher	1	1
Northern Bobwhite	1	1
Eastern Bluebird	1	1
Eastern Tufted Titmouse	1	1
Great-Horned Owl	1	1
Green-Backed Heron	1	1
Lark Sparrow	1	1
Ovenbird	1	1
Warbling Vireo	1	1
Wood Duck	1	1
Wood Thrush	1	1
Yellow-Breasted Chat	1	1

Table 1. Species of butterflies present and expected at each site 2003.

Species Present	Tallgrass Trail	Savanna Trail	Basswood Trail	Total
Black Swallowtail *Papilio olyxenes*	4			**4**
Eastern Tiger Swallowtail *Papilio glaucus*	2			**2**
Cabbage White *Pieries rapae*	9	1	1	**11**
Clouded Sulfur *Colias philodice*	6		1	**7**
Orange Sulfur *Colias eurytheme*	3			**3**

Little Yellow *Eurema lisa*	2			**2**
Eastern Tailed-Blue *Everes comyntas*	23		1	**24**
Great Spangled Fritillary *Syeyeria cybele*			1	**1**
Pearl Crescent *Phyciodes tharos*	4		1	**5**
Red Admiral *Vanessa atalanta*	3		1	**4**
Common Wood Nymph *Cercyonis pegala*	2			**2**
Monarch *Danaus plexippus*	5			**5**
Skipper	1			**1**
Total	**64**	**1**	**6**	**71**

Tenth year of breeding bird survey reports increased numbers of Henslow's sparrow.

Moth survey reveals over 500 savanna species of moth are on refuge.

Studies and Investigations - Dr. Diane Debinski, Iowa State University, Ames, Iowa - Research Topics: Regal fritillary butterfly reintroduction - In 2000, the first regal fritillary butterflies were introduced to prairie violet plots, in small cages. A second introduction of two butterflies occurred in 2001. In 2002, regals were found throughout the refuge. This year, several regal fritillaries were again observed, by Debinski, Drobney, staff and volunteers, but despite several exhausting attempts, only two regal fritillary butterflies, both males were caught. Capture attempts were abandoned in favor of observations, and again, researchers and staff verified regals occurring on multiple sites on the refuge. This indicates that a regal butterfly population has successfully been introduced after 8 years of establishment of plots of the larval obligate host food, and several failed experimental attempts at lab rearing. Future monitoring will continue.

Following are research summaries written by researchers at NSM - Dr. Keith S. Summerville, Drake University - Research Topics: Moth survey - In the spring of 2003, with research support from Pauline Drobney, I submitted grants to the Iowa Science Foundation, Prairie Biotic Research, Inc., and the National Geographic Society to fund research at Neal Smith National Wildlife Refuge. The objectives of my research were to inventory moth species diversity at Neal Smith National Wildlife Refuge and test hypotheses for how variation in savanna size, isolation, and habitat quality affect moth communities. Moths were sampled May – August 2003 from savanna remnants in using blacklight traps, and relationships between the moth diversity and savanna area, isolation, and habitat quality will be examined using multiple regression in spring 2004. Thus far, I have identified 513 species of moths from 13 savanna and woodland patches at the refuge. Several species from the refuge are known to be prairie-dependent, including the tiger moth *Grammia virguncula* (Lepidoptera: Arctiidae) and the underwing moth *Catocala alabamae* (Lepidoptera: Noctuidae). At least one species new to science has been discovered; specimens have been forwarded to Dr. William Miller at Minnesota State University for future description. In conjunction with P. Drobney, I am building a voucher collection of all species captured on the refuge for inclusion in the biodiversity collection at the Prairie Learning Center. Several drawers of specimens were deposited at the Prairie Learning Center in November 2003.

Wildlife

With our herds of both bison and elk at Neal Smith NWR, we need to keep an eye on the overall health and well being of the herds for their sake as well as try to maintain an accurate count of each herd for informing the public.

Twice a week we monitor the herds. We check for total numbers of animals in each herd, overall appearance and health of each animal as well as the activity level of the animals based on the season and the activity level of the remainder of the herd. We check the number of calves born to each herd and document the first sightings of each calf to give us an idea of the approximate date of their birth, and monitor their growth.

We estimate 35 total bison, including the four calves that were born this year. The total numbers are uncertain due to the fact that we have a number of bulls on the refuge that are loners and stay by themselves. This makes it hard to count the total number because with the loner bulls, the herd becomes scattered throughout the entire enclosure instead of all the animals being localized in one area. As a whole, the bison herd appears to be in excellent condition going into winter. The calves have fattened up and the adult cows and bulls are also putting on a good layer of fat and donning their winter coats. During the heat of the summer, the bison were very sluggish and lethargic, usually hanging around more shaded areas and the pond.

Being secretive animals, the elk are much more difficult to monitor and count than the bison. Throughout the summer the elk were very rarely observed, except during dawn and dusk hours of the day. Even during these times usually only solitary animals were observed, most of the herd remained within the confines of the wooded areas to ride out the heat of the day. As fall approached, and subsequently the rut, the elk became more visible to refuge staff as well as visitors. We started to see bulls sparring for dominance and the right to breed with the harem of cows. We observed at least five bulls within the herd, two of which are large 6x6's with impressive sets of antlers. The others are slightly smaller. There is some debate as to the total number of elk calves that were produced this year, some say as many as five and others say as few as one. There are several cows within the herd that are yearlings, these may have been misidentified as calves. The total number is 22 animals. The health of the herd looks to be very good. The bulls appear to be large bodied, strong and free of injuries and several have grown impressive sets of antlers, a testimonial to their good health. The cows are fat and active, also free of any injuries and the calf/calves appear to be growing well and all seem to be ready to head into winter.

Bison Fecal Study - Since May, 2003, the biology department has been cooperating in a bison fecal sample and media survey on the 35 bison within our herd. The relatively "wild bison," have been confined to a 740 acre enclosure on the refuge. Dr. Joseph Craine from the University of Minnesota had originally questioned the nutrition that the animals had been getting. Based on studies prior, his colleagues had come to the conclusion that the bison did not have enough nutrition to survive, as they had done for hundreds of years. This became the basis for the study.

The study consists of three basic portions. First, taking a media sample from a designated location in the enclosure and second, retrieving a resin bag which is buried for a one month period. Thirdly, fresh fecal samples are collected from any willing donors in the herd. By first taking a media sample from a designated area within the enclosure, Dr. Craine can decide if the animals are getting enough nutrients in their diet. Layers of various species of vegetation within the outlined area are trimmed and collected. The sample is then dried, tagged and placed into plastic bags to be sent to Dr. Craine's lab at a later time.

Every month a resin bag is dug up and secured to later be sent in for testing. By doing this, it can be concluded as to whether the soil nutrients are sufficient to the nutrient requirements of the bison. After the bag is retrieved, a fresh bag is then placed in the ground and recorded by GPS.

The third portion of the survey is the collection of fresh bison fecal samples. At minimum, six different fecal samples were collected for testing. To do this, the bison herd is first located within the enclosure perimeter. This is done by using a two-person, all-terrain vehicle and just a hint of knowledge as to where the bison may be at a given time throughout the day.

Once the herd is located, an escape route is planned out. The collector and the driver discuss various routes to safety in the event that the herd decides to charge. Once a plan is created, the slow approach is made. As the collector and the driver near the herd, the collector walks beside the vehicle to make him/herself appear much larger. Caution is taken to approach so that the collector is never put between a cow and her calf. Generally, the curious animals watch intently as the approach is made. The collector hopes that the herd will become annoyed by the incoming vehicle, slowly wander away and allow fresh droppings to be collected and secured for testing.

We have found it is virtually impossible for the study to result in 100% success after just one day of collecting. Days and days of collection at times were necessary before the six samples were collected. A few hours per day were generally the rule to try and collect samples. Anything more than that compromises the safety of the collectors.

At current date, several samples have already been collected and sent in for study. The refuge staff is eagerly awaiting the arrival of the results from Dr. Craine's lab.

Microhistological analysis of bison diets in Central Iowa on reconstructed prairie - Christy Smith – final report - In 2002, ROS Smith undertook a study to analyze the bison diets. A number of problems arose which precluded her from completing the two year analysis. This is the 2003 report of her findings to date.

Table 1: Percent composition of plants in bison diets by season on Neal Smith NWR 2001-2002

PLANT	FALL	WINTER	SPRING	SUMMER
Smooth Brome	**25**	**35**	**38**	**12**
Partridge Pea	**19**	0	0	0
Canada Wild Rye	12	9	0	9
Indian Grass	12	8	17	11
Foxtail	12	**35**	5	0
Red Clover	7	7	7	10
Big Bluestem	7	0	**26**	**55**
Percent Total	**94%**	**94%**	**93%**	**97%**

Fecal samples were gathered the first week of each month. October, November and December are combined as the Fall category; January, February and March as Winter; April, May and June as Spring; and July, August and September as Summer. Data that indicated a percentile of 5% or

above was considered to factor in error. Key species for ungulate diets is usually determined at the 3 to 5% or above level. Most plant species consumed at levels below 3-5% are possibly incidental and may not indicate any real selection taking place.

Bison diets were the most diverse in Fall with 94% of their diet consisting of 7 plant species. Smooth brome (25%) and partridge pea (19%) made up the bulk of the diet, followed closely by Canada wild rye (12%), Indian grass (12%), and foxtail (12%). Red clover and big bluestem came in last. Grasses constituted 76% of bison diets with legumes making up 26%.

Winter, Spring and Summer were characterized by a lower diversity with only 5 plant species dominating each of those seasons. Throughout these seasons, grasses were the most important part of bison diets averaging 90% and legumes remaining in the diet at levels of 10% or less.

During Winter, foxtail and smooth brome tied for the most abundant plant in the diet followed by Canada wild rye, Indian grass, and red clover. Spring was dominated by smooth brome, big bluestem and Indian grass. Red clover maintained consistency at 7% and foxtail dropped to a very low 5%. These 5 species made up 93% of bison diets in spring.

The Summer diet was by far the greatest showing of big bluestem at 55%. This proportion could indicate high selectivity or just an increase in the abundance and availability of big bluestem. Smooth brome, Indian grass, red clover and Canada wild rye each varied from 9 to 12%.

Without vegetation data for the same seasons, there is no way to determine if bison are selecting one species of plant over another or if they are just consuming what is most abundant in front of them. The following statements about bison diets are indicated by the preliminary data:

1. Legumes seem to play a role in the diets of bison with partridge pea and red clover composing 26% of bison diets in the Fall and red clover remaining at a pretty steady 7 to 10% through the rest of the seasons.
2. Like the legumes, smooth brome, a cool season grass, plays a dominant role in bison diets through all seasons. Canada wild rye is present in feces through all seasons except Spring. This may indicate that bison prefer brome to wild rye when wild rye is just coming up, or it could mean that they have consumed most of the Canada wild rye by the end of Winter and switch to brome when it is more abundant.
3. Bison diets consist of approximately 50% native tallgrass prairie plants and 50% non-native pasture species.

