North Dakota Army National Guard

Camp Grafton North

Integrated Natural Resources Management Plan

(INRMP)

Prepared by:

North Dakota Army National Guard Environmental Division

Updated

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Camp Grafton North
Integrated Natural Resources Management Plan
Prepared by:
Environmental Programs Branch, Office of the Adjutant General

Signature Page

I agree with and/or approve the following Integrated Natural _Resources Management Plan (INRMP). The plan meets the requirements for INRMPs listed in the Sikes Act and in the "Executive Summary and Scope" ofthis plan. Ithas set appropriate guidelines for conserving and protecting wildlif and other natural resources of Camp Grafton North.

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Annual Review and Coordination of the Camp Grafton North Integrated Natural Resources Management Plan

Signature for Certification

I agree with and/or approve that the Camp Grafton North Integrated Natural Resources Management Plan has been reviewed and properly implemented

_____

North Dakota National Guard

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United States Fish and Wildlife Service, North Dakota

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North Dakota Game and Fish Department

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EXECUTIVE SUMMARY

The North Dakota Army National Guard (NDARNG) is devoted to supporting the Army's underlying need for realistic military training in concert with efforts which will protect, enhance, and sustain the natural resources found at the Camp Grafton North (CGN) training area. NDARNG is also is committed to maintaining compliance with relevant laws (e.g. the Sikes Act (16 U.S.C. 670 et.seq) and applicable policies and regulations (AR-200-1).

The CGN Integrated Natural Resource Management Plan (INRMP) has the full support of the Adjutant General for the State of North Dakota and other personnel in command positions with NDARNG. Command support is essential for the implementation of this INRMP and is required for many of the natural resources management projects described herein.

The CGN is owned by the State of North Dakota and operated by the NDARNG. CGN supports a variety of military users and serves as NDARNG's primary training site for NDARNG units. These Units include three Battalions: the Quarter Master Battalion, Air Defense Artillery Battalion and the Aviation Battalion. CGN is also utilized by the Regional Training Institute (RTI), which has a national training mission including courses for equipment operator 21E, 21J, and bridge crew members 21C. Annually CGN is utilized by approximately 2500 soldiers trained at the RTI, with soldiers logging 7770 man days at the CGN's ranges, 4790 man days at CGN's training areas, and 950 man days at the bivouac sites.

1. Overview

1.1 Purpose

The purpose of this plan is to guide natural resources management of the Camp Grafton North Training Area (CGN) while simultaneously meeting military training mission requirements and ensuring NDARNG compliance with all relevant environmental regulations set for by the Sikes Act.

CGN's first Integrated Natural Resources Management Plan (INRMP) was published in 2002. This new document is designed to update the original plan in pursuant to the Sikes Act (16 U.S.C. 670 et.seq.) and in the future CGN INRMP will be periodically updated as necessary to address major revisions.

The Sikes Act (16 U.S.C. 670 et. seq.) requires the preparation and implementation of an INRMP and ensures the " no net loss in the capability of military lands to support the military mission" of the training site has occurred as a result of natural resources management set out in this plan. The CGN INRMP has been developed using the principles of ecosystem management and covers all CGN natural resources conservation activities, best management practices, and land management options for sustaining CGN's ability to support current and future military training efforts. NDARNG environmental activities at CGN include the management of threatened or endangered species, woodland operations, hunting and fishing, fire management, soil erosion control, invasive species control, and both protection and enhancement of the waters of the United States which includes CGN's wetlands.

As required by the Sikes Act, the CGN INRMP has been prepared in cooperation with the U.S. Fish & Wildlife Service (FWS) and the North Dakota State Game & Fish Department (NDGF). The completed and approved CGN INRMP addresses NDARNG plans to conserve, protect, and manage the fish and wildlife resources at CGN and exemplifies the cooperative and mutual agreement between the NDARNG, FWS and the NDGF.

The CGN INRMP also addresses cultural resource compliance matters associated with implementing the INRMP. Careful consideration has been given to insure the INRMP details natural resources management efforts that could impact cultural sites and sets out steps that will ensure NDARNG compliance with all cultural resource statutes, regulations, and policies.

1.2 Scope

CGN is a 1856 acre state owned annual training site situated in east central North Dakota. More precisely, CGN is located within Ramsey County approximately 3 miles south of the city of Devils Lake, North Dakota.

CGN is a triangular shaped peninsula with water two sides and land on another (Figure 1). On CGN's southwest perimeter, the waters of Devils Lake lap directly against CGN's shoreline. Along CGN's eastern perimeter lie State Highway 20 and the waters of Devils Lake. Highway

20 serves as a dam which prevents the waters of Devils Lake from inundating portions of CGN. The highway also leads north into the community of Devils Lake and south towards the Spirit Lake Reservation. Lastly, CGN is bordered to the north by land. The acres to the north are comprised of residential homes, agricultural fields, and hardwoods. The dryland areas to the north of CGN are constantly being threatened by the ever rising waters of Devil Lake.

A recent addition to CGN includes 155 acres of property referred to as the Regional Training Institute Local Training Area (RTI-LTA). The RTI-LTA is located four miles west of Devils Lake and adjacent to North Dakota Highway 19.

The NDARNG Environmental Office is responsible for the management of these natural resources located at CGN and in order to accomplish this goal, the Environmental Office has developed cooperative agreements with various state agencies to ensure that the best technical expertise is utilized. Additionally, the environmental office is responsible for 1) providing technical assistance to training site personnel, 2) training on site personnel and units, 3) updating the INRMP 4) updating the Integrated Pest Management Plan (IPMP), and 5) coordinate the ITAM program in cooperation with North Dakota State University (NDSU).

All acronyms found within this document are listed in Appendix 1.

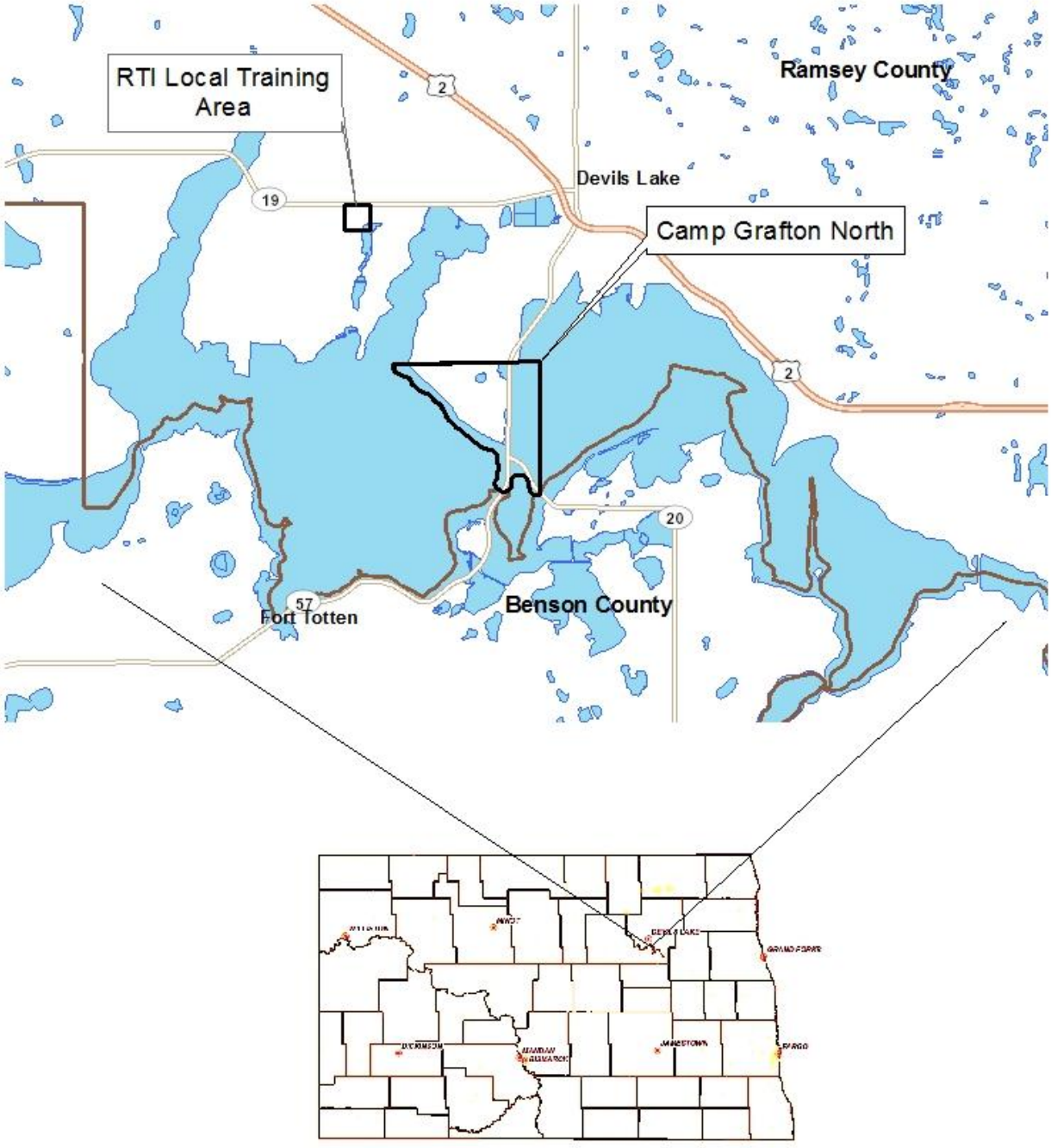

Figure 1. Vicinity map of Camp Gilbert C. Grafton (North Unit) near Devils Lake, ND.

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1.3 Goals and Policies

Camp Grafton Annual Training Site personnel, the Training Site Manager, and Environmental Office personnel will use the INRMP.

The CGN INRMP consists of two sections:

1. A description of the history, mission, setting, and resources of CGN

2. Implementation steps which ensure the continued stewardship of CGN and provide managers with the ability to:

    - choose optimal sites for training activities
    - identify and protect environmentally sensitive areas
    - ensure natural resources management and military training are accomplished concurrently
    - improve ecosystem health and tolerance to drought, insect infestations, floods, fire, windstorms, livestock use, and military training
    - manage natural resources in coordination with other state and federal agencies
    - maintain positive public relations by conducting good land stewardship

Training sites provide military troops with the training needed to win wars and protect our nation. Impacts from training will be minimized and/or mitigated to maintain the carrying capacity of the training site. The military will plan training activities so they will not negatively affect the people, lands or resources surrounding the training site or the training site itself.

Effective planning requires knowledge of the training site resources and required training activities. With this knowledge, training site managers can choose the locations best suited for each training activity. With proper management, training sites can continue to provide quality training through the years.

The goals of CGN INRMP are:

- Maintain training land in a condition, so they can be used in perpetuity for realistic military training
- Integrate elements of natural resources management into a single program which, in turn, can be integrated into the North Dakota Army National Guard military training and environmental management program

- Describe the training site and its natural resources

- Describe the military mission, potential effects of the mission on natural resources at the training site and options for resolving potential conflicts between the military mission and natural resources management

- Provide references, show the environmental compliance status of the training site and the INRMP; and define responsibilities for the management of natural resources

- Show the status of baseline inventories of natural resources and the monitoring needs for environmental compliance

- Describe re-vegetation and erosion control techniques used that will maximize stable soils and ensure high quality water resources and training lands

- Detail methods used to increase environmental awareness of the NDARNG personnel and the public

- Outline management guidelines, policies and projects that will be effective in maintaining and improving the sustainability and biological diversity of ecosystems on the training site, support human needs, emphasize public involvement, partnerships and adaptive management

- Manage natural resources at CGN to assure good stewardship of public lands

- Provide necessary means for implementation of the plan

Benefits of the INRMP to the military mission include improved training lands, better distribution of military activities and addressing public concerns at CGN. This plan will enhance mission realism through more options for training as well as providing natural resources data, enabling more intensive mission planning.

Benefits to the environment include reduced soil erosion and vegetation loss, protection of plant animal populations and habitats, protection of water quality in watersheds and an increase in overall knowledge of the operation of the ecosystems on CGN through surveys and monitoring.

1.4 Responsibilities

NDARNG Environmental Program is responsible for developing and implementing the INRMP in cooperation with the U.S. Fish & Wildlife Service (FWS) and the North Dakota State Game and Fish Department (NDGF) as required by the Sikes Act. In accordance to Department of Defense (DoD) policy the NDARNG Environmental Program will conduct annual INRMP reviews with the Sikes Act partners.

NDARNG is responsible for integrating the INRMP with the installation master plan, range plans, training plans, integrated cultural resources management plans (ICRMPs), integrated pest management plans (IPMPs), cleanup installation action plans (IAPs), and other appropriate plans to ensure plans are consistent and in concert with environmental, wildlife, and invasive species laws and regulations.