The refuge is currently supporting 35-40 head of bison and 22 elk within its 740 acre enclosure. These herds are on a continuous grazing regime which is estimated to produce approximately 1,125,000 to 1,500,000 pounds of forage annually. The newly established prairie within the enclosure is capable of sustaining the current herd size at a 35 to 40% utilization rate, with a 30% slope correction. Bison herd reductions will be made each year as needed to prevent habitat damage while allowing the bison to continue playing a vital role in the establishment and ecology of the prairie.

A partial bison round-up was conducted on November 4th with 15 bison captured. The purpose of the round-up wasn't to collect biological data but to cull 6 bulls from the herd to ensure the correct stocking rates were within acceptable limits. The remaining animals were processed through the facility and released. Six bulls ranging in age from 6 months to 6 years were retained in the facility. One cow was retained because she was suffering from pink eye and Smith determined a

veterinarian should look at it. After lunch, Dr. Tim Yoder, D.V.M. arrived and the 6 bulls were processed again. Each animal was identified by its pit tag if it had one, aged and an additional identification tag placed in its ear. Yoder examined the cow that was retained, perforated her bulging eye, cleaned it out and sewed her eye closed so it would heal. Yoder also gave her an injection of antibiotic and then she was released. One of the older bulls escaped the enclosure and was not recaptured. The 5 remaining bulls were fed hay and given water for the night. The next day, representatives of the Santee-Sioux Nation of Nebraska arrived to pick up 2 yearlings and a 2 year old. Representatives of the Ho-Chunk Nation of Wisconsin picked up the remaining bulls, a 6 month old and a 3 year old. The round-up was completed with very few people and without the added expense of assistance from other refuges.

2004

This is the eleventh year of the bird counts at Neal Smith National Wildlife Refuge (NSNWR) near Prairie City, Iowa. Liessa Thomas began the bird counts as part of the work for her Master's Thesis in 1994. She reported that very little documentation existed quantifying the changes of avifauna over time on large-scale prairie restoration projects. The NSNWR is a large-scale prairie restoration area with hundreds of acres of primarily crop fields having been seeded with native tallgrass prairie plantings. A savanna area is being developed and for the most part, the remnant grass areas, woody areas, and riparian areas have been left undisturbed.

The methods used to do the counts were established during Liessa's thesis work and are listed in her thesis (Thomas et al). There have been a few modifications to the methods over the years. Up until and including the year 1999, three counts were done for each point. It was determined that very little was statistically gained by doing each count three times so currently each point is visited once.

An AOU code was created for unknown meadowlarks (UNME). When no birds were recorded at a point within the 10 minute recording time, the four character code NONE was entered and NA (not applicable) was entered under the "GUILD" field on the Excel database. Also a period or dot at the end of the AOU code on the data sheet means the birds were recorded in the second five minutes of the count or T2.

The counts were done between June 5 and July 13. The bison confinement counts were done June 22, 28 and 30. Only one count (point 40) in the bison confinement was shortened to six minutes as the result of approaching bison.

As a result of crop fields being seeded to prairie plants, crop field points have declined. Six new crop points were added this year to keep the number of crop points comparable to the other three habitat types of this project. The new crop points are 192, 193, 194, 195, 196, and 197. There were six crop points from last year that were either planted to prairie or left fallow and thus became herbaceous fields this year. Those six points are 53, 57, 134, 186, 188, and 189.

There were a total of 113 point counts with 59 species in 678 entered data records and 1098 individual birds being counted, compared to last year's 69 species and 1300 individuals. See the breakdown for all the species identified in the 2004 bird counts on Table 1.

Monarch butterfly activity at Neal Smith National Wildlife Refuge: Summer and Fall 2004
Principal Investigator: Robert D. Woodward, Ellis and Nelle Levitt Professor, Drake University, Des Moines, Iowa - The monarch butterfly activity at Neal Smith National Wildlife Refuge was observed from late June through the end of September 2004 to determine the extent of the both the "resident population" in the summer and visits by monarchs during the fall migration period.

Field observations tended to show the importance of Neal Smith as a key refuge for monarchs in the contemporary environment. Reports from other parts of the nation in 2004 suggested a dramatic decline in the monarch population yet substantial monarch activity was documented by field observations in the summer and fall at Neal Smith.

An old seed production site on the Refuge was used as the primary study area for observing summer monarch activity. In the small area, the variety of wildflowers and milkweeds—the host plants for monarch caterpillars—regularly attracted monarchs from June 23 through August 27. Away from the Refuge across central Iowa, monarchs were being reported much less often. One factor at Neal Smith coincided with many reports from Iowa and other parts of the nation—that few monarch caterpillars were being observed on milkweed leaves. Daily studies of milkweeds in the production site and other areas of Neal Smith indicated little to no presence of the caterpillars.

Nationally, several major studies were reporting significant declines of the numbers of monarchs migrating during the fall 2004. However, at Neal Smith, solid migratory activity was observed from late August until the end of September. Anecdotal reports for the period can be found at http://www.drake.edu/monarch/migration2004.html . Based on yearly studies of fall migration over central Iowa since 1997, it's fair to say Neal Smith has become a key stopover area for migrating monarchs.

2004 Breeding Bird Count Results – Table 1

COMMON NAME	SPECIES	POINTS OBS.	TOTAL #
Red-Winged Blackbird	RWBL	48	177
Common Yellowthroat	COYE	44	72
American Goldfinch	AMGO	39	68
Gray Catbird	GRCA	36	67
House Wren	HOWR	35	63
American Robin	AMRO	30	43
Brown-Headed Cowbird	BHCO	23	36
Song Sparrow	SOSP	25	36
Northern Cardinal	NOCA	25	32
Barn Swallow	BARS	19	30
Mourning Dove	MODO	19	27
Dickcissel	DICK	17	26
Killdeer	KILL	15	26
Indigo Bunting	INBU	17	21
Vesper Sparrow	VESP	15	21
Willow Flycatcher	WIFL	16	20
Cliff Swallow	CLSW	6	19
Rose-Breasted Grosbeak	RBGR	16	19
Bobolink	BOBO	3	17
Downy Woodpecker	DOWO	16	17
White-Breasted Nuthatch	WBNU	11	17
Red-Bellied Woodpecker	RBWO	12	16
Horned Lark	HOLA	9	15
Sedge Wren	SEWR	10	14
Eastern Kingbird	EAKI	12	13
Blue Jay	BLJA	9	12
Field Sparrow	FISP	10	12
Great-Crested Flycatcher	GCFL	8	12
Black-Capped Chickadee	BCCH	6	11
Eastern Bluebird	EABL	5	11
Northern Oriole	NOOR	11	11
Eastern Wood-Peewee	EAWP	9	10
Yellow Warbler	YWAR	10	10
Common Grackle	COGR	8	9
Hairy Woodpecker	HAWO	9	9
Brown Thrasher	BRTH	7	7
Eastern Meadowlark	EAME	7	7
Grasshopper Sparrow	GRSP	6	7
Henslow's Sparrow	HESP	5	7
Rufous-Sided Towhee	RSTO	7	7
Yellow-Billed Cuckoo	YBCU	6	6

Northern Flicker	NOFL	5	5
European Starling	EUST	2	3
House Finch	HOFI	3	3
Lark Sparrow	LASP	2	3
Red-Eyed Vireo	REVI	3	3
Unknown Meadowlark	UNME	3	3
Cerulean Warbler	CERW	2	2
Orchard Oriole	OROR	2	2
Red-Headed Woodpecker	RHWO	1	2
Ring-Necked Pheasant	RNPH	2	2
Tree Swallow	TRES	2	2
Bank Swallow	BANS	1	1
Great-Horned Owl	GHOW	1	1
Loggerhead Shrike	LOSH	1	1
Pileated Woodpecker	PIWO	1	1
Purple Martin	PUMA	1	1
Red-Tailed Hawk	RTHA	1	1
Western Meadowlark	WEME	1	1
Wood Thrush	WOTH	1	1

Wildlife

There were 23 crop points, 32 herbaceous points, 30 riparian points, and 28 wood points. Only two of the 113 points had no birds (NONE) recorded in the 10-minute period. These were points 103 herbaceous and 139 crop. Also, there were four instances where counts were discontinued due to the weather, three times because of rain and once because of high winds exceeding 12 mph.

The month of June was extremely wet which may have contributed to the fewer records. Groups of juvenile red-winged blackbirds didn't start showing up until very late June and early July. Last year, these large groups of fledged blackbirds were obvious by mid-June. The Henslow's sparrow (HESP) numbers were also down from last year, appearing on five points as opposed to last year's 10 points. The points were in the northern third of the Refuge with one point (point 40) from within the bison confinement. On the 13th of July, while walking out of a field near point 12, I observed two separate groups of fledged Henslow's sparrows. The first group was three fledglings with an adult and the second was two fledglings with an adult.

Upland sandpipers (UPSA), another grassland bird of special interest, were not recorded this year although individuals were identified in fields near Highway 163 while traveling between points.

Broods of ring-necked pheasants were small and much scarcer than last year. The heavy rains of late May and early June had an impact on their reproduction as well. However, several adult hens and roosters were observed and so one can expect the hens to make a second or even third attempt at laying another clutch.

There was one new species to have been recorded on the counts this year, the Pileated woodpecker (PIWO). Also notable is the increase in Eastern bluebirds (EABL) on the Refuge. Several broods were recorded or observed this summer. In the case of point 36, the fledglings were still sitting with both adults on the branch near the nesting cavity.

The wet weather was likely the main contributor to the decrease in bird numbers this year as opposed to last year's dry summer.

Anabat Survey Report - Principal Investigator: Kim Livengood **-** In early May 2004, one evening of active bat monitoring on the Neal Smith NWR was conducted using Anabat bat detectors. This limited survey of a savanna area revealed a species assemblage including Eastern Red bats *Lasiurus borealis*, Big Brown bats *Eptesicus fuscus* and many recordings of 40 kHz *Myotis*. In central Iowa, the endangered Indiana bat and the Little Brown bat are two *Myotis* species that are difficult to distinguish acoustically. For this reason, calls of these two species are sometimes grouped together and referred to as 40 kHz *Myotis* calls. According to surveys conducted in 1997 by the Refuge staff, reproductively active Indiana bats are known from the Neal Smith NWR (photo 1). This survey used active monitoring which means that bat calls were recorded while observations of behavior were made visually. The combination of visual cues and acoustic records improves the chance of identifying bats such as these, which are hard to identify acoustically. A careful analysis of the recorded calls, in the context of the visual

observations, led us to conclude that at least some of the 40 kHz *Myotis* we recorded were Indiana bats. Further acoustic recordings, and preferably trapping, would be necessary to confirm their presence.

The use of bat detectors in this brief survey illustrates the usefulness of this technology (photo 2). Bat detectors give land managers a cost effective tool to survey bats which are otherwise extremely labor intensive to monitor. They also allow managers to confirm the presence of a bat species without physical interference. This is particularly valuable in areas where maternity colonies are present since care must be taken not to disturb the roosts or stress the females.

Bat detectors can be used in a variety of ways. Active monitoring is the most effective method for species identification when conducted by a skilled observer. Using this method, observations of bat behavior can be used in conjunction with characteristics of recorded calls to identify a higher percent of calls and to increase the certainty of identification.

Passive monitoring is conducted by leaving bat detectors out in the field to automatically record and store bat calls. This method can be used to record for just a few hours, or all night, every night for years, depending on the objectives. Long-term passive recording has the advantage that the sampling effort can be vastly greater for much less human resource commitment than is possible using active monitoring. This increases the possibility of detecting rare or difficult-to-identify species by increasing the likelihood that distinctive calls from those species will be detected. In addition, the long term record can provide insights into spatial and temporal heterogeneity which are unattainable through other means. This approach is relatively new and there is a great deal yet to be learned about how to get the most out of passively recorded datasets, but the technology has proven effective and relatively inexpensive. If used appropriately, a small network of passive monitoring stations could provide useful baseline data and provide the means to assess the long-term impacts of land management decisions on bat faunas.

The Reintroduction of a Declining Insect Associated with an Endangered Ecosystem: A Case Study with *Speyeria idalia* (Regal Fritillary) in a Reconstructed Prairie in Central Iowa - Principal Investigators: Diane M. Debinski and Stephanie Shepherd, Ecology, Evolution and Organismal Biology, Iowa State University, Ames, IA - Abstract: The decline of many prairie endemic butterfly species in the Midwestern United States has been well documented. These species declines are strongly associated with the destruction and fragmentation of their prairie habitat. One conservation strategy that can be used to compensate for both the loss of prairie and its endemic insect fauna is the reintroduction of rare butterfly species into reconstructed prairie areas. We are examining approaches to reintroduce *Speyeria idalia*, a declining prairie endemic butterfly, to a 1,250-hectare reconstructed prairie at Neal Smith National Wildlife Refuge, in Iowa. We first established 1,980 individuals of *S. idalia's* host plant, *Viola pedatifida* (blue prairie violet) at the Refuge during 1998-1999. Then a total of seven gravid *S. idalia* females were moved during 2000-2001 from two abundant source populations to the Refuge and placed in mesh cages over violet plots. Surveys for larvae and adults were conducted during the

summers following reintroduction. In 2002 and 2003, adult *S. idalia* were sighted in several places across the Refuge in early July and they persisted through late August. Maximum numbers observed were on the order of 84 individuals. The presence of females was never confirmed on Refuge property during 2002 or 2003. However during 2004, the butterfly was still present in good numbers and females were documented on the Refuge. Therefore, it appears that in the case of *S. idalia*, reconstructed prairies may serve as adequate habitat. Additional time will be required to determine whether the population will sustain long-term viability.

Evaluation of isolated and integrated prairie reconstructions as habitat for prairie butterflies - Principal Investigators: Stephanie Shepherd and Diane M. Debinski, Ecology Evolution, and Organismal Biology, Iowa State University, Ames, IA - Reconstructing prairie habitat is one of the most promising techniques for conserving the imperiled prairie ecosystem and its associated organisms. However the degree to which reconstructed prairies function like remnant prairies has not been fully examined. We evaluated the effect of restoration planting prescriptions, management, and vegetative quality on butterfly communities inhabiting prairie reconstructions in central Iowa, USA. Twelve isolated reconstructed prairies (small, surrounded by agriculture), 12 integrated reconstructions (planting units in a larger matrix of reconstructed and remnant prairies at Neal Smith NWR), and 12 remnant prairies were surveyed for butterfly and plant diversity, abundance and composition. Remnant prairies supported significantly higher butterfly richness and plant diversity but were not significantly different from reconstructions in butterfly species composition and abundance. Remnant prairies also supported significantly higher richness and abundance of habitat-sensitive butterfly species. Reconstructions that were the most similar to remnant prairies in plant diversity and percent native plant species did not support significantly different butterfly communities than lesser quality reconstructions based on measures of butterfly richness, abundance and composition. However, butterfly richness and abundance were highest on high quality reconstructions. There was also a trend towards higher butterfly richness on integrated reconstructions (sites at Neal Smith NWR) when compared to isolated reconstructions. Finally, the best vegetative predictors of butterfly richness ($R^2 = 0.38$) and abundance ($R^2 = 0.13$) were the availability of nectar and the % cover of duff (which is related to management issues such as time since burning). In conclusion, we found that the response of the butterfly community to vegetation in a reconstructed prairie is more complex than simply a response to vegetation diversity. Both management and landscape context of the restoration also play an important role.

Arthropod collecting at the Neal Smith National Wildlife Refuge Principal Investigator: Steve M. Spangler, Ph.D, CCA, 9468 Indian Hills Drive, Clive, IA **-** The objective of this preliminary work was to develop a framework for future long-term, funded studies relating to re-establishment of arthropod communities associated with the on-going tallgrass prairie reconstruction at the Refuge.

Various arthropod-collecting techniques were used as outlined below. The following sites, as recommended by the Refuge Biologists, are referenced in the discussion below: ‘NE Entrance’, ‘Cabbage’, ‘Dogleg’, and ‘Coneflower’.

Wildlife

Three sets of five sweeps per location were taken at the NE Entrance, Cabbage, and Dogleg sites on September 3 at about 11 a.m.

Three to five traps were used at the NE Entrance, Cabbage, Dogleg, and Coneflower sites, for a 48-hour period, from about 11 a.m. on September 3 through 11 a.m. on September 5.

One Malaise trap at each of the NE Entrance and Cabbage sites, for a 48-hr period, from about 11 a.m. on September 3 to about 11 a.m. on September 5.

One light trap at each of the NE Entrance and Cabbage sites, for a 24-hr period, from about 11 a.m. on September 8 to about 11 a.m. on September 9.

An entomological collection is being developed at the entomology laboratory at NSM as specimens are identified. It is anticipated that specimens of the Homoptera, Hemiptera, and Coleoptera will be identified eventually to the species level. Other taxa that are analyzed will be identified to Family level.

Ten to fifteen species of Homoptera. Hemiptera and Coleoptera were identified from the sweep sampling from the NE Entrance, Cabbage, and Dogleg sites. Indices of diversity indicated fairly similar levels of diversity, however, the habitat closest to agricultural habitat, the Cabbage site, tended to have certain species much more abundant which are common in agricultural habitats (*Empoasca* sp., *Lygus lineloaris*, *Diabrotica* sp.).

A note of caution here is that these habitats at the NSM can have noticeably different volume of vegetation, which may result sampling errors in comparing habitats because of variable sampling efficiencies relative. In the future, foliage sampling may need to be done with a method other than sweep net sampling.

Five to fifteen species of ground-dwelling Collembola, Coleoptera, Hymenoptera, and Orthoptera were identified from the pitfall sampling from the NE Entrance, Cabbage, and Dogleg sites. Indices of diversity were highest in the Dogleg site; this site had greater numbers of ant (Formicidae) species, and also had greater numbers of Gryllidae. The NE Entrance and Dogleg sites, particularly the Dogleg site, also had noticeably greater numbers of ground beetles (Carabidae). Springtails (Collembola), which feed on dead plant material (detritus), were noticeably more abundant in the reconstructed sites (NE Entrance and Dogleg) compare3d with the first-year site (Cabbage). Thius, in general, these pitfall trap samples indicated greater abundance and number of species of ground-dwelling ants (Formicidae), springtails (Collembola), and ground beetles (Carabidae).

Survey of Mycorrhizal Symbioses at Neal Smith National Wildlife Refuge - Principal Investigator: Inger Lamb **-** Evaluating the effects of the soil system on seedling establishment and growth is a complex task. In addition to soil mineral and nutrient availability, the below-ground biological component has an enormous potential to influence plant growth and survival. The sheer complexity of the interactions and influences of the soil biological and mineral environment can make research intimidating.

Nevertheless, projects designed to establish vigorous and long-lived perennial ecosystems (especially on soils in transition from traditional agricultural practices) require an understanding of the soil microflora if they are to be successful. In Iowa there is considerable interest in establishment of native perennial plants, for a variety of reasons ranging from re-establishment of the original ecosystem to energy and food production from low input perennial plant systems. Any desire to mimic the original flora must include consideration of the soil environment. Optimal soil properties and function are also very important to consider when designing or developing a reduced-input perennial production system.

Mycorrhizae are one of the soil biological components frequently ignored or at best poorly evaluated and understood. Essentially no research has been done documenting the extent or importance of mycorrhizae in Iowa prairies. This is unfortunate considering the potential benefits and essential nature of this common root-fungal symbiosis, and the probable importance in the prairie ecosystems being re-established in Iowa.

This study involves a survey of mycorrhizal associations in remnant (virgin) and reconstructed prairies at Neal Smith National Wildlife Refuge. Techniques for root sample processing and spore isolation and identification will be developed to fit the facilities. The results will be establishment of baseline data and experimental protocols that will be used to direct and develop future research on this important soil component. Data produced will be made available to any interested party, with the intent of encouraging follow-up studies by graduate students, interns, and other researchers from a wide range of institutions. Sampling is scheduled to begin in December 2004.

The Service is stepping up its monitoring of Chronic Wasting Disease (CWD) in Cervids, and as such, provided funding to develop a monitoring program on refuges. In Region 3, Neal Smith NWR was one of those refuges. Funding was provided in FY 2004 to assist in preparing the CWD plan and replacing the water gaps in the bison/elk enclosure.

The Iowa Department of Natural Resources oversees CWD issues in deer for the State of Iowa. Because elk were extirpated from Iowa and are no longer considered “game” animals, elk herds are monitored by the Department of Agriculture as farmed animals. The CWD plan will address monitoring of the elk herd, disposal of excess animals, testing for diseases, and response in case of disease.

The Refuge went into the fall and winter with 41 head of bison and 30 head of elk. Surveys of both herds were conducted twice a week to monitor the general health and well being of the animals. In December a visitor witnessed an injured bull bison, at which time Krueger investigated and found that the bull had suffered an injured left hind leg. The decision was made to let nature take its course and keep an eye on the bull to see if his condition worsened. As the months progressed, the bull started to put more pressure on the leg, however, to this day he still favors the leg and walks with a limp.

One cow was looking very thin. Apparently she became trapped in the mud of the creek and succumbed to exhaustion of struggling to get free. She was discovered by staff several days later. A necropsy performed on the cow showed that she had suffered from pneumonia as a calf and currently had intestinal parasites.