The FWS and NDGF for their part will review and provide comment on the INRMP as necessary to insure the INRMP addresses Wildlife and Wildlife Management concerns applicable to the CGN. A review of the plan will take place at least once every five years and, if necessary, the plan will be revised to address significant changes to mission, natural resources, laws, etc affecting the Natural Resource program at Camp Grafton North. The INRMP can also be up-dated as appropriate in concert with the installations needs to obtain mutual agreement in coordination with FWS & NDGF.

1.5 Authority

As required by the Sikes Act, this INRMP has been prepared in cooperation with the U.S. Fish and Wildlife Service (FWS) and the North Dakota State Game and Fish Department (NDGF). The completed and approved INRMP exemplifies the cooperative effort and mutual agreement between the NDARNG, FWS and the NDGF addressing the conservation, protection and management of fish and wildlife resources.

Pursuant to 16 U.S.C. 670a (b) (1) (I), this INRMP ensures that " no net loss in the capability of military lands to support the military mission" of the training site has occurred as a result of natural resources management set out in this plan. Identified within this plan are specific management objectives for maintaining the training site's mission capabilities.

1.6 Stewardship and Compliance

1.6.1 National Environmental Policy Act of 1969

The National Environmental Policy Act of 1969 (NEPA) was passed by Congress to protect human and natural resources. This Act requires all federal agencies to evaluate proposed actions to determine all possible alternatives and environmental impacts.

The NDARNG Environmental Office administers the NEPA process for the NDARNG. The NEPA is a three-level process. A record of environmental consideration (REC) is prepared and if the proposed action is determined to have an insignificant impact on the environment, the project may proceed as planned. At the second level an Environment Assessment is required. After the Environmental Assessment (EA) has been written and reviewed, the project may proceed if there is a Finding of No Significant Impact (FONSI). If more study is needed, the third level must be implemented with an Environment Impact Statement written and procedures for completing the project defined by the National Guard Bureau.

An EA was prepared addressing the implementations and impacts of the CGN INRMP and a FONSI was signed on October 1, 2001. A REC was prepared for the updated CGN INRMP.

1.6.2 Natural Resources Awareness

The NDARNG publishes environmental annexes in the training circulars produced by the Directorate of Plans, Operations and Training, and the units. In addition to that information, the Environmental Office provides maps to the units with sensitive areas marked. The information, in turn, enables the units to develop operational plans which minimize their impacts to these areas.

NDARNG has sponsored a wide variety of forestry, wildlife, and noxious weed control studies at CGN. The studies for the most part have been conducted by North Dakota State University and research findings have been shared with local, state, and national audiences. NDARNG offers the public to the opportunity to tour CGN and witness how NDARNG has incorporated the research findings into natural resource management program. These tours allow NDARNG the opportunity to ensure the public that the Guard is a good steward of the state owned natural resources identified at CGN.

1.6.3 Environmental Compliance Documentation and Status

The NDARNG completed an EA for the 2001 CGN INRMP and a REC for the 2013 CGN INRMP. These documents are available upon request from the North Dakota Army National Guard Environmental Office, Office of the Adjutant General and address CGN INRMP and the NDARNG Integrated Cultural Resources Management Plan. The NDARNG does not anticipate any new projects requiring additional EAs in the foreseeable future.

1.7 Review and Revisions

Annually NDARNG solicits comments from and/or meet with internal and external stakeholders to discuss CGN's environmental management efforts, implementation of the INRMP, newly documented directives, proposed CGN projects, changes in the training mission, and/or issues of concern. If necessary, the INRMP will be revised in the future to address significant changes or major issues of concerns made by the stakeholders. A revision is not required if circumstances have not changed.

1.8 Management Strategy

The INRMP supports the NDARNG's planning process by providing information about natural resources and projects for improving training opportunities and realism. The integration of CGN's INRMP with the integrated pest management plan (IPMP) provides opportunities to better manage the natural resources and compliance with applicable laws and regulations. Details contained in the plan also provide users of CGN with information regarding the types of training allowed within the training area. Users may also find information regarding permitted activities by referring to the Camp Grafton Training Center (CGTC) Standard Operating Procedures (Appendix 9). Activities requiring additional coordination must be detailed via a

CGTC training area request as early as possible, to avoid potential scheduling and environmental conflicts.

Effective planning requires all associated information regarding an area's training site resources. When fully armed with the details about the natural resources and training requirements, training manager can best select areas able to meet training requirements and also able to sustain training activities will into the future.

This plan supports the Environmental Management System (EMS) – "Plan, Do, Check, Act" model by describing the environmental aspects and properties. It also allows planning to minimize or eliminate negative disturbances to the resources (plan). The plan allows for training activities to be implemented that fit the current resources, both physical and environmental (do). This document allows the Installation Commander to review all concerned issues, both land and wildlife, and develop training activities in proper areas (check). The plan describes monitoring protocols and a monitoring plan to determine direct and indirect impacts, both negative and positive, on the faunal and floral resources. Finally, the plan describes reporting protocols for reviewing impacts of training activities on the natural resources and progress of any ITAM Programs (act).

ITAM and the Sustainable Range Program (SRP) fund many land management projects at Camp Grafton particularly those involving reconfiguring training lands and repairing maneuver training damage. As our partners, FWS and NDGF may also provide funding through various methods, such as in-kind services, which support natural resources management. The NDARNG may also leverage funds from the Directorate of Facilities Engineering to provide infrastructure maintenance. Projects of this type may affect natural resources management concerns, such as, maintaining trails, controlling surface water runoff, and the control of noxious weeds.

1.9 Plan Integration

Camp Grafton's INRMP is integrated with the Integrated Pest Management Plan (IPMP), the Range Complex Master Plan (RCMP) and the Real Property Development Plan (RPDP).

Current Conditions and Use

2.1 Installation Information

2.1.1 General Description

Camp Grafton North (CGN) is a state owned facility located within Ramsey County, North Dakota. The primary and oldest portion of CGN is located 3 miles south of the city of Devils Lake and its newest addition, the Regional Training Institute – Training Area (RTI-TA), is located 4 miles west of the city.

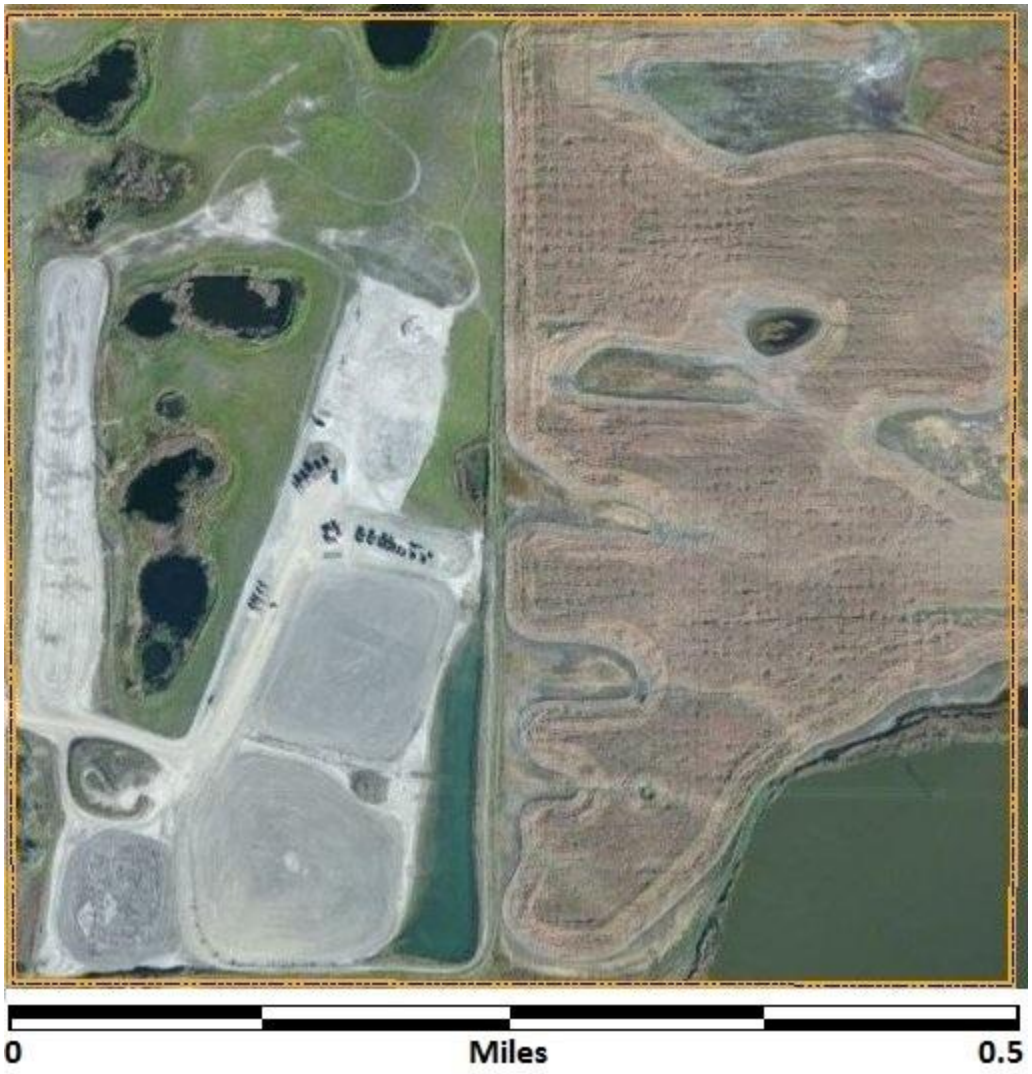
The primary area of CGN is situated on triangular peninsula which stretches into the waters of Devils Lake (Figure 2). In has been recorded as1700 dryland aces, but currently 516 of those acres are inundated by waters of Devils Lake. The site's remaining 1184 dryland acres are made-up of a cantonment area, roads and undisturbed forested lands. The cantonment area & roads account for 222 acres and the remaining 962 acres are covered by mechanically undisturbed forested land (bur oak/green ash tree community) with wetlands and prairie found either within or bordering the forest community.

The primary area of CGN is bordered by both land and water. On its northern perimeter forested areas, hayland and residential homes can be found. To the east, the camp is border by North Dakota State Highway 20. Highway 20 services as the primary pathway to CGN and acts as a dam which prevents the waters of Devils Lake from flooding areas of CGN and properties owned by both public and private entities. The camp's southwestern parameter is bordered by the waters of Devils Lake. This particular interface between CGN and the Devils Lake has been built up and armored with rock to prevent shoreline erosion and further inland flooding.

During 2012 CGN increased in size when the state purchased a 155 acre area for heavy construction equipment and military training. The RTI-TA was first leased by NDARNG in 1999 and prior to 1999 the area of the RTI-TA had been used for hayland and growing small grains. The RTI-TA is surrounded by privately owned agricultural lands, but it's also bordered to the north by State Highway 19 and to the west by an unpaved township road. Currently, the RTI-TA is a collection of 31 acres of land used for heavy equipment training, 112 acres of hayland, and 12 acres of wetlands (Figure 3).

Figure 2: Camp Grafton Training Center (CGTC)

Figure 3: Camp Grafton North Regional Training Institute Training Area (RTI-TA)



2.1.2 Regional Land Use

CGN is located within an agricultural region of north central North Dakota. Small grains (spring wheat, barley, durum, oats, and winter wheat), oil seeds (sunflowers & canola), forage production (corn silage, alfalfa, mixed grass hay, tame pastures, & native rangeland), and livestock production (beef cattle, dairy cattle, hogs, horses and sheep) summarize the majority of the agricultural activities conducted within the area surrounding CGN.