The bison herd grew by seven during the spring and early summer with the arrival of the calves. All the calves grew fast and strong and continue to thrive in the herd. The elk herd grew by four; one cow appeared to have had twins. The mature bull elk grew impressive sets of antlers to prepare them for the fall mating season. Both herds made it through the heat of the summer unscathed, and seemed to relish in the cooler days of fall. Preparations were made in late summer for a bison round-up, at which time we will attempt to reduce the herd by 15 bulls (photo 35).

A bison round-up was conducted on the second of November with 23 bison captured. The purpose of the round-up was to cull 10 bulls from the herd to ensure the correct stocking rates were within acceptable limits. The remaining animals were processed through the facility and released. Eight bulls ranging in age from two years to six years were retained in the facility. We had ten, but two escaped back into the field. The eight remaining bulls were fed hay and given water for the night. The next day, representatives of the Santee-Sioux Nation of Nebraska arrived to pick up two yearlings and a five year old. Two days later, representatives of the Ho-Chunk Nation of Wisconsin picked up the remaining bulls. Overall, the bison looked to be in fair to good condition with some bulls in excellent condition. The round-up was completed with very few people and without the added expense of assistance from other refuges.

The bison and elk herds are on a continuous grazing regime which is estimated to produce approximately 1,125,000 to 1,500,000 pounds of forage annually. The newly established prairie within the enclosure is capable of sustaining the current herd size at a 35 to 40% utilization rate, with a 30% slope correction. Bison herd reductions will be made each year as needed to prevent habitat damage while allowing the bison to continue to play a vital role in the establishment and ecology of the prairie (photo 36).

Prairie Chicken Reintroduction Feasibility Report - An investigation of the feasibility of reintroducing the Greater Prairie Chicken culminated in a report which carefully examined literature pertinent to the Neal Smith NWR. While the plan is to reintroduce the birds at some point in the future, it is not currently appropriate, according to the literature. Several reasons exist for this decision including too many roads, fences, trees, and not enough contiguous land.

However, future reintroduction is possible with some long-term preparations. That preparation includes continued intensive tree removal in appropriate areas, removal of fences, removal of unused roads, and acquisition of land especially in areas where bison and elk range are scheduled to be expanded, as grazing can be important in development of prairie chicken habitat. In addition, monitoring, planning and partnership development need to occur.

Development of partnerships with Refuge neighbors in prairie chicken introduction is critical, as prairie chickens may not stay within Refuge boundaries. Local education, outreach, and partnership programs need to be developed to draw stakeholders to the table in advance of prairie chicken introduction to maximize success.

Action should be taken to begin planning for prairie chicken reintroduction by developing a habitat monitoring phase as a part of the overall NSM Habitat Management Plan. Discussion among conservation organizations to develop a state-wide landscape plan for prairie chicken recovery in Iowa should begin; this document could help in beginning the dialogue. Prairie chickens are adaptable animals and with appropriate timing of introduction relative to educational and outreach efforts, Refuge ecological development, and partnership development, introduction is likely to be successful.

The YCC crew built a butterfly garden with 1100 square foot brick walkway, benches, rock wall, boulder and a "puddle" for the butterflies to drink from; cleared approximately three miles of fence; surfaced part of a public use trail with wood chips and built a boardwalk over a wet area; cleared invasive species from prairie plantings and planted seedlings; harvested seed; removed non-native plants from future harvest sites; and cleared brush and trees from prairie remnants, plantings and fence lines. They also aided in the maintenance of the Refuge by litter removal, cleaning offices, washing vehicles and cleaning storage areas and sheds (photos 62 – 66).

2005

(Oct. 2004)

Krueger continues bison and elk herd health monitoring. Drobney worked with contractor, Bret Geisler in continued development of the CWD contingency plan for the refuge, specifically concerning the elk herd. Relationship of vegetation to bison grazing. Leanne Martin performed final data collection on vegetation for fall, 2004.

Operation staff prepared for the upcoming bison round-up by inspecting facility and placing gravel along loading area.

(Nov. 2004)

The bison roundup was held the first week of November. Tom Roffe, veterinarian from Region 6, and his assistant, Jessica Barton, arrived to check each animal for overall health and to take blood and fecal samples. Bison were baited into the handling facility with hay and salt. Ten males were selected to be culled from the herd and donated to the Ho-Chunk Nation in Wisconsin to help increase genetic diversity of their bison herd. Just prior to loading the animals, two of the bison escaped back to the refuge herd.

(December 2004)

Wildlife

Krueger and Allen began regular fecal sampling of bison. Samples will be sent for disease analysis at ISU Veterinary Clinic.

February 2005

Krueger monitored bison and elk herd health noting that both herds are looking good. One smaller bull elk has dropped one of his antlers, though others have not.

Bret Geisler has agreed to conduct the Breeding Bird Survey for 2005. This will be Geisler's 5th year, providing us with very consistent data.

March 2005

Krueger developed an Excel spreadsheet to record weekly elk/bison monitoring.

Gilbertson attended the Fish and Wildlife Service Bison Management meeting in Denver, CO. The group discussed Fish and Wildlife Service for maintaining bison herds on refuges. Those reasons included legal mandates, conservation and restoration of native species, educational purposes, tools for ecosystem/habitat management, cultural or historic significance, and research. Dr. Roffe will present a paper at the DOI bison meeting to be held in May or June 2005.

April 2005

Krueger conducted routine bison and elk health surveys weekly. Four bison calves have been born thus far.

Walt Sadinski, USGS Principle Investigator for amphibian research, and his assistants sampled amphibians at the refuge on April 5. In addition to frog listening surveys, and searching for evidence of salamanders, a small number of eggs of chorus frogs will be taken and analyzed for pesticides.

Drobney met with Heidi Asbjornsen, Matt Helmers (Principle Investigators) ISU Researchers on Agro-ecosystem project. She discussed with researchers specifically designing bird monitoring and invertebrate monitoring components of the project; issues of design and implementation of research on the refuge; articulate needs addressed in previous research meeting groups; and address mutual concerns such as control of highly invasive species in or near research areas.

Drobney also met with Dave Otis (ISU Cooperative Research Unit Leader), and Walt Sadinski (USGS researcher working with amphibians), and a professor of Landscape Architecture to address developing research that would demonstrate necessity of linkage of the refuge to other conservation areas nearby to create large-scale conservation land linkages for amphibians.

Wildlife

Mycorrhyzae research project through the Leopold Center is continuing. A dry run of methodology for sampling and analyzing roots potentially infected with mycorrhyzae was performed.

Matt O'Neal of ISU met with Gilbertson and Drobney and discussed the invertebrate research component of the Agro-ecosystem project. Methodology was established and additional research possibility was discussed. This is especially important since so little is known about changes in invertebrate diversity in prairie reconstruction process. Some of O'Neal's proposed work will involve understanding the role of native invertebrate predators on crop pests such as soybean aphid when crops are located near diverse prairie plantings. This has important implications for NRCS programs and on the need for pesticides.

Sue Fairbanks, a new ISU professor interested in bison research, met with Drobney. Fairbanks has experience in studying diseases and behavior in bison and elk and is interested in assessing quality of forage and behavior patterns in NSM bison. This meeting was exploratory; Fairbanks will follow-up by submitting a proposal and seeking funding for a graduate student.

Bob Woodward of Drake University is interested in continuing research this year on monarch use of the refuge for breeding and migrating. Last year's information indicated the refuge was an important area for both, as both were relatively depressed in surrounding areas.

May 2005

Bret Geisler, contract ornithologist, began the NSM Breeding Bird Survey this month. This will be his 5th consecutive year of surveying.

Krueger continues monitoring bison/elk herd health and activities. A bull elk was acting lethargic for a couple weeks, and appeared to be breathing with difficulty. The elk typically could be found lying next to the road much of the day. Region 6 LMRD big game veterinarian, Tom Roffe, was consulted as to a course of action. Because of the number of wildlife diseases in the forefront we were advised to euthanize and necropsy the animal. On the appointed day, the animal could not be found and now it seems he has taken a turn for the better. Krueger continues to monitor.

To date, eight bison calves have been born.

Bob Woodward, entomologist, was issued a special use permit to continue monarch butterfly monitoring on the refuge. Bob's research last year indicated that the refuge was an important breeding and migrational site for monarchs, as few were found on off-refuge sites throughout Iowa in contrast to more numerous sightings on NSM. This work will continue in 2006.

Wildlife

Keith Summerville was issued a special use permit to continue moth research on the refuge. Work will be a continuation of last season's work, using black lighting to capture moths at night.

Drobney participated in a group research meeting at Iowa State University on May 25-26 regarding the Agro-ecosystem Research, and Comparative Ecosystems research. Approximately 20 people were present to discuss aspects of present and future research, primarily happening on the refuge. Individuals presented information about research on these topics or other topics on the May 25. Drobney presented information and an update on the LMRD program at NSM. The second day was structured to solve several problems related to the Agro-ecosystem and Comparative Ecosystem research projects. Conference calls nearly weekly provided continuity of project information and field progress.

USGS researchers Walt Sadinski and assistants began work monitoring frogs on the refuge in early May.

Al Murray worked closely with a cadre of volunteers to establish plants in the new butterfly garden, and maintain a watering regimen for same. Al has maintained a plant stock in EE greenhouse specifically for volunteers wishing to work in the new garden.

June 2005

Bret Geisler continues breeding bird survey. Krueger assisted in monitoring in the bison area.

Krueger monitors bison and elk herds. Nine calves have been born. A bull elk was exhibiting unusual behavior including repetitive circling. This is the elk recorded with aberrant behavior last month. Below euthanized the animal, and veterinarian Tim Yoder performed a necropsy. Tissue all seemed healthy and normal except eyes were cloudy as though the animal were blind. A small hole extended through the anterior of the brain. The head was sent to the Iowa State Animal Health Clinic for further analysis including tests for CWD.

Mycorrhyzal research: root segments of prairie plants are being sampled and tested for presence of mycorrhyzae and their spores.

Invertebrate study: study began last year will continue.

Mycorrhizae: roots of prairie plants are fixed and examined for evidence of mycorrhizae.

June 2005

Wildlife

Gilbertson attended the DOI Bison Management Meeting in Fort Collins, CO. Discussion centered around new genetics information, future studies for increased genetics knowledge, disease, issues, and a charter for the DOI Bison Management Group.

August 2005

Krueger continues monitoring bison and elk herd health. In his absence (fire detail), Welsh continued evaluation. Herds appear healthy.

At the end of the month, monarch migration began. Bob Woodward is tracking migration on the refuge. A Des Moines Register article highlighted monarch migration including the refuge.

September 2005

Bison and elk herds are being monitored by Krueger. No significant changes noted this month.

Hager, Boot, Krueger, and Welsh worked on extending and upgrading the drive fence in preparation for the bison roundup.

October 2005

Hager, Welsh and Boot extended the bison drive fence by building 500'of 8' tall high tensile strength wire mesh. The addition will make future roundups easier for staff and safer for the animals.