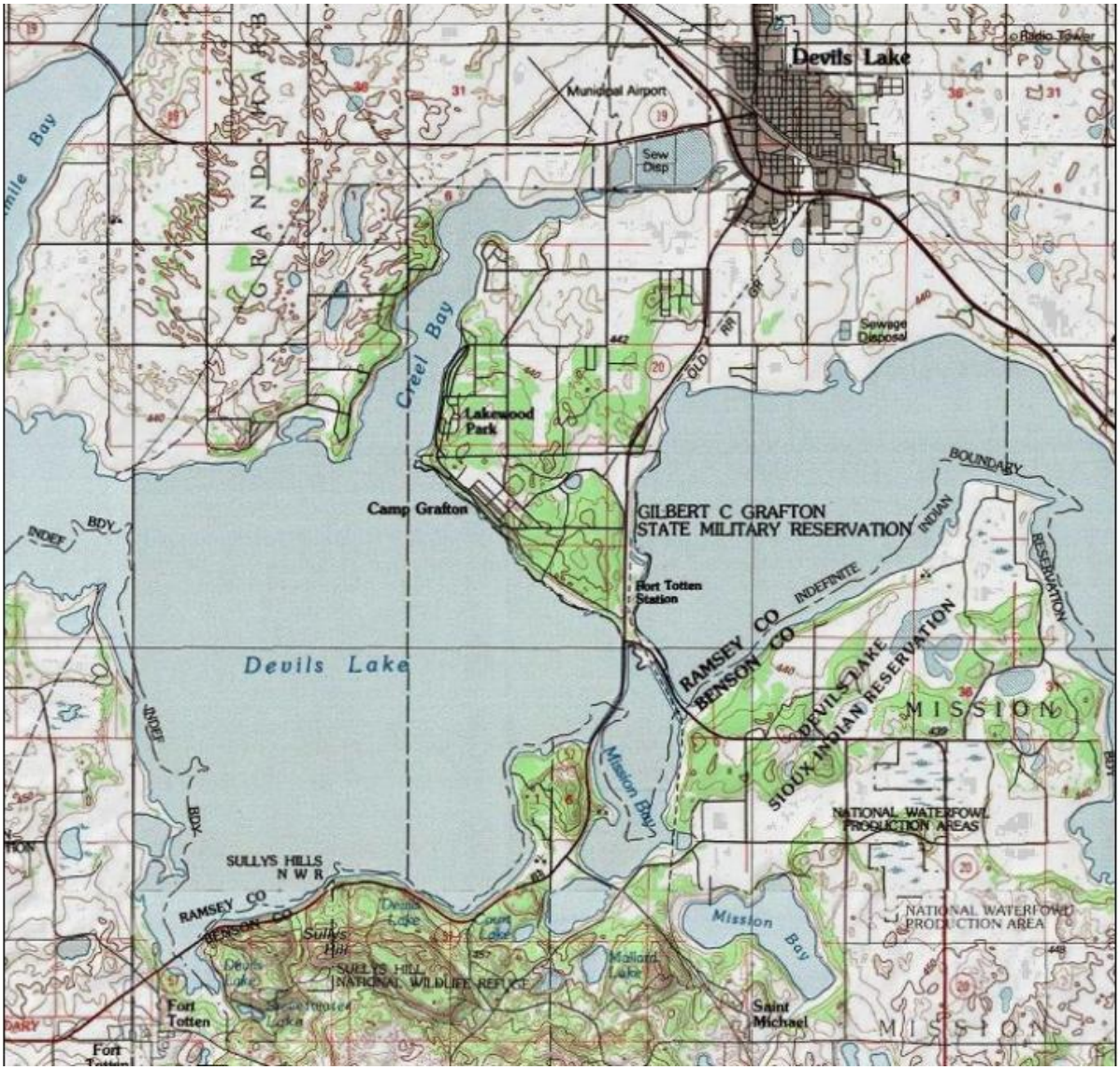
CGN is also located within an area with a numerous water bodies and wetlands. The continental glaciers that geologically impacted the state of North Dakota over 10,000 years ago, created numerous lakes and wetlands in regional the area of CGN. The lack of outlets associated with these water bodies in combination with a climatologically wet cycle in the Devils Lake region, both help to explain why the lake's elevation and surface acres continue to increase. The runoff

from rain and snow storms has impacted the lake and has increased the lake's surface acreage of 44,230 acres (1993) to its present day size of 211,300 acres. The unusually high amount of precipitation between 1993 and 2011 have contributed to the flooding of farms, lake side residences, wildlife/water fowl production areas, and other areas. The flooding also accounts for a growing number of recreation related businesses (boating, camping, fishing and hunting) being established in the region.

The region surrounding CGN is not densely populated; however, the most populated areas in the region are relatively close to CGN. 3 miles to the north of CGN is the community of Devils Lake, population 7141. Numerous rural residences can also be found between CGN and the city of Devils Lake. 1.3 miles south of CGN is the northern border of the 90,000 acre Spirit Lake Sioux Reservation, population 4228. Fort Totten, population 1694, is located 8 miles to the southwest, St. Michael , population 591, is located 6 miles to the southeast, and Tokyo, population 360, is located 12 miles southeast of CGN. All three communities are within the parameters of the Spirit Lake Reservation.

There are a number of notable properties near CGN. The Devils Lake Municipal Golf Course is located only one mile north of CGN. Three miles north of CGN is the Devils Lake Municipal Airport. Five miles to the west of CGN and across the waters of Devil's Lake is Gramms Island State Park. Two miles south of CGN is the Spirit Lake Reservation's Casino and Resort. Four mile southwest of CGN is Sully's Hill National Wildlife Refuge and four miles to the east of CGN is one of the region's many National Water Fowl Production Areas.

Figure 4: Camp Grafton North Surroundings & Topographic Map



2.1.3 History

CGN was originally part of the Fort Totten Military Reservation created on January 11, 1870 pursuant to an executive order signed by President Ulysses S. Grant. Initially, the Fort Totten Military Reservation included over 11,000 acres and was located within the borders of the Devils Lake (Indian) Reservation established in 1867. Rock Island (the site of CGN) was annexed to the Fort Totten Military Reservation on 7 October 1873 when “all the islands in Devils Lake area were added to the present military reservation of Fort Totten, Dakota Territory” by executive order of President Grant. The "islands" held a heavy stand of timber with the intended use as a supply of fuel (and building materials) for Fort Totten. Because of its ample stand of timber,

Rock Island became known as the Fort Totten Wood Reservation. Later when the water levels of Devils Lake dropped, it was recognized that Rock Island had become a peninsula. By 1890, the military no longer had a need for Fort Totten and the soldiers were withdrawn and buildings and grounds at Fort Totten turned the property over to the Secretary of the Interior for use as an "industrial training school for Indian youth".

On 6 July 1894, (per Public Law 102) that part of the former Fort Totten Military Reservation known as the Fort Totten Wood Reservation was ceded to the State of North Dakota for "the use of the militia of the state and for other public purposes not inconsistent with such use". A concurrent resolution passed by the Fourth North Dakota Legislative Assembly (1895) accepted the land donation on behalf of the State of North Dakota. At the time the Fort Totten Wood Reservation was transferred to the State of North Dakota, it included the southern two miles of the Rock Island peninsula most of which was heavily wooded and ideal for military training. The NDARNG's first encampment at what is now CGN was held in July of 1891. A lack of funding from the state curtailed development at the camp for several years. The first camp improvement project was undertaken in 1896 and 1897 when brush and trees were cleared for a parade ground. The first building at the encampment site was completed in 1902. It was a stone warehouse built for storing tents and other equipment. In addition, a wood frame caretaker's residence, a water tank, and tower were built. Also completed about this time was a rifle range. Two years later, a barn was constructed to house the horses, which were used during the annual encampment period. By 1906, it was estimated the value of the buildings, land, timber, and other improvements located at Camp Grafton totaled $200,000.00.

Today, Camp Grafton is much different from its early days when its only flurry of activity occurred during the annual two-week encampment periods. CGN offers training all year round to soldiers from across the country. Soldiers can attend Officers Candidate School or NCO leadership courses. They can obtain training in operating heavy equipment, bridge building, demolition, military operations in urban terrain, or food preparation. In addition, CGN provides soldiers vertical engineering training programs in the areas of carpentry, plumbing and electrical.

2.1.4 Military Mission

The North Dakota National Guard Joint Strategic Plan 2010-2014 states the military mission as: “Providing ready units, individuals, and equipment supporting our communities, state and nation.” The vision for this mission is: “A dynamic relevant force where everyone is a trained, mentored and empowered leader.” CGN fulfills this mission by providing operational training lands where our personnel can train to achieve tactical and technical proficiency.

The NDARNG Environmental Office monitors the training lands of CGN and is responsible for the management of CGN’s natural resources. To accomplish this goal, the Environmental Office has developed cooperative agreements with various state agencies to ensure that the best technical expertise is available and utilized. The NDARNG Environmental Office is responsible for 1) providing technical assistance to training site personnel, 2) providing training for training site personnel and units using CGN, 3) updating the INRMP, 4) updating the Integrated Pest Management Plan, and 5) and coordinating the CGN ITAM program.

Coordinating environmental conditions with training activities helps to minimize damages to CGN's natural resources and insures NDARNG is able to sustain CGN for the many military and civilian organizations using the training site. Two major military commands primarily training at CGN. They are the 141 Maneuver Enhancement Brigade and 68th Troop Command. Subordinate units within these commands include the 1-112th Aviation Bn, 136 Css Bn, 164 Engr Bn, 231 Bde Spt Bn, and the 188th ADA Reg. NDARNG units with Joint Forces Headquarters also train at this site. The 164 Regional Training Institute (RTI) is located at CGN. Their mission is to train soldiers nationwide on engineer subjects and equipment operation. Civilian agencies including the North Dakota Highway Patrol, North Dakota Department of Transportation, North Dakota Probation, Lake Region State College and city police departments use facilities at CGN for training. Training areas at CGN are also available for; Military Operations in Urban Terrain (MOUT), Rappelling, Leadership Reaction, Land Navigation, and engineer equipment operation. CGN has sites that support convoy operations, and military bridging. Other units using the training area include: Aviation (Light Utility Helicopters), Air Defense Artillery (mechanized), Medical, and the Quartermaster (water purification, water storage).

2.1.5 Operations

A great number of training activities take place at CGN; however, only a few of the training programs enacted have the potential to impact the natural environment. These include:

- Maneuver Training
- Bivouac Operations
- Convoy Lane Area is located in Training Area with demolitions simulator pits
- IED Practice Lanes
- NCOS Training (fire impact)
- Horizontal Project Construction
- MOS training

2.1.6 Constraints

2.1.6.1 Primary Training Constraints

CGN has only a few constraints with the potential to affect training. These include cultural resources sites and wetlands areas. Wetlands and cultural resource sites can limit where training will take place and they present a challenge in which NDNG balances the training need against environmental impacts. For example, CGN has digging restrictions; however, dig permits may

be issued to units requesting to dig in areas without known cultural resources, threatened and endangered (T&E) species, sensitive habitat, or wetlands issues.

To best protect sites from vandalism, exploitation, and unnecessary physical disturbances, maps identifying both sensitive habitat areas and cultural resources site are maintained by the Camp Grafton Technical Center's (CGTC) Environmental Manager. These maps are not included in the INRMP. It is of major importance that units training at CGN contact the CGTC to insure their activities will not adversely impact cultural sites or disturb T&E species in the CGN area.

2.1.6.1.1 Threatened & Endangered Species Constraints

Protecting habitat areas required for T&E species can present a unique obstacle to training; however, the Whooping Crane (Appendix 4), a T& E species associated with Ramsey County, is unlikely to be sighted at CGN. This species places only limited constraints upon CGN training activities. In the event a Whooping Crane is sighted at CGN all efforts will be made to avoid disturbing the T&E species. All Whooping Crane sightings will be reported to the Environmental Office or the CGTC Environmental Specialist.

2.1.6.1.2 Cultural Constraints

CGN has a rich archeological history. Cultural resource studies conducted at CGN over the past three decades have recorded 18 archaeological sites within the training area. To maintain compliance with Section 106 of the National Historic Preservation Act (NHPA) and the Native American Graves and Repatriation Act, it is of great importance to NDARNG that every effort be taken to prevent training activities from inadvertently damaging both NHPA eligible and unevaluated cultural sites. To protect CGN's cultural resource sites, their locations are maintained confidential and maps displaying their locations have not been included in the CGN INRMP. Training units are required to work with the CGTC Environmental Specialist to ensure their training efforts and ground disturbing activities will not impact the cultural resource sites recorded at CGN.

2.1.6.1.3 Wetland Constraints

CGN water bodies physically limit where training can be conducted (Figure 5 & 6); however, federal and state water quality regulations, laws, and codes represent the greatest constraints to NDARNG training activities. CGN's surface waters are protected by AR 200-1, EPA's Clean Water Act, and the North Dakota Century Code, each in part emphasize pollution prevention and the protection of water quality.

In order to meet compliance with federal and state regulations, acts and codes, NDARNG restricts unwarranted high impact training activities within and/or in close proximity of CGN's wetlands and surface waters bodies. High impact training activities and disturbances within these basins release plant nutrients entrapped by the basin sediments. The released nutrients then spawn a cycle of events (algae blooms, plant decomposition, & oxygen deletion), which

negatively impact water quality and threatens the survival of number of invertebrates and vertebrates found within these waters.

When it's feasible, units are advised not to train within 30 meters of a wetlands and/or surface water body. Avoiding these areas makes it easier to sustain the vegetation along these areas and maintain water quality standards. A 30 meter vegetative zone or buffer located at the edge of a wetland or water body acts as a filter capable of filtering out more than 90% of the sediments and nutrients carried by the run-off waters flowing into these water bodies. Migratory birds also benefit from a 30 meter vegetative zone and/or buffer. Migratory birds heavily use these narrow areas for the purpose of staging, nesting, & rearing young. The importance of a vegetative zone to migratory birds is supported by the fact that 31% of the birds listed by the North Dakota Game & Fish Department Comprehensive Wildlife Conservation Strategy nest within 30 meters of a wetland or water body. Staging NDARNG training activities outside the 30 meter buffer area helps to maintain the unique wildlife habitat found adjacent to CGN's wetlands. During the nesting period it is important to limit training impacts that adversely affect those migratory birds utilizing these areas.

Figure 5: CGTC Surface Water and Wetland Resources

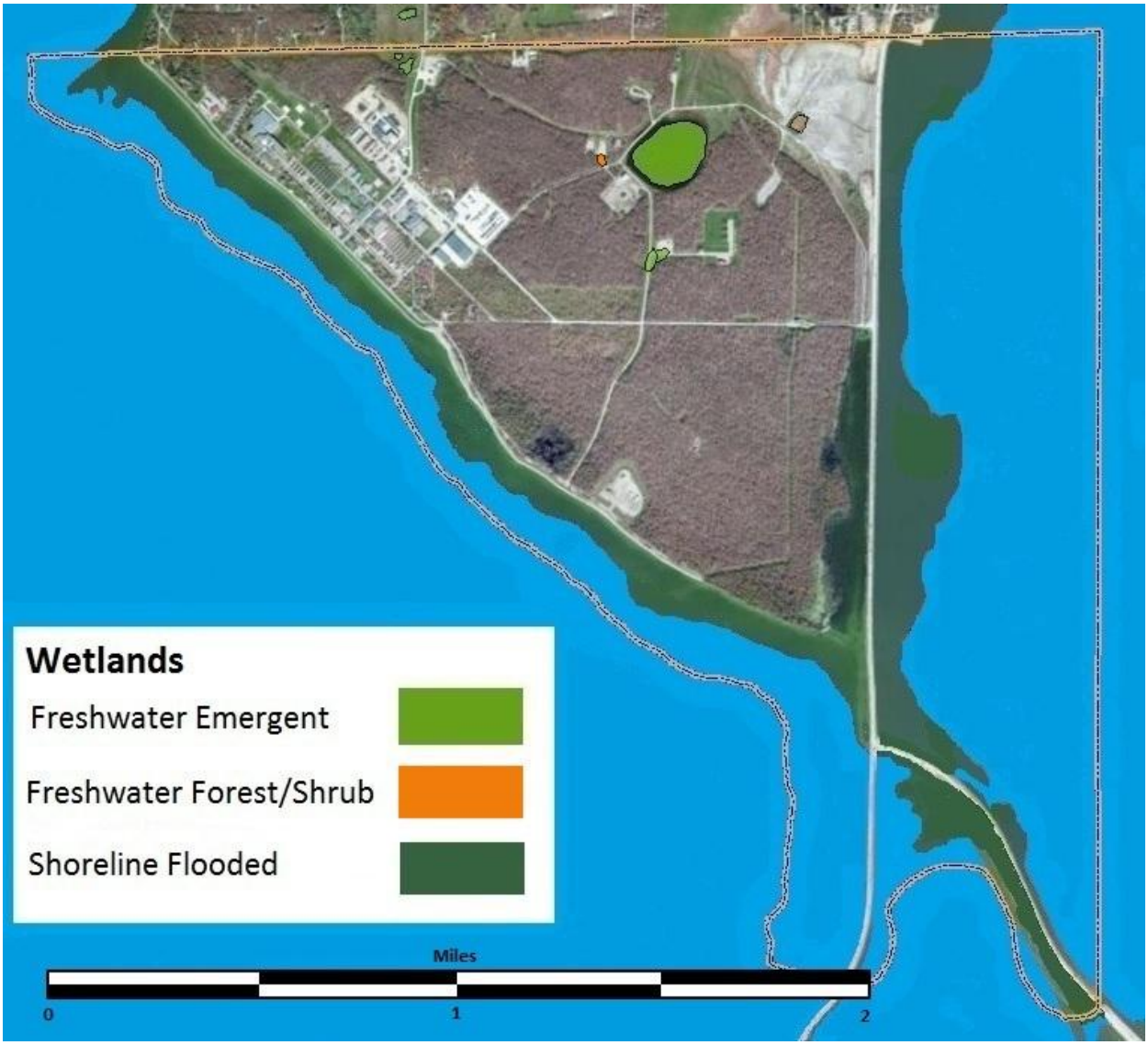


Figure 6: CGN RTI-TA Wetlands and Surface Waters

2.1.6.2 Secondary Training Constraints

Soils at CGN represent a secondary training constraint. CGN's soil resources don't directly limit annual training activities, but abusing the soil resources could eventually impact the training site's long term sustainability. Therefore, it is important to reference available soil resources (Ramsey County Soil Survey) and select training locations with soil factors (profile, texture, grade, slope length, and vegetative cover), which are able to tolerate the physical impacts created by a particular training activity.

2.1.7 Opportunities

2.1.7.1 Training Opportunities

All areas of CGN provide opportunities for training. Constraints discussed in the prior section primarily limit high impact and ground disturbing training activities to specified areas. Impacts to known cultural sites, areas with threatened & endangered species, areas with surface water, and wetlands all have the potential to trigger violation of federal and state regulations. Consulting with CGTC staff will help to insure training activities will not adversely impact theses sites.

CGN's secondary constraints, such as steep slopes, highly erodible lands, or sites with fragile vegetation are also suitable for training purposes. Again, high impact training activities upon these areas can easily damage the vegetative growth and initiate erosion problems. Therefore, it is important that units work with the CGTC staff to insure planned training activities take place within areas able of enduring and sustaining their training activities.

2.1.7.2 Partnering Opportunities

NDARNG has fostered a favorable relationship with area landowners, state agencies, and federal agencies. As a result NDARNG has been able to work together with these groups upon mutually beneficial projects. The members of the Devils Lake community have shown overwhelming support of the NDARNG and together the NDARNG, the North Dakota Department of Transportation, the city, and area land owners have fought against the rising water levels of Devils Lake. The cooperation and support between these organizations have resulted in the construction of numerous projects that collectively protect Camp Grafton North, the Devils Lake Community, and numerous properties within the Devils Lake Region.

2.2 Physical Environment and Ecosystems

The plant and animal communities, ecosystem, and biological diversity are integral components of the ecological concept. Barbour et al. (1987) defined communities as interrelated assemblages of plants and animals found in a given region or area. For example, a community can be classified as prairie that includes the living organism found within the area. They defined ecosystems as the sum of the plant community, animal community, and environment in a particular region or habitat. The CGN is part of a large ecosystem that includes several plant and animal communities found in northeastern North Dakota all of which vary with changes in topography and soils.

2.2.1 Soils

CGN soils have been developed upon geological deposits left behind by the retreating glaciers that once covered the majority of North Dakota over 10,000 years ago. The soils at CGN have also been strongly influenced by factors, such as, vegetation, topography, climate conditions (moisture and temperature), and time.

The *Soil Survey of Ramsey County, North Dakota* (Bigler and Liudahl 1986) shows 17 soil-mapping units within the boundaries of CGTC & RTI-TA (Figure 7 & 8). The upland prairie soil (upland, midland, and lowland swales) series include Fargo, Svea, Bearden, Aberdeen-Fargo, and Towner soils and comprise 52 acres. Bottomland soil (wetlands, wet meadow, and marshes) series include Tonka, Parnell, Southham, Lallie, Southam, and Mauvais soils and comprise 117.4 acres. Hardwood forested soil series include Hamerly-Wyard, Zell-Maddock, Towner, Wamduska-Mauvais, Mauvais, Dickey-Buse-Embden soils and comprise 1,014.6 acres.

CGN's upland soils developed under prairie vegetation. Prairie vegetation has deep, fibrous root systems that grow, die, and decay to form a humus soil. Glacial soils influenced by prairie vegetation frequently are deep with thick layers of topsoil. The upland soils at CGN include silty clay, loam, silty clay loam, and fine sandy loam textured soils with 0-3 percent slopes.

Over 9.9 percent of CGN soils are classified as wetland and wet meadow. These soils are also very deep, poorly or very poorly drained, and may have water on them for periods of time during most years. These soils are associated with depressions or convex topographical locations.

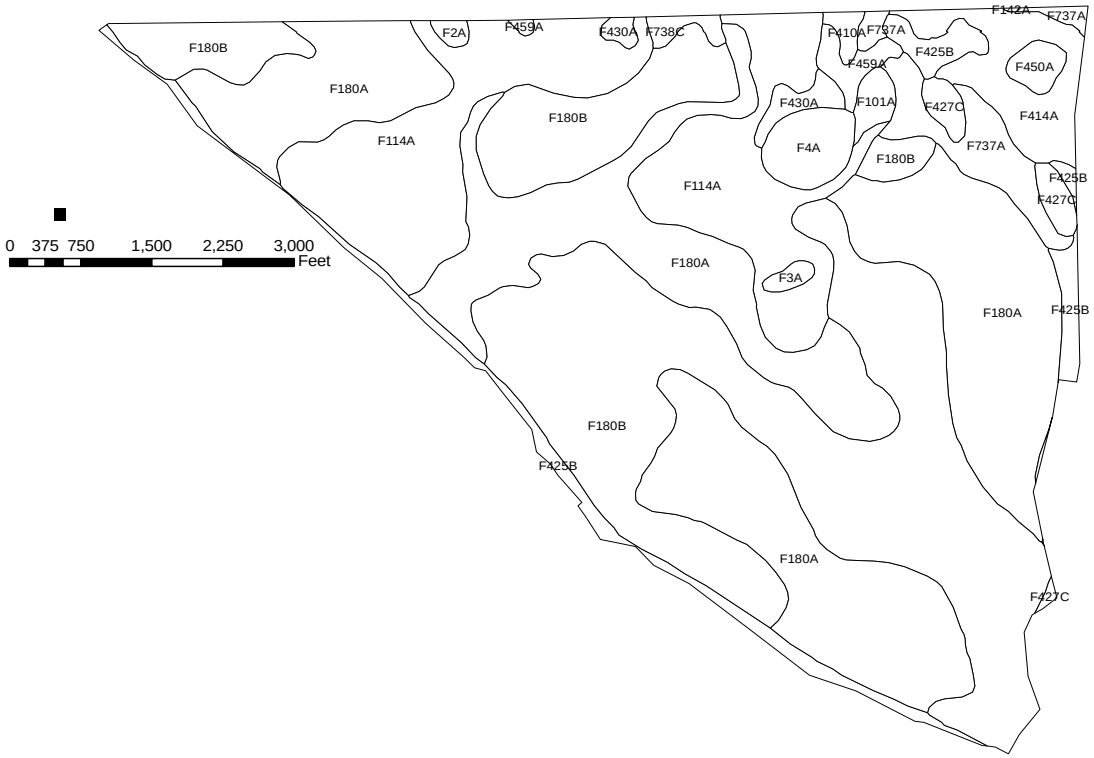
The majority of CGN's soils have been strongly influenced by its hardwood forest. Hardwood forest soils comprise 85.7 percent (1,014.6 acres) of CGN's land area. These soils have been strongly influenced by the growing hardwood community over story and mixed grass plant community understory. Unlike a prairie soil, the organic matter associated to a hardwood forest soil is found on the surface rather than distributed throughout the soil profile (Bigler and Liudahl 1986) and surface horizons are thinner than the prairie soils. These soil types are well to moderately drained and have a soil texture of clay loam, loam or sandy loam. The CGN hardwood forested soils are also associated with slopes between 1 to 9 percent grade and they have limited land use options due to hardwood forest cover.

A minority of CGN's soils are limited in their use by erosion. Approximately 52 acres of the soils are susceptible either to water or wind erosion. Protecting these soils from the forces of erosion somewhat limits their use; however, maintaining permanent plant cover upon these soils will protect them from both wind and water erosion.

Soils located at RTI-LA have been strongly influenced by the prairieland grasses that once grew upon the area. Soils at the RTI-TA have deep soil development with high amounts of organic matter throughout. The Barnes, Svea and Sioux soil mapping units are well drained. Vallers, Valle, Hamerly , Balaton, and Udorthent soil mapping units are poorly drained and are associated with a sodic or alkaline layer in the subsoil. The soils also have a high level of tolerance to erosion and reasonable resistant to wind erosion.