Drobney participated in a prairie chicken recovery meeting sponsored by the Missouri Department of Conservation in Eldorado Springs, MO from October 25-27. Speakers included Dr. Jeff Walk, Illinois Natural History Survey; Dr. Nova Silvey, Texas A & M University; and Dr. John Toepfer, Society of Tympanuchus cupido pinnatus. Speakers set the stage for discussion of the Draft Missouri Prairie Chicken Recovery Plan. Field trips provided opportunity for discussion of field characteristics important as prairie chicken habitat. Patch-burn grazing research at Taberville Prairie (managed by MDC), and Wah'Kon-Tah (managed by TNC and MDC) was discussed. Greater Prairie Chicken populations continue to decline precipitously in Missouri, as in other states. Nebraska and Kansas seem to have stable populations as yet. Attwater's Prairie Chicken is extinct in the wild, but survives in captive breeding programs.

Gilbertson contacted Ho-Chunk Nation representatives regarding transfer of excess bison, but because of the domestic cattle gene question, the Ho-Chunks declined the transfer.

November 2005

Krueger continues monitoring of bison and elk populations. The animals generally look healthy.

2006

January 2006

Krueger headed the Christmas Bird Count for 2005 on January 21. Eleven participants gathered at the Refuge for a morning of bird watching. Volunteers counted over 800 individual birds from 25 different species.

ISU Professor Sue Fairbanks, her Master's student, researchers Brian Wilsey, Dave Engle, and Laura Erikson met with Drobney, Gilbertson, and Viste-Sparkman to discuss bison research possibilities on the refuge. This initial meeting was intended to lay the groundwork for an intensive study of bison/elk related issues of importance to refuge management.

Twelve volunteers joined Krueger, Murray and Viste-Sparkman on the 21st to assist with the Christmas bird count.

February 2006

Two male and three female elk were culled from the herd on February 7. Zone Officer Gensmer and Special Agent Mays, as well as Hager and Severson assisted. For surveillance purposes, USDA veterinarian collected brain and lymph node tissue samples and sent the samples to the ISU lab for testing. All were negative for transmissible spongiform encephalopathy (TSE).

March 2006

Drobney attended a talk at ISU regarding bison age classes and behavior

Gilbertson attended the annual FWS bison meeting in Denver, CO with bison managers from Regions 2 and 6. The meeting centered around the question, "what is in the best interest of bison genetic conservation for the FWS NWRS?"

Gilbertson attended the Trilateral Monarch Butterfly Sister Protected Areas Workshop in Morelia, Michoacan, Mexico. At an earlier meeting, The Ecosystem Conservation Working Table several months ago, passed a resolution establishing a framework for the formal recognition of a network of "Sister Protected Areas" (SPAs) to link land management expertise and habitat conservation efforts in North America. The resolution defines SPAs as two or more nationally designated protected areas from different countries, endorsed by the Trilateral Committee, with similar resources or shared management interests, that agree to cooperate on projects and programs for the conservation and management of wildlife, plants, biological diversity, and/or ecosystems of mutual interest. The focus of the tri-national SPA is the Monarch Butterfly. The

Wildlife

Morelia Workshop provided habitat restoration/research, environmental education, and monitoring resolutions for the Tri-national meeting in May.

April 2006

Bison surveys continued. The first bison calf was noted April 24, and three more were born by the end of the month.

The first marsh marigolds ever noted on the refuge began blooming in late April in two nearby locations.

May 2006

Bison surveys continued, with one additional bison calf born in May contributing to a total of 5 calves. All bison appeared healthy and foraged primarily in the area north of the road, which was burned this spring.

Bison enclosure fence posts lost during the prescribed burn of the North bison enclosure were replaced.

A permit was issued to Erma Selser to conduct butterfly surveys in prairie remnants on the Refuge.

Dr. Keith Summerville received a permit to sample moths on the refuge. This is part of a ten year project titled "Moth Species Diversity & Composition in Tallgrass Prairies and Savannas of Iowa.

A permit was issued to Barbara Kagima, an Iowa State graduate student, to study the effectiveness of ungulates in facilitating the prairie reconstruction process and to determine the nutritional needs of native ungulates in the current phase of the prairie reconstruction process at the Refuge.

June 2006

The bison survey continued through the month in conjunction with bison research being conducted by an ISU master's student. The surveys have resulted in a consistent count of 39 adults and 5 calves.

Bret Giesler began this year's bird surveys throughout the Refuge, for his 7th year. These surveys have been conducted annually since 1993 and document changes in bird abundance and habitat associations on the Refuge.

Harlan Ratcliff gave a presentation to staff and volunteers on Poweshiek Skipper surveys. He is coordinating volunteers in Poweshiek and neighboring counties to conduct surveys in prairie habitat to search for this rare butterfly. His presentation covered identification of common butterflies of central Iowa and survey methods.

Wildlife

LMRD - Assisted ISU MS student in development of bison research activities beginning this month. Bison and elk observation times, routes, and observation points were reviewed, visited, and established. Volunteer Yentis began assisting in fecal sample collection.

LMRD - Coordinated Challenge Cost Share grant involving botanical and entomological work on a new fringed white prairie orchid (*Platanthera praeclara*) site owned by Polk County, adjacent to a FWS FMHA site. Work will guide restoration of those sites, and determine appropriateness of introduction of orchid seeds to nearby sites in the Chichaqua Bottoms project and to NSM. Initial data indicates that that moth pollinators specific to the orchid are present at the orchid site and at NSM.

LMRD - Met with a MS student of Diane Debinski of ISU, to develop methodology and finalize sites on her entomological research at NSM.

LMRD - Met with MS student of Matt O'Neal of ISU, to determine the effects on populations of soybean aphids by native predators when soybean fields are close to or distant from diverse native vegetation that provide habitat for a diversity of potential predators.

The Refuge was officially certified Monarch Waystation number 598 by Monarch Watch. A sign was installed in the butterfly garden to recognize this designation.

July 2006

Bison surveys continued weekly. The bison herd now stands at 38 adults and 6 calves.

Bret Giesler continued the breeding bird counts on the Refuge.

In late July a bull bison escaped from the bison enclosure by learning to cross the cattle guard. After the first escape he was relocated just down the road from the enclosure and refuge staff herded him back in. Three days later he escaped again. After ground search and helicopter search for two days he was located off refuge on state land. Without any way of herding him back to the refuge it was determined that he would have to be killed. Refuge staff dispatched him with a rifle. He was removed and brought back to the refuge for disposal.

August 2006

One bison and one elk were found dead in late August. They presumably died of natural causes but both were too decayed to necropsy. The elk had a broken antler, so may have been injured. The bison was a very old male.

Wildlife

August 11: Drobney met with Diane Debinski to discuss her PhD student possibly analyzing NSM's 13 years of breeding bird data by refuge management activities and natural community type. Later in the month, this idea was further developed with Viste-Sparkman. Because Bret Giesler had performed the point counts for several years on the refuge, and because he had begun putting data in a spread sheet for this purpose on his own time, it made sense to include him in this research.

Drobney received info from Drake University moth researcher regarding finding *Schinia gaurae*, a rare moth at NSM. Only one other siting has been documented in Iowa. The host plant for this species is *Gaura sp.*, and the only species known on NSM in this genus is biennial gaura (*Gaura biennis*). Moth experts Eric Metzler and Ron Panzer consider this remnant dependant, meaning it is a conservative species and needs a remnant prairie to be present. However, the NSM collection was on a planting, indicating a high quality area becoming more like a remnant than a planting. Another moth, *Pyrausta laticlava* was present in thee same sample with the *Schinia gaurae*. This species is very remnant dependant with mints being the host species. The presence of both these moths is an important indicator of progress in emulation of historic ecosystems.

Aides from Congressman Boswell's local and regional offices met with Gilbertson and Viste-Sparkman to discuss reintroduction of prairie chickens. A couple of weeks later, Gilbertson met Congressman Boswell's aide from the Washington office on the same topic of prairie chicken reintroduction.

September 2006

Viste-Sparkman and a graduate student at ISU doing research on the bison and elk, conducted weekly bison and elk surveys. Although the response to the mowing within the enclosure was not immediate or dramatic, bison and elk were observed grazing in those areas. Bison were bothered by flies, and one bull was observed with pink-eye. Viste-Sparkman observed one large elk calf on September 18. With cooler temperatures and shorter days, the elk have been easier to observe in the mornings and evenings.

The date of the Christmas Bird Count was changed to December 23, 2006 to avoid conflict with nearby bird counts.

This month's Second Saturday activity was Monarch Madness, a monarch-tagging event for volunteers (see Outreach). Hollerich, Costello, Viste-Sparkman, Gilbertson, and Murray also participated in Monarch tagging throughout the month. Approximately 400 Monarchs were tagged on the refuge by the end of the month.

September 2006

Hollerich created a butterfly list for the refuge. Viste-Sparkman updated refuge mammal, reptile, amphibian, and bird lists in order to create new brochures.

Wildlife

Hollerich planned and implemented the first ever Monarch Madness. This special event encouraged participants to assist with the capture and tagging of monarch butterflies. The butterfly tagging program is an ongoing University of Kansas interest which allows citizen scientists to capture and tag butterflies which will hopefully be captured again on their way to Mexico, while in Mexico or on their migration north. The monarch program is supposed to assist scientists that are researching the migration route, length of the migration, destination of the butterflies, and the butterflies return route. The event drew 40 participants and featured Bob Woodward, a monarch enthusiast, butterfly tagging, a going away party and a piñata break.

Hollerich and Murray worked with 15 different school groups, about 700 students, throughout the month. The big stewardship project for September was tagging monarch butterflies. If any tagged butterflies make it to Mexico I will send the school information on their butterfly.

Drobney prepared a plant species list of an endangered prairie near Grinnell, Iowa where efforts are underway by concerned citizens to protect it.

The Volunteer program enjoyed a great month in September with volunteers donating over 2000 hours of time. This effort capped off a solid year for the program that saw over 21,000 hours of volunteer service. With the arrival of autumn most activity was focused on stewardship. Individuals, groups and schools donated over 1300 hours performing a variety of tasks to include Adopt-a-trail, Adopt-a-Plot, seed harvest, seed cleaning and butterfly tagging.

October 2006

Viste-Sparkman and Hager continued bison surveys in October.

Costello, Eicke, and Hollerich continued to catch, tag, and release monarch butterflies. This year the refuge tagged 486 butterflies on the refuge and in the surrounding areas. Return tags should reach us in late spring next year.

The bison herd removal will take place in late November. Twenty animals will go to the Meskwaki Tribe of Tama, IA; twenty animals will go to the Spirit Lake Tribe of Fort Totten, North Dakota; and two animals will go to Polk County Conservation at Jester Park.

Gilbertson worked with the Inter-Tribal Bison Council biologist to arrange for needed certificates and ear tags for interstate transfer of animals.

School Stewardship activity saw 492 students and their teachers from 10 visiting schools contributing over 605 hours of stewardship as part of their Environmental Education programming. These activities included collecting seed, cleaning seed and Monarch tagging.