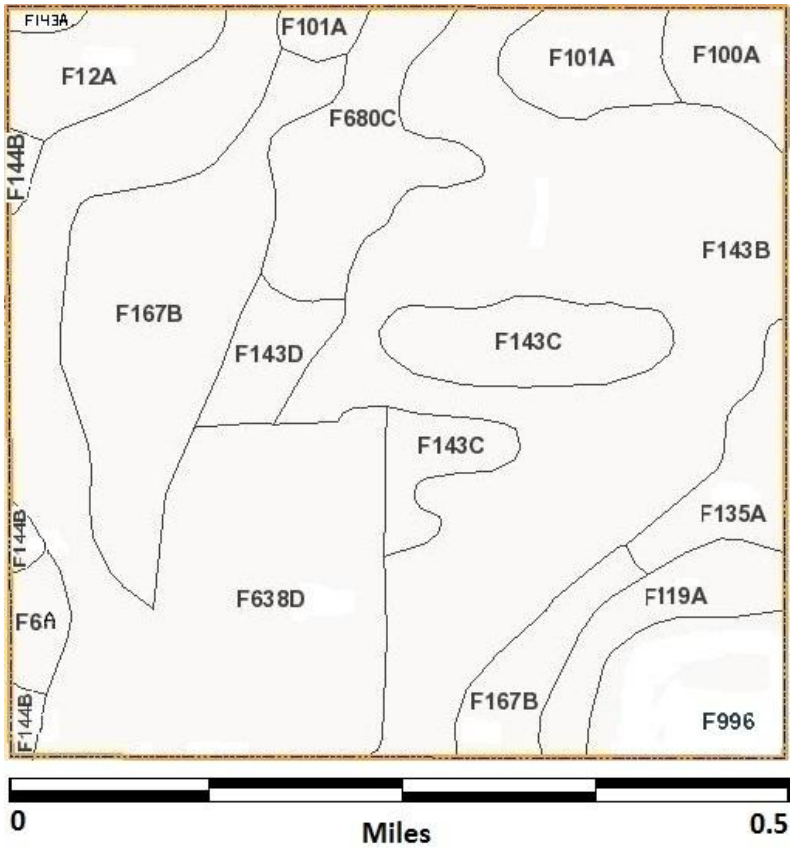
The *Soil Survey of Ramsey County* provides detailed information on the soils found at CGN.

Figure 7: CGTC Soils Map



Symbol	*Soil Name*	*Acres*
F101A	*Hamerly-Wyard loams, 0 to 3 percent slopes*	*81.5*
F114A	*Hamerly-Wyard loams, wooded, 0 to 3 percent slopes*	*133.8*
F142A	*Svea loam, 0 to 3 percent slopes*	*0.1*
F180A	*Bottineau loam, 0 to 3 percent slopes*	*393.5*
F180B	*Bottineau loam, 3 to 6 percent slopes*	*379.0*
F2A	*Tonka silt loam, 0 to 1 percent slopes*	*2.1*
F3A	*Parnell silty clay loam, 0 to 1 percent slopes*	*2.7*
F410A	*Fargo silty clay, 0 to 1 percent slopes*	*3.3*
F414A	*Lallie silty clay loam, 0 to 1 percent slopes*	*38.5*
F425B	*Mauvais loam, 0 to 6 percent slopes*	*52.0*
F427C	*Wamduska-Mauvais complex, 0 to 9 percent slopes*	*22.5*
F430A	*Bearden silty clay loam, 0 to 2 percent slopes*	*8.7*
F450A	*Lallie silty clay loam, saline, 0 to 1 percent slopes*	*5.9*
F459A	*Aberdeen-Fargo silty clay loams, 0 to 2 percent slopes*	*8.4*
F4A	*Southam silty clay loam, 0 to 1 percent slopes*	*16.2*
F737A	*Towner-Barnes fine sandy loams, 0 to 3 percent slopes*	*31.5*
F738C	*Dickey-Buse-Embden complex, 3 to 9 percent slopes*	*4.3*

Figure 8: RTI-TA Soils Map



Symbol	*Soil Name*	*Acres*
F6A	*Vallers loam, 0 to 3 percent slopes*	*1.6*
F12B	*Valle, saline Parnell Complex, 0 to 1 percent slopes*	*5.2*
F100A	*Hamerly-Tonka complex, 0 to 3 percent slopes*	*3.8*
F101A	*Hamerly-Wyard loams, 0 to 3 percent slopes*	*6.0*
F119A	*Vallers Hamerly loams, 0 t 3 percent slopes*	*4.6*
F135A	*Hamerly-Cresbard loams, 0 to 3 percent slopes*	*4.1*
F143A	*Barnes-Svea loams, 0 to 3 percent slopes*	*0.7*
F143B	*Barnes-Svea loams , 3 to 6 percent slopes*	*44.8*
F143C	*Barnes-Buse-Langhel loams, 6 to 9 percent slopes*	*8.4*
F143D	*Barnes-Buse-Langhel loams, 9 to 15 percent slopes*	*3.1*
F144B	*Barnes-Buse loams, 3 to 6 percent slopes*	*1.1*
F167B	*Balaton-Wyard loams, 0 to 6 percent slopes*	*20.1*
F638D	*Udorthents loamy, borrow area 0 to 15 percent slopes*	*36.0*
F680C	*Barnes-Sioux complex, 3 to 9 percent slopes*	*8.7*
F996	*Water slopes*	*6.8*

2.2.1.1 Wind and Water Erosion

Wind and water erosion both can adversely impact CGN's long term ability to sustain training. The soil's natural attributes, environmental conditions, and soil management together determine the rate at which erosion will occur. Fortunately, over the years CGN has been protected by a permanent plant cover (trees and/or grass) which greatly reduces the negative impacts caused by the wind and prevents rainfall events from eroding away at its surface.

The soil erosion will vary depending upon environmental factors, management practice factors and attributes associated with soil texture and profile. Factors associated with water erosion include rainfall (R), steepness and length of slope (LS), soil texture or erodibility (K), and soil erosion tolerance (T) (Appendix 4). Factors that affect wind erosion include cover protecting the soil (C), soil erodibility index (I) and soil erosion tolerance (T) (Appendix 4). Other factors that impact erosion are practices (P) implemented by man; such as, terracing & vegetative/residue management. The Universal Soil Loss Equation (A=R x LS x K x C x P) uses these factors to estimate average soil loss for a specific soil with specific management (Wischmeier and Smith 1978). The Natural Resource Conservation Service has estimated the soil erosion tolerance of individual soils. This tolerance is the average soil loss in tons per acre per year that can be tolerated by the soil without diminishing the soil productivity.

Soil texture or erodibility (K) is one factor in determining the rate of soil erosion. The loamy sands and clay sand soils at CGN have lower erodibility factors than the loams or silt loams. They allow more water to infiltrate, leaving less runoff to move soil. However, loamy sand soils have steeper and/or longer slopes than some silty soils thereby causing sandy soils to have higher erosion rates when management factors C and P are nearly equal.

The water erosion index (WaEI) shows the potential for soil erosion caused by water runoff. An erosion index can be computed by assuming management factors C and P to be constant and by adjusting for differences in soil erosion tolerance [WaEI=(R x LS x K)/T]. Average slope steepness and slope lengths for each mapping unit were used to compute an LS factor. The water erosion index considers the combined effects of rainfall intensity (R), soil erodibility (K), slope (LS), and soil erosion tolerance (T). Wamduska-Mauvais loamy sands with a slope of 6-9 percent (WaEI = 5.924) have the highest potential for water erosion. Soils with a WaEI greater than 8.0 have the greatest potential of erodibility due to water runoff. Soils at CGN are not considered highly erodible for water erosion. CGN's permanent cover type (forest and rangeland) helps even further to minimize water erosion.

The wind erosion index (WiEI) shows the potential for soil erosion caused by wind. The (WiEI) can be computed by assuming management factors (P) to be constant and by adjusting for differences in soil erosion tolerance. The WiEI = C x I)/T considers a combination of the combined effects of climatic factors (C), soil erodibility (I), and soil erosion tolerance (T) (Figure 5). Since CGN is protected by permanent vegetative (trees & grass), wind erosion is minimal. Dickey-Buse-Embden complex and the Wamduska-Mauvais soil series have the highest wind erosion rating of the 17 soils identified at CGN.

Figure 9: Soil erosion tolerance for soils at CGTC

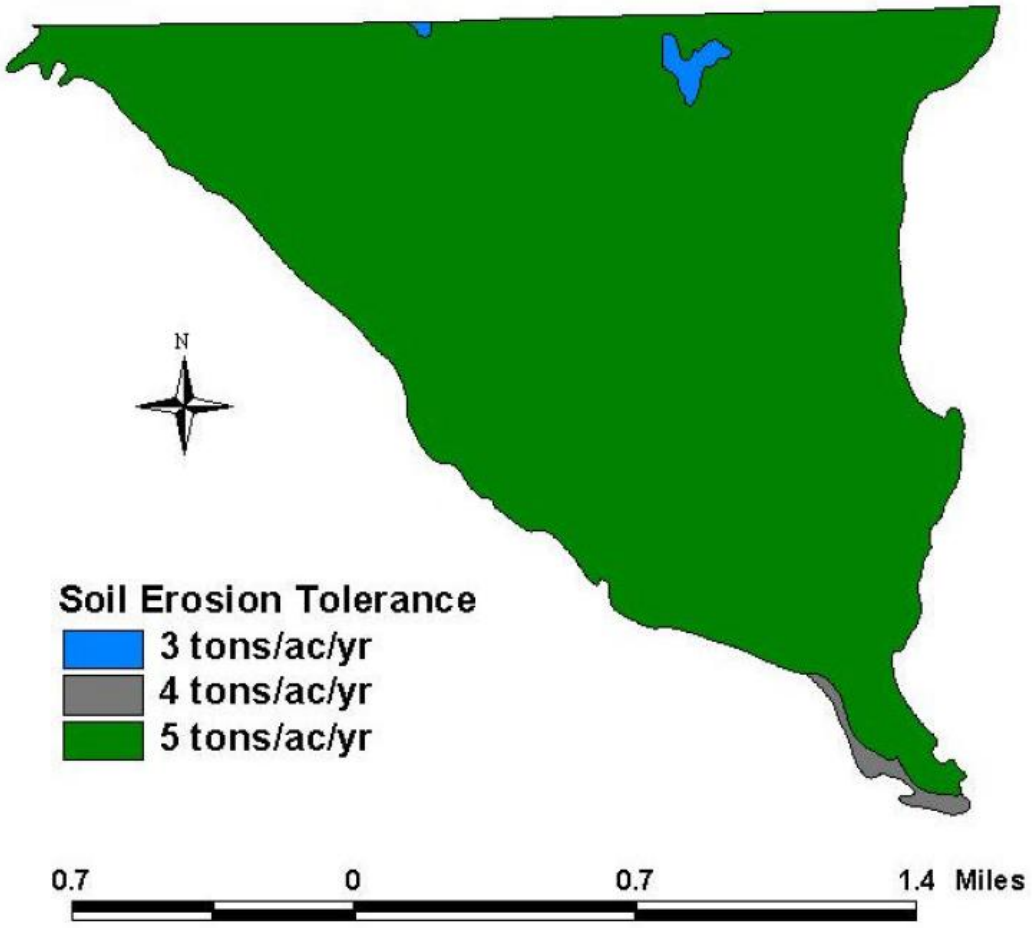
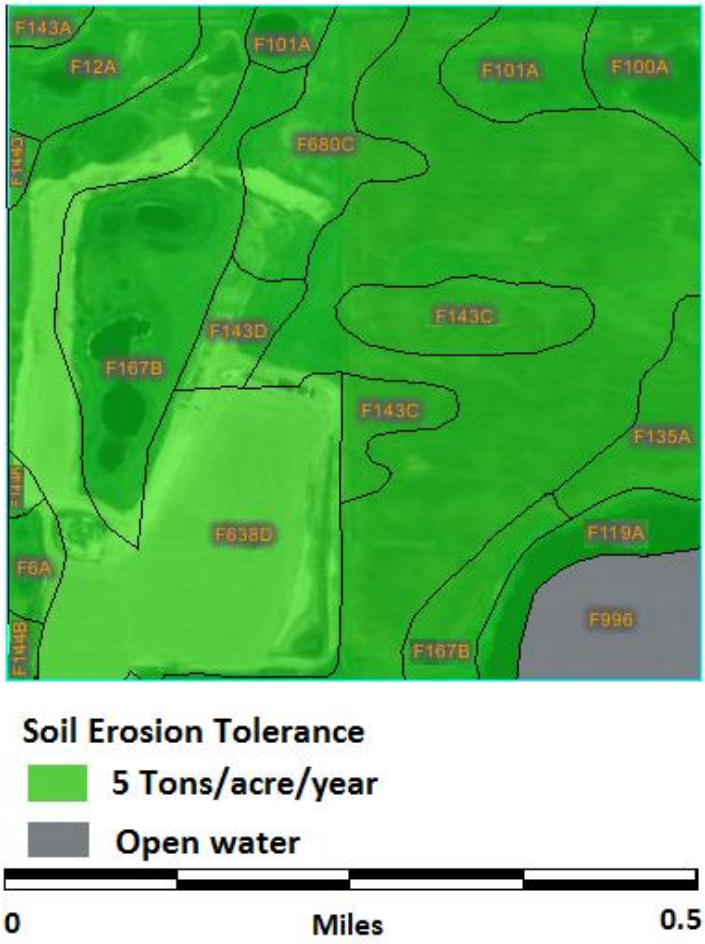


Figure 10: Soil erosion tolerance for soils at RTI-TA



A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 2 are the most susceptible to wind erosion and those assigned to group 6 are the least susceptible.

Figure 11: CGTC Wind Erodible Group (WEG)

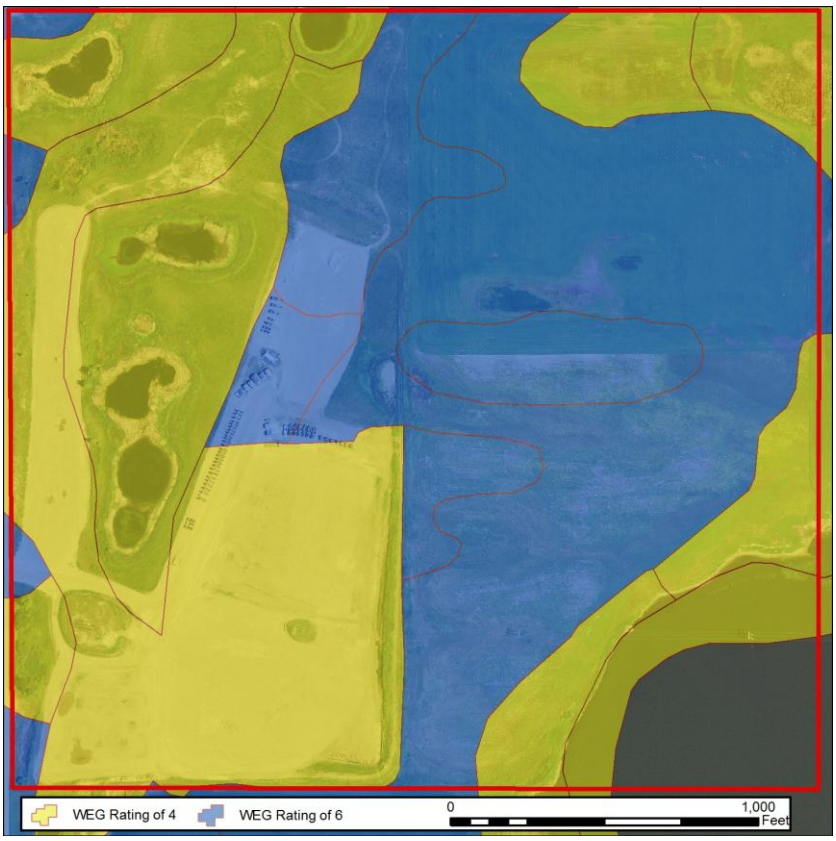
WEG Rating of 2

WEG Rating of 3

WEG Rating of 4

WEG Rating of 6

Figure 12: RTI-TA Wind Erodible Group (WEG)



2.2.1.2 Shoreline Erosion

CGN biggest erosion threat is attributed to Devils Lake's record water elevation. The lake and its associated erosion concerns have been a constant threat to CGN during recent years. Under windy conditions, waves have ripped away the growing trees, grasses, wetland vegetation, and soil medium. Only recently, after rock harden dikes were constructed along CGN's shoreline areas, have the lakeshore erosion problems been held in check. CGN shoreline erosion greatly outweighs all current inland wind or water erosion concerns.

2.2.2 Topography

CGN's topography is undulating (Figure 13). CGN's shoreline measures approximately 1454 feet above sea-level and inland the camp ranges from 1465 to1500 feet above sea-level. Back in 1993 the greatest change in relief occurred within the first 100-300 feet of the lake, when the lake was recorded to be 1426 feet above sea-level. Today, however, the camp's most dramatic change occurs at two isolated locations within CGTC's interior. In these areas the relief changes from 1475 to 1520 feet above sea level within a horizontal distance of 250 feet.

Figure 12: CGTC Topographical Map

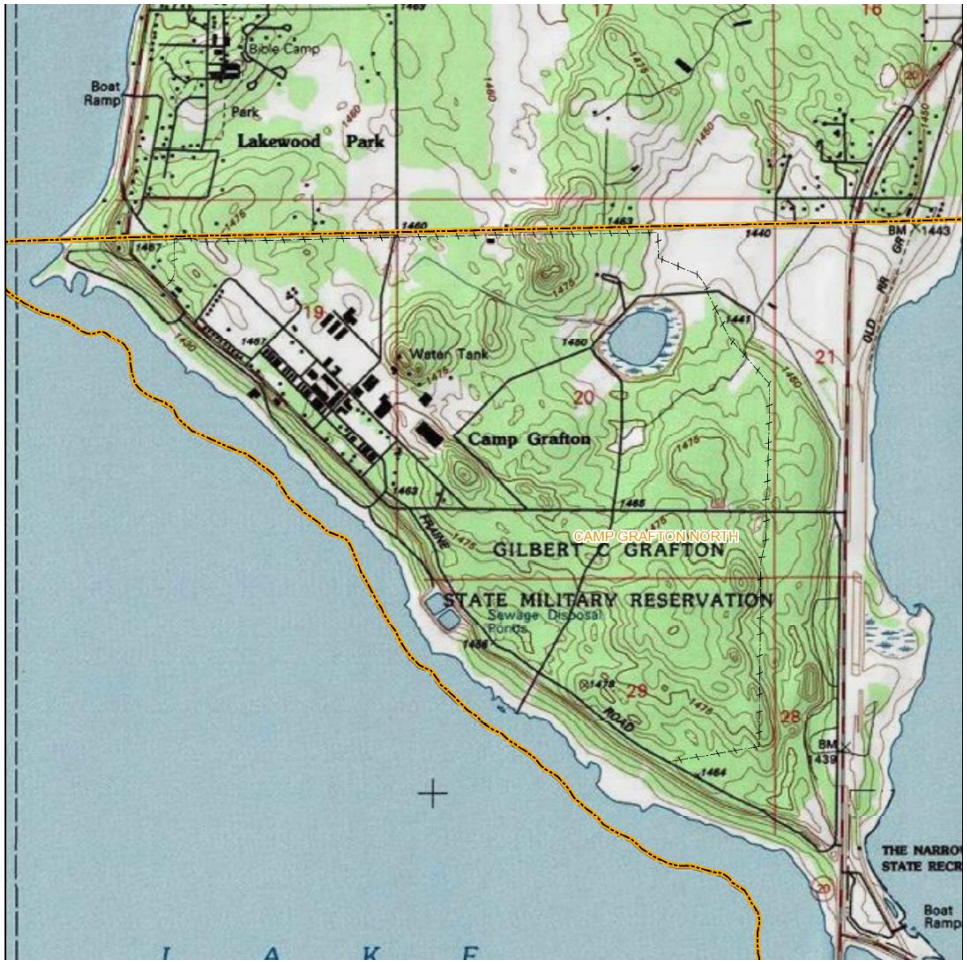
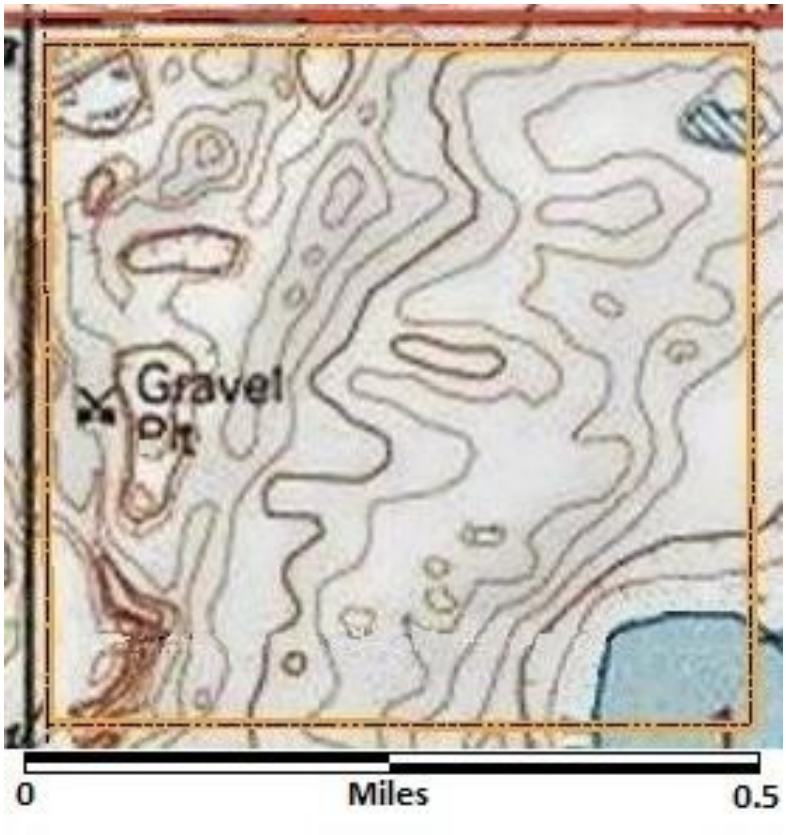


Figure 13: RTI-TA Topographical Map



2.2.3 Vegetative

Hardwood forests dominate CGN despite the fact that CGN it is located within a historically grassland predominated area of North Dakota. During pre-settlement times, hardwood forest, mixed grass prairie, and wetlands covered approximately 100 percent of the area of CGN (Kücher 1964).

CGN maintains a diverse plant and animal community and its biological diversity makes it worthy of plant, animal, and land stewardship. Information gathered while researching and surveying camp indicates four terrestrial community types have been identified in the area of CGN. These vegetative communities have been identified as mixed grass prairie (106 acres) , wetland vegetative sites (25 acres), and hardwood forests (855 acres) and the mixtures or monocultures of cool-season grasses found within the cantonment areas (198 acres or primarily Kentucky bluegrass (*Poa pratensis*)), (Figure 11). The plant communities at CGN represent basic management units for this INRMP.