November 2006

Wildlife

Bison surveys continued this month until the roundup. Overall the herd appeared healthy. The elk have also been more visible with the cooler weather.

Hager coordinated the bison roundup, which took place on November 28. Thirty-seven animals were lured into the corral and given hay and water for a few days prior to the roundup. The crew attempted to capture the remaining six bulls during the roundup, but only one could be captured. Jester Park took two bison (1 male and 1 female), the Meskwaki Tribe took 20 (12 males and 8 females), and the remaining 16 (9 males and 7 females) were sent to the Spirit Lake Tribe in North Dakota as coordinated through the Intertribal Bison Cooperative. The roundup went smoothly and safely, and the bison all arrived safely in their new homes. Three of the remaining 5 bulls were captured by Boot and Krueger and transported to the Meskwaki Tribe.

Drobney participated in TNC Central Tallgrass Prairie Ecoregion Portfolio Development Meeting on November 16-17. The meeting is designed to identify priority element occurrences in 7 states across different natural community types and rare plant and animal species. The refuge is being considered as a priority site for grassland birds.

Gilbertson worked with the Inter-Tribal Bison Cooperative biologist to arrange transfer of the bison to the Spirit Lake Tribe of Fort Totten, ND and arranged for the USDA animal inspection and ear tagging. She also coordinated the same efforts with the Meskwaki Tribe of Tama, IA for transfer of the bison.

December 2006

This year's Christmas Bird Count was a great success. Thanks to assistance from Friends Board Member Mark Lyle in preparing and dispersing a press release, radio interviews, and other publicity, we had a record number of participants this year (26 counters). Many of the participants had heard about the count from various local newspapers and from the IA-BIRD listserv. The number of species and individual birds observed also set records, with 39 species detected on the count (34 on the refuge), plus one count-week species (Short-eared Owl). A total of 7,354 individual birds was counted. Notable species observed included Eastern Bluebird, Rusty and Brewer's Blackbird, and Brown-headed Cowbird. We also had record high numbers for 18 species. Several counters stayed after lunch to bird off-refuge areas within the count circle. Murray helped with publicity and Hager prepared maps and a chili lunch for the hungry counters, as well as directing them to their assigned area. Viste-Sparkman coordinated counters and compiled the data. The food was provided by the Friends of PLC.

On Dec. 22, Nott gave a presentation to refuge staff on an analysis she carried out using the Refuge's Breeding Bird Count data for the past 10 years. She used statistical analysis to determine whether grassland species were increasing, how fire management influenced grassland species, and whether birds are selecting certain areas of the refuge. She also used GIS to create maps showing "hot spots" for certain species on the refuge.

Wildlife

Drobney submitted a Challenge Cost Share Proposal entitled "Interactions between Bison, Elk, and Plant Communities in an Ongoing Tallgrass Prairie Restoration Effort". Drobney participated as a collaborator, reviewer and NSM research liaison in development of a National Research Initiative grant proposal by the NSM agro-ecosystem research team. Iowa State University has committed $300,000 in matching funding if the NRI grant is approved.

A letter of intent to submit another proposal to NRI was developed by Drobney, Marc Linderman (U of I Geography professor) and Silvia Secchi (ISU Economics professor). This research involves comparison of expected and actual floristic quality developed in plantings and remnants on NSM and other sites, with an emphasis on site vulnerability to invasive species. Additional collaborators will be sought if the letter of intent is accepted.

Krueger assisted Gensmer in the removal of the last bison of the original herd. Krueger and Viste-Sparkman assisted Dr. Riordan with the castration of a bull bison from the original herd who will remain here when the new herd arrives.

The new bison herd arrived December 16 and was unloaded that night. One cow refused to leave the truck, even when left alone overnight. She eventually was pulled out of the truck by placing a rope around her horns. Unfortunately, the rope got stuck on the horns so two days later she was tranquilized by Dr. Riordan to remove the rope. The bison seem to be adjusting well to their new home.

At the invitation of the Meskwaki Settelment, Viste-Sparkman and Murray participated in their "bison education day" for tribal members. Murray presented information from the bison program we present at the refuge. Viste-Sparkman talked about bison management and research at the refuge.

Twenty-two volunteers showed up on the 23rd to help with this year's Christmas bird count recording over one hundred hours for the event. As reported by the Biology Staff it was a very successful turnout. This helped the refuge finish the first Quarter of FY 2007 with a solid 4000+ hours in volunteer assistance.

2007

January 2007

The new bison herd is doing well, with all animals appearing healthy. One cow broke her horn during transport and it is still attached but dangling at the base. The group size fluctuates frequently as individuals split off and return to the main family group. It was difficult to conduct the survey for much of January because of snow.

Viste-Sparkman gave a presentation to the Iowa Chapter of The Nature Conservancy during their meeting at the refuge on Jan. 19. The presentation on bison management and

genetics at Neal Smith NWR was followed by a tour of the bison facilities and viewing of the new bison herd.

February 2007

Bison are beginning to look a little thin, probably due to the stresses of transport followed by cold weather. In early February, one cow was seen trailing placenta, an indication that she had aborted. With new snow and ice arriving at the end of the month, we began putting out alfalfa pellets for them, and the bison ate them readily. All bison are behaving normally and appear normal except for a few thin individuals. They are eating well and do not appear to be getting significantly thinner. Grass is beginning to green up below the snow.

March 2007

Alfalfa pellets were spread on top of the snow for the bison 5 times (100 lbs. each feeding) in late February and early March, and the bison ate them readily. When March began, there was snow and ice on the ground, but by the end of the month spring had arrived and cool season grasses were green and growing. Some of the bison were still thin, but did not appear to be losing weight. Several cows are obviously pregnant. Overall bison and elk appeared healthy.

Drobney and Viste-Sparkman met with Diane Debinski and Brian Olecnowski regarding a bird research proposal. This meeting resulted in some changes in several of the details of the proposed work.

April 2007

The first bison calves were born in mid-April, with the first born April 14 and the second around April 19. Bison appeared to be healthy and taking advantage of the green brome. Elk were sometimes visible as well; the bulls had lost their antlers during the month. There are currently 15 adult elk and 40 adult bison.

On April 20 Viste-Sparkman conducted a frog and toad call survey with the assistance of volunteer Jonathan Yentis. Four species were detected: Western Chorus Frog, American Toad, Eastern Gray Treefrog, and Northern Leopard Frog. In addition, a surprise on this night-time survey was several singing Henslow's Sparrows at 10:30pm.

Hager checked and cleared water gaps around the bison enclosure.

Preparations were made for the FWS bison meeting in May at the RO in Denver. Preliminary information was gathered on herd health, carrying capacity, equipment needs, etc. for presentation at the meeting.

At the recommendation of Professor Engle of Iowa State University, the Refuge is experimenting with patch-burn grazing on the south side of the bison enclosure. A third

or about 80 acres of the south side was burned this spring. An additional 80 acres will be burned in July and another in late fall.

Drobney and Viste-Sparkman provided assistance to Cathy Noe of the Meskwaki Natural Resources Department on prairie seeding and bison management.

May 2007

Seven calves have been born to date. The bison are spending most of their time in the southwest corner, which was burned this spring as our initial effort in patch-burn grazing. It will be interesting to see how their use of this area changes through the seasons. The dynamics of the new herd are different from the former herd, with small groups of cows or young bulls occasionally splitting from the main family group for several days at a time.

Ten people participated in the Spring Migration Count as part of International Migratory Bird Day. We split into two groups and found 77 species of birds. Some of the highlights are listed below. There were 14 species of warblers and 9 species of sparrow detected. Most common species (not surprisingly) were Red-winged Blackbird (289), American Goldfinch (168), and Common Yellowthroat (157). Since not all of the refuge was covered, there were many birds that didn't get counted. It appears to be a good year for both Henslow's Sparrows and Bobolinks. A good time was had by all.

Red-headed Woodpecker	3
Willow Flycatcher	3
Least Flycatcher	3
Bell's Vireo	2
Horned Lark	1
Sedge Wren	31
Golden-winged Warbler	1
Chestnut-sided Warbler	1
Cape May Warbler	1
Blackburnian Warbler	1
Blackpoll Warbler	3
Black-and-white Warbler	1
Eastern Towhee	1
Grasshopper Sparrow	14
Henslow's Sparrow	19
Harris's Sparrow	1
Dickcissel	2
Bobolink	15
Eastern Meadowlark	34
Western Meadowlark	2
Orchard Oriole	3

Wildlife

Viste-Sparkman, intern Ryan Neuhaus, and volunteer Jonathan Yentis conducted a frog and toad call survey on the evening of May 31 during the full moon. Four species of frogs and toads (American toad, western chorus frog, eastern gray treefrog, and cricket frog) were heard. It was a lovely, calm night, and Henslow's sparrows and sedge wrens were heard singing at most of the stops. A single barred owl was the only other bird heard.

Hager provided GIS support and Viste-Sparkman prepared for the imminent breeding bird counts. Hager provided GPS support to interns for monitoring Lespedeza cuneata locations.

Gilbertson and Viste-Sparkman attended the FWS bison meeting in Denver. A proposal to manage all FWS herds as a metapopulation was discussed and agreed upon. Implementation will begin immediately.

Hollerich and Viste-Sparkman teamed up and took International Migratory Bird day in a different direction this year. A spring bird count was conducted on May 12th and a total of 77 species of birds was found using the refuge that day. VanRyswyk and Simmen conducted the Junior Duck Stamp Ceremony. Lunch was served by the Johnston Kiwanis. There were bird hikes, a live bird show, and a beginning birding talk by Viste-Sparkman. Ian Bryant-Drobney conducted the crafts. Several staff members helped support this day and it was a success with over 150 people visiting the refuge.

June 2007

Viste-Sparkman began the season's breeding bird point counts on June 14, and continued through the end of the month. Hager provided GIS support, making maps of the points. Hager also assisted with counts in the bison enclosure, serving as driver and bison look-out. It looks like a good year for Henslow's Sparrows on the refuge.

Hollerich assisted Viste-Sparkman with the butterfly count on June 30, along with five additional participants, and we found 21 species of butterflies along the Tallgrass Trail.

Hollerich found that preliminary results from the Monarch tagging in September produced at least five tagged butterflies found in Mexico. Two butterflies tagged by Emmerson Elementary School in Indianola, one tagged by Sara Hollerich, and two tagged by Jesse Fuller and her family, were reported at El Rosario, Mexico. The results still need to be officially correlated by Monarch Watch.

July 2007

Viste-Sparkman completed the breeding bird point counts on July 6.

The first elk calf was seen with a lone cow on July 6, visible from the PLC.

Eight bison calves and two elks calves were born (so far) this year.

Wildlife

AUGUST 2007

The 8th bison calf born in mid-July brings the total number of bison to 48. There were 3 elk calves elk calves born this year bringing the total of elk to 18.

Viste-Sparkman demonstrated monarch tagging to Groom and Visitor Services interns. Only a few scattered monarchs were migrating through by the end of the month.

Drobney and Costello completed floristic monitoring on the Cabbage Unit.

Preparations are underway for the October bison roundup. Personnel from Region 6 will be assisting with the passive integrated transponder implantation and blood drawing on the eight calves.

Viste-Sparkman communicated with Lee Jones of the R6 Wildlife Health Office about the roundup. The roundup is planned for Oct. 24. This year all of the calves will be microchipped and have samples collected for genetic analysis. We have purchased a new microchip scanner that will read both frequencies of microchips that are in our bison, and new microchips for this year's calves.

Barbara Kagima was issued a permit to study ungulates and determine nutritional needs.

September 2007

Viste-Sparkman and Hager continued monitoring bison. The herd appears healthy and most of the bulls remain with the family group. Elk have been more visible as the days begin to shorten.

Viste-Sparkman submitted Frog and Toad survey results to DNR. Five species were heard during the three surveys in April, May, and July: Chorus Frog, Northern Leopard Frog, American Toad, Eastern Gray Tree Frog and Cricket Frog.

Groom, Viste-Sparkman and Murray presented Monarch Madness, a special event focused on tagging monarch butterflies and educating participants on the science behind the tagging, took place on Sunday, September 9th. There were 136 monarchs tagged in 90 minutes, with 81 volunteers from all over the state assisting refuge staff.

October 2007

The bison roundup was held October 24. Forty-seven of the 48 bison were peacefully lured into the corral on Monday and given hay and water for the next two days. During the roundup all eight calves were tagged with microchips and had blood and tail hair samples taken for DNA analysis. Three adults who were in fair condition had blood and fecal samples taken. All other adults appeared to be in good to excellent condition and were released. No animals had lost microchips. Two days after the roundup fecal samples were collected and sent to the Region 6 Wildlife Health Office for parasite testing. The

staff worked together to ensure a smooth roundup with no serious injuries to people or bison. Lee Jones from the WHO was instrumental in processing the animals. We all learned how we can improve the roundup and facilities in the future.

Drobney and Viste-Sparkman met with Brian Olecnowski and Diane Debinski to discuss progress of the breeding bird research project and future needs of the project.

Simone Williams, director of Meskwaki Department of Natural Resources, participated in the bison roundup to get a better understanding of running a roundup and what equipment and facilities the Meskwaki need in the near future.

November 2007

On November 5, Dave Engle, Sue Fairbanks, Ryan Harr, Barbara Kagima, and Devan McGranahan from Iowa State University met with Gilbertson, Drobney, Viste-Sparkman, and Hager to observe this spring's patch burn in the bison enclosure. Kagima presented results of her research on bison and elk grazing and patch use. The consensus was that we do not have enough grazers in the enclosure to keep the patches grazed to an adequate level while burning the prairie frequently enough to prevent woody vegetation from encroaching. We decided to gradually increase the herd size and continue monitoring bison and elk health and prairie vegetation to ensure overgrazing does not occur.

A 10-year-old bull elk died on November 15 and a necropsy was conducted by Dr. Tim Yoder. The results found sarcocystosis, which is not considered to have pathologic significance.

We received information in November that the bison roundup did not include one cow and two bulls. On the most recent survey in late November only 47 bison were located. We will continue to monitor to try to locate an additional bison which our records indicate should be present.

Viste-Sparkman completed the report for the breeding bird counts. Counts took place at 136 points this year, compared to 100-120 most years. This year 842 individuals of 60 species were recorded within the 50-m plots. This is lower than previous years, and may be due to factors of weather or a different observer conducting the counts. The most abundant species was Red-winged Blackbird with 148 detected at 52 points. The next most common species were Common Yellowthroat with 76 at 50 points, House Wren with 62 at 32 points, American Goldfinch with 45 at 28 points, and Dickcissel with 44 at 34 points. A pair of Cooper's Hawks found in the Thorn Valley savanna was a new species for the count. Sixteen Henslow's Sparrows were detected at 11 points, tying the previous high in 2003.

December 2007

Wildlife

Bison and elk continue to find ample forage despite snow and ice which coated the ground in December. Conditions were difficult for monitoring, but bison and elk appeared healthy. Forty-eight bison and 16 elk were observed during December.

Viste-Sparkman and Hager prepared for the Christmas Bird Count by notifying potential participants and preparing maps. The CBC is scheduled for January 5.

2008

January 2008

The Christmas Bird Count was held on January 5. We were lucky with the weather, with what was probably the best weather of the count period. Temperatures ranged from 29 to 43 degrees F and the sun emerged in the late morning. We had 23 enthusiastic participants and a record total of 46 species, topping last year's record of 40. Most volunteers birded the refuge in the morning, and a few spent time in other parts of the count circle in the afternoon. Although there were several beginners, overall our group was skilled and we were able to split into more groups with at least one experienced birder than in the past. The willingness of beginners to learn and experienced birders to lead are at the heart of a successful Christmas Bird Count, and I consider this year's count a huge success. We had two feeder counters (our first ever!), and feeders added two species to our comprehensive count list (Red-breasted Nuthatch and Eurasian Collared-Dove) and several for the day. We had 7 new species this year, and got new high totals for 14 species. Our comprehensive list is now 65 species. This year's highlights include Bald Eagle, Northern Harrier, Sharp-shinned Hawk, Cooper's Hawk, Rough-legged Hawk, Short-eared Owl, Belted Kingfisher, Horned Lark, Winter Wren, Northern Shrike, Eastern Towhee, Lapland Longspur, Snow Bunting, Meadowlark sp., and Purple Finch.

February 2008

Snow and ice cover made monitoring the bison and elk difficult during February, but from incidental roadside observations, the bison appeared to be in fair to good condition. They appear more robust than they did last winter at this time, so they seem to be taking the snow cover in stride.

March 2008

Bison and elk appeared healthy. Snow and mud made monitoring difficult during March.

April 2008

Bison and elk appeared healthy through the month. No bison or elk calves were born as of the end of April.

Wildlife

Viste-Sparkman consulted with Melinda Knutsen of the BMT to discuss breeding season bird counts on the refuge. It was determined that no changes would be made to the sampling design this year, but further discussion will take place next winter.

Drobney worked with Nick Schmidt to finalize sites for aphid research on crop fields adjacent to prairies on the refuge.

Six bison bulls escaped and were reported near the Savanna trail by a neighbor on April 17th. Refuge staff responded and located the bison south of the savanna on private land. The bison were promptly herded into the enclosure without difficulty. No escape route was found, but it was presumed they escaped through a stream crossing. All the crossings were checked and reinforced and there have been no more escapes.

May 2008

Bison and elk calves began arriving in May. By the end of the month there were 8 bison calves and 1 elk calf. The bison appear very robust and are spending most of their time in the areas that were burned last fall and this spring.

Viste-Sparkman and volunteers conducted a bird count for Migratory Bird Day. We found 68 species, despite a downpour in the morning. Most of the breeding grassland species had returned, although some were present in only small numbers. Red-winged Blackbird (164), Common Yellowthroat (90), and American Goldfinch (83) were the most abundant species. Many interesting migrating species were counted, including two Harris' Sparrow, one Scarlet Tanager, and several species of warblers.

Brian Olechnowski, investigating breeding bird use on the refuge is preparing for vegetation sampling next month. Farmer contacts were made for aphid studies involving cropped land adjacent to prairies.

Eight bison calves were born by the end of May.

June 2008

Viste-Sparkman conducted bird surveys throughout the month when weather permitted. One highlight was a pair of Upland Sandpipers on June 14.

By the end of June we had 10 bison calves, bringing the total to 58 bison. The bison remain healthy and in good to excellent condition. With the wet spring we have had, vegetation is lush and forage is plentiful.

Brian Olechnowski continues working on vegetation plot work associated with breeding bird surveys this year, and Viste-Sparkman performs the bird surveys. This is the last field season for Olechnowski's PhD work.

Wildlife

Gilbertson and Viste-Sparkman met with representatives of TNC to discuss a FWS/TNC partnership of bison genetic exchange. They are very interested. More discussion to follow in July.

July 2008

Viste-Sparkman completed bird surveys on July 2. Biology interns began computer data entry in July.

The final frog and toad nocturnal call survey was completed on July 10. Data for the season were submitted to Iowa DNR. No survey was conducted during the first survey period due to weather. Species detected during the surveys in May and July were western chorus frog, eastern gray tree frog, American toad, and cricket frog. Barred and Great Horned Owls, Henslow's Sparrows, and Sedge Wrens were also heard on the July survey.

Bison and elk continued to be monitored. The final bison calf count is 11, with the last calf born in late June or early July. Bison appeared healthy through the month of July, and vegetation is lush.

Drobney coordinated field work with researchers on the refuge. A request was received to include live aphids on soybean plants placed on a prairie planting as a pair to the soybean area where this project will occur.

Kagima had her thesis defense on bison behavior and feeding habits on the refuge on July 23. She is making a presentation of this work available to refuge staff.

August 2008

One emaciated bison cow was observed during a weekly monitoring in early August. A fecal sample was collected on this animal and two others that appeared a little thin, with results showing moderate numbers of Trichostongylus and Moniezia eggs. A few days later fecal samples were collected from 17 random bison, showing few to moderate numbers of Trichostongylus eggs in most samples. Medicated blocks were placed for the bison, and the mowed brome area where they have been spending a lot of time was harrowed to break up feces and dry them out. The cow continued to lose weight, and was monitored frequently after separating from the herd. On August 29, she was found stuck in the creek, too weak to get out, so she was euthanized. The carcass was taken to ISU veterinary pathology lab for necropsy.

Hager and DeBruin, with help from Biology interns, continued to make improvements on the bison handling facility, including installation of the new squeeze chute.

Gilbertson, Drobney, and Viste-Sparkman met with representatives from Iowa DNR, Polk County Conservation, and The Nature Conservancy to discuss the feasibility of re-introducing Greater Prairie Chickens to the Neal Smith NWR/Chichaqua Bottoms area south to Ringgold County.

Wildlife

September 2008

Results of the bison necropsy for the thin cow that got stuck in the creek were received and interpreted by Dr. Tom Roffe. The bison's condition was caused by complications from nematode larvae and fungal infection. Tom recommended treating the herd during the roundup with a pour-on systemic de-wormer. The remainder of the bison herd appears less than ideal in condition, but healthy.

Three elk calves were seen in September.

Hager researched and completed an acquisition request for a camera that can be used to photograph bison to assist in monitoring.

Drobney and Viste-Sparkman provided review for Brian Olechnowski's paper on bird use of the refuge relative to a general history of refuge management.

Hager and DeBruin continued work on modifying the bison handling facility. The new scale was delivered and installed.

Murray, Lang, Groom, and Viste-Sparkman celebrated Monarch Madness on September 14th with about 70 visitors that came to help tag the butterflies. Seventy-three butterflies were tagged under cool, windy conditions.