Figure 14: CGTC Vegetation Map

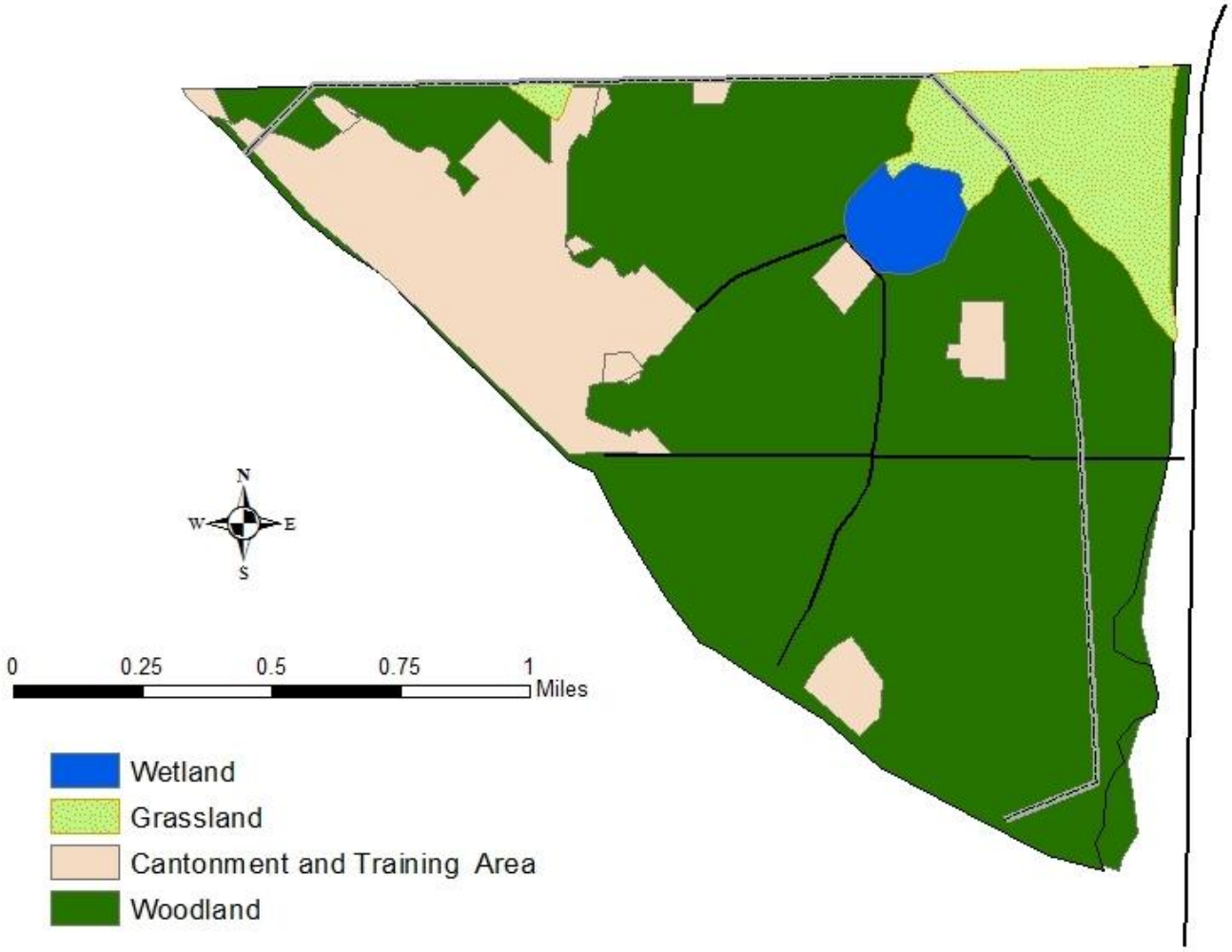
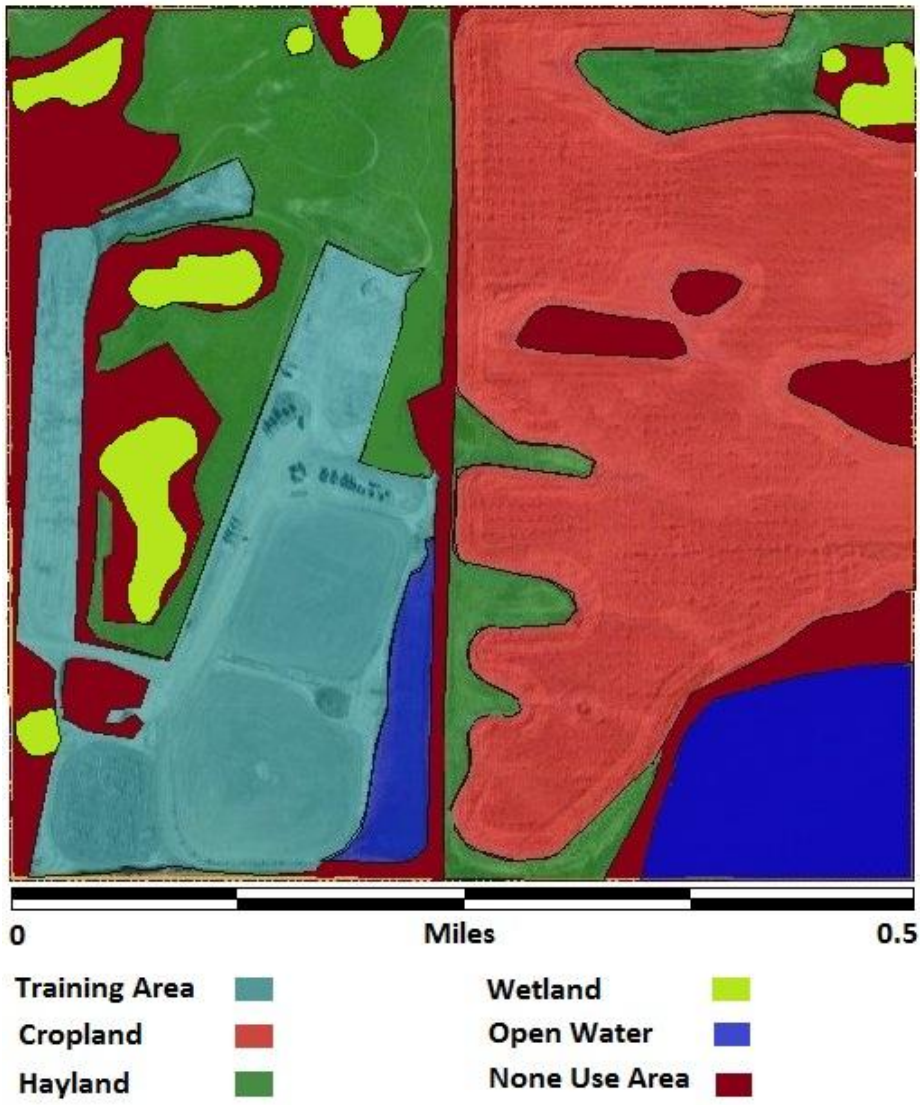


Figure 15: RTI-TA Vegetation Map



Training needs are monitored and scheduled to prevent NDARNG activities from excessively impacting vegetation. A healthy plant community shields the soil from the erosive forces of wind and water. A healthy plant community also helps to restrict the establishment of invasive plants.

The NDARNG has an on-going contractual arrangement with North Dakota State University (NDSU) to quantitative analyze the vegetative communities at CGN. Randomly located transects have been established to characterize the grassland and wetland communities using the U.S. Army Range and Training Land Assessment (RTLA) field method to evaluate training impacts upon CGN's natural resources. In addition, a combination of RTLA, vegetative transect

monitoring techniques, herbage production clipping techniques, visual surveys, floristic collection, and soil sampling efforts obtained along these same transects are used to record and inventory plants, animals, and soils conditions as they evolve and adjust to the pressures placed upon CGN.

Appendix 4 provides a list of plant species collected from CGN. Voucher specimens of these plants have been placed on file at the NDSU Herbarium (Great Plains Flora Association 1986 and Dekeyser 1995). The plant species on the list are characterized as common, occasional, or rare. The plants listed as common are easily located. These plants are often characteristic species of a certain vegetation types and/or have a range of tolerance capable of existing in a variety of different vegetative types. The species that are listed as occasional are few in number and are usually restricted to one vegetation type. Plant species that are listed as rare have been collected only once or twice in the area. These plants often are limited to special habitat conditions and are usually rare across grasslands transition in general.

2.2.4 Wetlands

All natural wetlands in the Devils Lake region were formed by the last continental glacier which impacted North Dakota. The regions wetlands are important natural resource components. They store water and help to minimizing flooding. They provide food and habitat for many species of birds, amphibians, reptiles, mammals, and numerous micro and macro invertebrates. The wetland plants growing within these sites are credited with filtering out sediments and removing unwanted impurities that flow into the wetlands.

CGN wetlands vary in their ability to hold water and in their ability to provide habitat. The main body of CGN or the CGTC, has 18.3 acres of natural wetlands. CGTC wetlands acres have been determined using the Soil Conservation Service technical guidelines by Bigler and Luidahl (1986). The CGN RTI-TA has 9.2 acres of wetlands. These wetlands have been been identified using the Fish and Wildlife National Wetlands Inventory.

2.2.5 Flora

CGN is located in the transitional grasslands zone of North Dakota and its diversity of plants demonstrates that training and the preservation of biological diversity can co-exist at CGN.

2.2.5.1 Prairie & Hayland

Prairie plant mixtures comprise only small areas of CGTC. These sites are classified as mixed grass prairie and/or as mid to low prairie plant community. Areas of prairie found on CGTC have clay-loam, loam, to sandy-loam soils on flat to slightly rolling prairie with slopes less than 3 percent. Soils are somewhat well drained with overland water runoff occurring from adjacent slopes. The soils have a higher organic matter and high number of plant species, due to the mesic conditions. CGN grasses and forbs can be found on the list of vascular plants of Camp Grafton North, Appendix 4.

Hayland acres makeup approximately one fourth of the acres located at the CGN's RTI-TA. The hayland vegetation is principally composed of alfalfa and a variety of tame and native grassland species. The hayland areas are located upon with either loamy textured poorly drained soils or loamy textured poorly drained soils with medium to high saline.

2.2.5.2 Wetlands and Wet Meadow Types

The CGTC and the CGN RTI-TA both have wetlands (Figure 5 and 6). CGN has one large permanent wetland known as Richey Slough and several small seasonal wetlands found within the forest community. Richey Slough is primarily a shallow body of water surrounded by wet meadow zones. The wetlands zones include the shallow marsh zone, deep marsh zone, and semi-permanent open water.

The wetlands at the CGN RTI-TA are primarily identified as seasonally flooded wetlands and support a variety of wetland plants listed in Appendix 4. The RTI-TA largest wetland area is located in the southeastern corner of the RTI-TA (Figure 6). This particular wetland is growing in size and currently appears to be excessively deep and unable to support the growth wetland vegetation.

2.2.5.3 Hardwood Forest

The hardwood forest areas dominate CGN's flora community types. This woodland community is found throughout CGN and with within the cantonment area. The following woody species are common to CGN and include: Bur oak (*Quercus macrocarpa*), American elm (*Ulmus americana*), boxelder (*Acer negundo*), quaking aspen (*Populus tremuloides*), balsam poplar (*P. balsamifera*), cottonwood (*P. deltoides*), and green ash (*Fraxinus pennsylvanica*). Plants associated with CGN's hardwood forest are listed with the vascular plants of Camp Grafton North, Appendix 4.

2.2.6 Fauna

The wildlife found at CGN is diverse due to the mix of grasslands, wetlands, small thickets of brush and hardwood trees. A wildlife inventory for CGN included visual sightings and tracks from 1 May through 31 October 1995, 1996, and 1997 and research inventories conducted during the springs and summers of 1998 and 1999. Rare or endangered species were surveyed and identified for CGN in 1998 and 1999. The current inventory of birds, mammals, reptiles, and amphibians were determined from these field studies and visual records (Appendix 4).

2.2.6.1 Fish and Invertebrates

A fish and/or invertebrate inventory for CGN CGTC or RTI-TA does not exist. There isn't a body of water within the area of the CGTC that supports fish life; however, 4.2 miles of shoreline of one of North Dakota most productive sports fishery, which is Devils Lake borders the CGTC. The RTI-TA is also has a water body located at its southeast boundary. At this time it is unknown if this closed body of water is capable of supporting fish.

A survey of CGN invertebrate species will be conducted in the future pending the availability of funding.

2.2.6.2 Birds

CGN provides habitat for a diverse population of birds of which most are migratory. Biologists reported sightings of 92 species of birds during the 1995-1999 surveys at CGN (Goertel 2000). Appendix 4 provides a checklist of common names, scientific names, seasonal status, and breeding potential of CGN bird species identified at CGN, (Faanes and Stewart 1982, North Dakota Game and Fish Department 1995).

2.2.6.3 Mammals

Biologists recorded 30 mammals on or near CGN from 1995 through 1999 (Goertel 2000) (Appendix 4). 18 species of mammals have been recorded at CGN. These mammals are listed on a checklist derived from Wiehe and Cassel (1978) and Seabloom et al. (1978) which lists those mammals found in North Dakota by order, family, scientific name, common name, and approximate range within the state. For each species, the scientific name is given and followed immediately by the authority for the name. The common name is then given and the approximate North Dakota range is as follows: NW, NE, SE, SW, N, E, or W indicating quadrant or half of most likely occurrence. "All" designates statewide (or nearly so) distribution. Each species may occur in all or only part of the quadrant or half range designations. Miller and Kellog (1955) was the primary source for authority of scientific names. Scientific and common names are those used by Jones et al. (1975). A fourth column was developed to indicate those mammalian species that could be found on CGN. The final column is used to indicate those mammalian species reported on or near CGN.

2.2.6.4 Reptiles and Amphibians

During faunal surveys at CGN, biologists identified one turtle species, four snake species, zero lizard and skink species, two frog species, and two salamander species (Goertel 2000). A checklist for North Dakota was derived from Hoberg and Gause (1992) and it lists those reptiles and amphibians found in North Dakota by scientific name, common name, and approximate range within the state (Appendix 4). The common name is then given and the approximate range is as follows: NW, NE, SE, SW, SC, NC, N, E, or W indicating quadrant or half of most likely occurrence. "All" designates statewide (or nearly so) distribution. Some species may have a specific description of where they can be found in North Dakota. Each species may occur in all or only part of the quadrant or half range designations. A fourth column was developed to indicate those reptile and amphibian species that could be found on or near CGN.

2.2.6.5 Threatened and Endangered Species

Federal status as a threatened or endangered (T&E) species is derived from the U.S. Dept. of Interior Federal Endangered Species Act (ESA) during 1973 and reauthorized in 1988, 1994, and 1996. The U.S. Fish and Wildlife Service administer the act with federal protection for all species designated as endangered or threatened.

CGN is located in Ramsey County, North Dakota and provides an excellent habitat for many wildlife species including some threatened and endangered species. Table 1 displays T&E species for Ramsey County. CGN is within the spring and fall migration patterns of the whooping crane (*Grus americana*). In recent years, whooping cranes have been sighted during the spring and fall migration periods in the Devils Lake, ND area; however, no sightings have been reported at CGN. The Sprague's Pipit is a listed candidate species for Ramsey County; however, CGN's small number of grassland acreage without trees or road makes it highly unlike that CGN will be utilized by the Sprague's Pipit.