On Tues. September 16 Lisa Young from the DOI Take Pride in America office visited the refuge as part of the Voluntour program. Volunteer coordinator Murray provided a tour that included Lisa observing a school stewardship program with students participating in the annual Monarch tagging program. In addition she met with volunteer Dave Wharff providing EE programming and Arleen Vander plough working in the bookstore. Lisa presented Refuge manager Nancy Gilbertson with a certificate for refuge participation in support of TPIA activities in 2008.

October 2008

"The Big Sit!" was held at the Savanna Trail parking lot on October 12, as part of an international event. Twenty-five species of birds were detected from a 17-foot diameter circle. Viste-Sparkman and Rasmussen staffed the event, and one volunteer participated.

Bison and elk were monitored throughout the month. One bull elk appeared to behave abnormally one day, but within a few days seemed back to normal again. All other animals appeared healthy.

Diane Debinski and Brian Olechnowski have requested additional data for the bird research Olechnowski is completing.

Wildlife

Hager continued upgrading the bison handling facility. A new chute and scales have been installed, and modifications made to the facilities including new catwalks, new gates, electrical wiring, tables, and a shelter for the computer operator. This should help the roundup go more smoothly. Boot hauled and spread gravel around the handling facility to cut down on erosion and mud.

November 2008

Hager and Viste-Sparkman collected fecal samples from the bison a week prior to the roundup. The samples were sent to the Montana FWS lab and results have not been received.

All 18 elk (including 3 calves from this year) were located during the bison roundup. (More on the bison roundup under Reintroductions).

The bison roundup took place November 20. Hager, Debruin, Boot, and Krueger finished work on the handling facility, conducted a test run of the new squeeze chute, and set up the generator to operate the chute and handle the bison. Hager spent many hours preparing, assembling equipment and heading up work on the handling facility. Staff worked together to herd the bison into the handling facility the day before they were run through. While searching the enclosure for stray bison, a recently deceased cow was located. Dr. Tom Roffe and Lee Jones arrived that afternoon and conducted a necropsy, with assistance from Viste-Sparkman, Hager, and Gilbertson. The cow died of severe pneumonia. Additional lab results are pending. A bull with an injured front leg was discovered during the day and was not captured. Under advisement of Dr. Roffe no action was taken and he will be monitored. During the roundup all bison able to fit through the chutes were treated with Ivermectin for internal parasites, due to the known parasite problem this summer. All calves were run through the squeeze chute, microchipped, and had DNA samples taken. A random selection of adults was sent through the squeeze chute for disease sampling. All bison were monitored for any sign of respiratory distress but all appeared healthy. Overall condition of the bison was good, with calves all in good to excellent condition. The new chute will need a few modifications for next year, and as always other improvements can be made, but overall, operations went smoothly and cooperation among staff and outside personnel was excellent. Most staff members were directly involved, as well as staff from The Nature Conservancy and Rocky Mountain Arsenal NWR, and volunteers from the Friends of the Prairie Learning Center.

Gilbertson attended the DOI Bison workgroup meeting in South Dakota. This is the first meeting of the new DOI workgroup. It was very short notice so several members were missing. It was a preliminary meeting of what could be expected of its members and what issues would be discussed. The next meeting is scheduled for March during the North American Wildlife Conference in Washington, DC.

Dr. Tom Roffe and Gilbertson met with TNC members to discuss a possible Memorandum of Agreement to move bison from the FWS bison herds to theirs. They

have recently re-introduced bison (from the Windcave NPS herd) to their facility in western IA. Presently, no concurrence was reached.

December 2008

Bison and elk appeared to be in good condition throughout December. They were able to get through the ice and snow layer to forage.

Viste-Sparkman advertised and prepared for Christmas Bird Count.

2009

January 2009

The Neal Smith NWR Christmas Bird Count was held Jan. 3 with windy conditions making it cold and difficult to find birds. We had a great turnout, with 19 intrepid participants, which is way above average for this count. Participants came from as far away as Colombia and Brazil! Carl Nollen has participated in every single one of our counts and remembers when there were only 2 or 3 people. We spread out in 7 groups across the refuge and beyond, looking for any birds within a 7.5-mile radius Vandalia, which is the center of the circle. We ended up with 37 species for the count circle, with 34 of them on the refuge. Eurasian Collared-dove made the "count week" list (species not seen on count day, but seen within three days before or three days after count day). A total of 1370 individual birds were counted. Here are some of the notable sightings:

Bald Eagle	9
Northern Harrier	1
Short-eared Owl	2*
Belted Kingfisher	2*
American Crow	283*
Eastern Bluebird	8*
American Robin	28*
Swamp Sparrow	1 (third time on count)
White-throated Sparrow	1 (only second time on count)
Meadowlark sp.	1 (fifth time on count)

*highest number recorded in the history of the count.

It is exciting having so many Rough-legged Hawks around this winter. We have been seeing them regularly from the Prairie Learning Center. Short-eared Owls continue to be seen early in the morning. Northern Harriers were much more abundant in November and early December but most have moved on. Last year we had 10 harriers on the count. It is fun to compare results between years, but this count has only taken place 13 times and the weather and effort have varied considerably, so it is hard to determine any trends yet. This year's wind was probably a factor in our lower numbers of songbirds like American

Wildlife

Tree Sparrows, Dark-eyed Juncos, and American Goldfinches than we have had the last few years with similar effort. Fruit-eating birds like American Robins and Eastern Bluebirds have been found in high numbers in counts throughout Iowa this winter. Volunteer Jonathan Yentis provided tasty and hearty home-made soup for lunch to warm us up, and Joan Van Gorp shared delicious cookies. Many thanks to both of them, and to all who participated.

Bison and elk appeared healthy throughout the month. Although snow and ice made monitoring difficult, both bison and elk were frequently seen from the road.

February 2009

Bison and elk herds continued to be monitored. In general they appear healthy.

March 2009

Bison and elk remain in fair to good condition overall. A dead bull bison was found and determined to be the one with the injured leg located on roundup day last fall. He had an abscess on his leg. A pus sample was collected and sent to the Veterinary Diagnostic Laboratory. Grass was greening up in the bison enclosure by the end of the month.

Debruin reported a dead male bison. Upon further inspection we surmised it was the same bison we had seen last fall with an abscess on his left front knee. Pus from the abscess was collected and sent to Iowa State University Veterinary lab for analysis. Two common forms of bacteria were found. The animal had received a puncture wound (rut/fighting?) which became infected with common bacteria found in the soil.

April 2009

Rasmussen attended a workshop in Texas on Monarch butterfly monitoring with the intentions of developing a monarch monitoring program on the refuge.

Viste-Sparkman and intern Libbey Taylor conducted nocturnal frog and toad call surveys on April 22. American toads, chorus frogs, and northern leopard frogs were heard, as well as Wilson's Snipe, Henslow's Sparrows, and Barred Owls.

Viste-Sparkman and Drobney discussed the bird monitoring sampling on the refuge with Dr. Doug Johnson and Melinda Knutson. After discussing the past and current objectives, we decided to stay with the existing sampling design for 2009. Dr. Johnson offered to advise on analysis of our current data set.

After seeing a Barn Owl during a prescribed burn in the Bobolink unit in March, Viste-Sparkman checked all refuge barns and silos for evidence of use by owls. None was found. The Barn Owl is a state endangered species.

Wildlife

Bison appeared in fair to good condition. The first calves arrived in late April with three by the end of the month.

Hager, Viste-Sparkman, and Krizman located the prairie violet plots in High Point unit before it was burned to protect any Regal Fritillary Butterfly larvae that might be present. All five plots were successfully protected during the burn.

Hager cleaned and repaired water gaps in the bison enclosure after rain events.

April 2009

The Makoke Trail guide to birding in Central Iowa was completed and distributed. It has received good reviews from the public and in publications.

Viste-Sparkman assisted Bob Russell of Migratory Birds in hosting an Upland Sandpiper meeting attended by representatives from several state DNRs, TNC, Audubon, and Manomet Bird Observatory, as well as FWS.

The members of the Meskwaki DNR picked up the bison squeeze chute that the refuge had transferred to BIA. The Meskwaki are building a corral in preparation for their first bison roundup. We also discussed how their prairie restoration was progressing. They will be ready to plant about 80 acres this spring.

May 2009

Viste-Sparkman and Taylor conducted a Frog and Toad Call Survey on May 28. Western Chorus Frog, Eastern Gray Tree Frog, and Cricket Frog were detected.

Viste-Sparkman made preparations to conducting bird surveys beginning in June.

The bison and elk herd appear healthy and are beginning to shed their winter coats. There have been 12 bison calves by the end of May. Hager and Taylor collected bison fecal samples and they were sent to the Bozeman Wildlife Health Office.

June 2009

Rasmussen and Viste-Sparkman set up monitoring sites and assisted in the kick off to a new monarch monitoring program called the Monarch Larvae Monitoring Project (MLMP). Volunteers are monitoring milkweeds in 2 sites for monarch larvae and recording their findings with the MLMP data base found at www.mlmp.org.

Viste-Sparkman conducted bird point counts throughout June. Surveys were completed between June 3 and June 26 at 107 points.

Wildlife

The annual bison roundup has been confirmed for November 18-19th. Lee Jones from Region 6 will be coordinating the data collection. Rick Hager will coordinate the roundup and logistics. About 20 people will be needed for the roundup.

Sue Fairbanks, Iowa State University, received a Special Use Permit to determine what native and exotic plant species are distributed as seed carried by and shed in bison & elk hair at the Refuge.

June was a busy month for the volunteer program. Bookstore volunteers led the way with nearly 300 hours contributed. They did a commendable job adjusting to the increased visitor flow. Volunteers recorded nearly 500 hours between Adopt-a Trail program, the butterfly garden, seed collecting & Monarch monitoring program. Seeds of Success volunteers collected blue-eyed grass the first seed of the season.

July 2009

Two more bison calves were born, bringing the total to 15 by the end of July. The bison herd appears to be doing well. Another batch of fecal samples was collected and sent to the Bozeman office.

Three elk calves have been seen this month.

Viste-Sparkman, volunteer Yentis, and interns Zearing and Taylor conducted frog and toad call surveys. Four species were heard (western chorus frog, American toad, gray tree frog, and cricket frog).

Hay was harvested from Basswood unit for the bison roundup.

Region 6 biologist, Lee Jones, reported the Neal Smith herd had the highest fecundity rate of all National Bison Range animals this year with a 71% reproduction. This was higher than the animals remaining on NBR and the bison at Rocky Mountain Arsenal.

Hager left July 29 for a 5-week duck banding detail in Canada.

Groom and Viste-Sparkman presented the last Beginning Birding Class on July 11.

Groom and Viste-Sparkman led the annual butterfly count on July 11th.

Rasmussen provided an interpretive program on July 19th about the prairie focusing on the bison and prairie plants to 20 people of all ages.