While candidate species receive no statutory protection under the ESA, the NDARNG acknowledges they may warrant future protection and voluntarily implement conservation efforts that may benefit their future.

Table 1: Camp Grafton North Listed Threatened, Endangered, and Candidate Species

Species	Status	Presence	Affects
Whooping Crane (Grus americana)	Endangered	No*	May affect, not likely to adversely affect
Sprague's Pipit (Anthus spragueii)	Candidate	No	May affect, not likely to adversely affect

* Whooping Cranes may use CGN as a migratory stop over; however, there have been no recorded whooping crane sighting at CGN.

3.0 Environmental Management and Mission Sustainability

3.1 Sustainability of the Military Mission and the Natural Environment

Sustainability seeks to reach a balance between current uses and future requirements. The military mission of the NDARNG requires the ability to provide training to our troops in a realistic training environment. This interaction between training needs and the natural environment often poses one against the other, while, in fact, there are tremendous opportunities to conduct military training that enhance the natural environment.

3.1.1 Military Mission and Sustainable Land Use

Military training activities vary depending upon a unit's the specific mission and whether they are engineers, quartermaster, air defense artillery, transportation or other type of unit. Each of these units will have different impacts on the training lands because of their size, equipment and training needs.

Training activities at CGN are limited to training exercises that fit CGN's capacity to recover from training events. In order to sustain the use of CGN for training well into the future, a unit's training requirements will be matched with land areas capable of tolerating training impacts and disturbances. For example, if ground disturbing training activities are required, they will be restricted to specific sites where re-vegetation and erosion control factors can be anticipated and controlled. Controlling the locations where various training activities take place will enable NDARNG to maintain and sustain CGN as a viable long term location.

3.1.2 Impact of the Military Mission

Military training exercises conducted at CGN have the ability to impact land resources in a variety of manners. Potential impacts could arise from military training conducted on 'sensitive' areas, such as, soils which are highly vulnerable to erosion, cultural sites, and areas of habitat required by endangered species.

There are six primary consequences of intensive and continuous use of Army training lands:

* the loss of historical sites, vegetation, water resources, and wildlife

* diminished quality of available realistic training areas

* diminished operational security

* ineffective tactical operations

* the creation of safety hazards to personnel and equipment

* an increase in training maintenance costs and litigation

Training activities conducted at CGN with the greatest potential to inflict adverse impacts upon CGN are; convoy operations training, mobility and counter mobility training, and engineering obstacles training. All of these have the ability to create ground disturbances or impact vegetative cover. The resulting adverse impacts have the potential to destroy vegetation, damage cultural sites, disturb wildlife and their habitat, create noise pollution, accelerate erosion, and create dust. The intensity, severity, and the nature of the impacts vary upon the units training, where training activities take place, and the attention given to environmental considerations by commanders and troops.

3.1.3 CGN INRMP Relationship with Operational Plans

3.1.3.1 Range Complex Master Plan (RCMP)

The RCMP is reliant upon CGN's INRMP for guidance with maintaining NDARNG compliance with environmental regulations and for sustaining CGN as a long term training site. The RCMP also uses the INRMP to develop schedules and plans which will prevent units from impacting culturally sensitive areas, important wildlife habitat areas, and vulnerable landscapes.

3.1.3.2 Integrated Training Area Management (ITAM)

CGN's INRMP and ITAM activities strongly support and complement one another. NDARNG's ITAM Program integrates training and other mission requirements for land use with sound natural resources management of the land. Components of ITAM can be thought of as the preventive maintenance of training land. Just as the Army conducts preventive maintenance programs to protect its substantial investment in tactical equipment, it also must invest in preventive maintenance of its training lands.

The ITAM Program establishes procedures to achieve optimum sustainable use of training lands by implementing a uniform land management program that includes the following:

* Inventorying and monitoring land conditions

* Integrating training and testing requirements with training land carrying capacity

* Educating land users to minimize adverse impacts

* Providing for training land rehabilitation and maintenance

The ITAM Program is based on user requirements derived from continuous interaction between HQDA, Major Commands (MACOMs), and installations and is applicable to Active Army, Army Reserve, and Army National Guard (ARNG) installations that have a major training mission, including those managed by NGB. The ITAM Program is comprised of the following four components:

* Range Training Land Assessment (RTLA)

* Training Requirements Integration (TRI)

* Land Rehabilitation and Maintenance (LRAM)

* Sustainable Range Awareness (SRA)

3.1.3.3 Range Training Land Assessment (RTLA)

RTLA is an inventory and monitoring program used to identify training-related impacts to natural and cultural resources. The RTLA collects biological and physical data and uses information management systems to help ensure sustainable use of training lands. Documenting and understanding training-related impacts can minimize unwarranted damages and their associated land rehabilitation costs.

Effective management of NDARNG lands requires information regarding initial resource conditions and knowledge of impacts from various types of military training. The NDARNG has conducted various natural resources surveys at CGN and has incorporated the information into GIS data layers. The data defines baseline conditions and identifies environmentally sensitive areas. Currently, training-related impacts and long-term trends are identified utilizing plots established randomly throughout the installation. These plots are monitored and the data is analyzed to identify changes in land condition overtime. They are also used to identify areas that require rehabilitation, maintenance and to provide information that can be easily used to make informed training area management decisions.

Implementation of RTLA at CGN has provided a systematic, routine monitoring program to identify potential impacts before they have a significant impact on training and the environment. Accordingly, to implement the CGN INRMP, the NDARNG must be adequately funded to continue the RTLA program.

A variety of field training activities are conducted at CGN and potential training-related impacts vary substantially based on the type of training. For example, dismounted maneuver and land navigation exercises have a relatively low potential for impact, while heavy equipment training and vehicle maneuvers have a relatively high potential for impact. Activities that involve concentrated and repeated use of an area (e.g., bivouac sites) also have a relatively high potential for impact. Accordingly, the RTLA at CGN focuses on monitoring impacts to natural resources in the most intensely used training areas including heavy equipment training areas, maneuver trails, open areas, and bivouac sites.

Programs developed to monitor impacts include:

* Weed Eradication/Control - Pursuant to North Dakota State Law 4.1-47-26 NDCC, real property owners/operators have a duty to control noxious weeds. Noxious weeds identified at CGN include: Leafy spurge (*Euphorbia esula L.*), Canadian Thistle (*Cirsium arvense L.*), Musk Thislte (*Carduus nutans*) and Absinth wormwood (*Aremisia absinthium L.*). The NDARNG annually and systematically utilize chemical and

biological means to control these weeds, however, due to either the large number of seeds produced by these plants, the long term viability of their seeds in the soil, their extensive roots systems, toxic nature of their vegetative plant parts, the lack of diseases that infect these plants, and/or lack of insects which could suppress or control these noxious weeds, seasonal monitoring & control measures will be required on a long term basis to insure these plants are controlled.

* Erosion Control - Areas of erosion concerns are associated with the trails located at CGN. Flash flood types of rainfalls can dump up to three inches of rain in one hour at CGN. Continuous monitoring of the trails and identifying areas that need maintenance will be an ongoing practice. This will help to ensure tails are in good condition and able to support training exercise requirements.

* Pest Control – The majority of the buildings at CGN are utilized on a seasonal basis for training. In order to prevent unnecessary pest infestations monitoring will be conducted annually to assess the effectiveness of building vector control efforts. Vector prevention will include the implementation of winterization measures to control pests. When necessary, pests will be eradicated. The NDARNG has a Pest Management Plan in effect.

* Cultural Resources - Information regarding the CGN archeological sites is kept confidential to prevent scavengers form disturbing these sites. It is of the upmost importance that personnel contact the Camp Grafton Training Center prior conducting training, construction, and conservation efforts that create ground disturbances to insure their activities won't adversely impact archaeological sites located within the area**.**

Insignificant cultural resources, those found to be ineligible for the NRHP as part of a comprehensive evaluation program, need not be avoided. Any finding or recommendation of NRHP ineligibility must have the explicit concurrence of the State Historic Preservation Officer (SHPO). An exception to this statement would be sites known or suspected to contain human burials, that may not be considered significant and NRHP eligible. Human burial sites are afforded protection under the Native American Graves Protection and Repatriation Act (NAGPRA) and/or state of North Dakota burial laws. Traditional cultural properties and sacred sites identified by Native American groups also would be afforded protection under federal law, particularly if they are located on federal property, even though they may not meet NRHP significance criteria. In addition, access to and use of traditional cultural properties and sacred sites by Native Americans is guaranteed under federal law, particularly when such sites are located on federal property

3.1.3.4 Training Requirements Integration (TRI)

TRI is a decision support procedure that integrates all requirements for training lands with natural resources conditions and cultural resource management processes. TRI also integrates

the installation training requirements for land use derived from the RTLP (Range and Training Land Program).

The TRI uses data derived from RTLA and Army Conservation Program components. It is intended to achieve the "training-environmental" balance and interface that is central to the ITAM Program. In general, the NDARNG will utilize TRI to optimize training land management decisions by coordinating mission requirements and land maintenance activities with training land carrying capacity, and generate prioritized requirements for land rehabilitation, repair, and/or reconfiguration.

Achieving this integration requires a clear definition of individual roles and responsibilities and adequate staffing. Under the DA ITAM Program structure, the ITAM Coordinator manages the TRI function, with direct support from training managers and the office of Installations, Resources, and Environmental. As a CAT IV installation, CGN is not currently allocated a full-time ITAM Coordinator position; therefore, overall responsibilities for this position have been assigned as additional duties to the Training Site Environmental Specialist within the Environmental Office.

An important aspect of TRI is the understanding of specific requirements for training lands and facilities. Standard Army procedures for defining such requirements include the Range Facility Management Support System (RFMSS), the Range and Training Land Program (RTLP), and the Range Complex Master Plan (RCMP). RFMSS is a multi-user, PC-based software package that automates the real property inventory, scheduling, firing (operations) desk, and management functions at an installation Range Control Center. RFMSS was developed to optimize the scheduling, use, operations, and maintenance functions for an installation's maneuver training areas and other related training facilities. The NDARNG has RFMSS software incorporated into training operations.

The RCMP provides a view of the available training assets, identifies users, and establishes the training requirements based on Army training doctrine and resource guidance. It establishes current requirements and utilization levels for available training assets, providing a near and long term project plan for training, public works, and environmental planners. The RCMP identifies potential range and training facility shortfalls for the NDARNG and evaluates alternatives and priorities for addressing shortfalls. Recommended courses of action are provided by the RCMP. TRI Goals and Objectives include:

1. Sustain training lands for long-term use.

    * Document and accurately monitor training use of the site (i.e., number of users).

    * Determine the carrying capacity of the land to sustain expected training demands and to focus on maintaining training land quality for a minimum of twenty years.

* Set acceptable disturbance limits and modify or move training uses that exceed set limits. Include outside impacts (hunters, and wildlife) in accessing land capabilities.

* Set up "what if" scenarios and prescriptions to counter problems that could limit carrying capacity and training activities.

2. Maintain quality-training lands by minimizing, rehabilitating, and mitigating disturbances.

* Locate military missions (and other land uses) in the areas best capable of supporting them.

* Provide command elements with information needed to make decisions that include natural resource related values.

* Perform site evaluations after every major training event.

3. Avoid conflicts between military training and other land uses.

* Update the CGN Standard Operating Procedures (SOP).

* Provide adequate signage to inform the public and troops of CGN's location.

3.1.3.5 Land Rehabilitation

LRAM is described as a preventive and corrective land rehabilitation and maintenance procedure that reduces the long-term impacts of training and testing on an installation. It mitigates training and testing effects by combining preventive and corrective land rehabilitation, repair, and/or maintenance practices. It includes training area redesign and/or reconfiguration to meet training requirements.

The NDARNG has implemented a variety of LRAM-type projects. These projects have primarily focused on maintenance to existing maneuver trails and roads to correct erosion problems. The LRAM project Goals and Objectives include:

1. Protect and maintain soil integrity, water quality and air quality by providing adequate vegetative cover for all soils.

* Comply with all federal, state and local laws and regulations pertaining to soil stabilization and water/air quality.
* Provide protection of natural resources by implementing best management practices (BMPs) for routine maintenance/repair projects and LRAM projects.

c. Rehabilitate and enhance disturbed sites with native species, so they are capable of supporting and sustaining training indefinitely.

2. Execute repair and maintenance projects of trails, roads, ranges, and training areas prior to the development of severe problems.

* Determine rehabilitation, re-vegetation and monitoring standards based upon RTLA baseline data.

* Rehabilitate rutted areas to prevent water erosion.

3. Maintain existing access routes on and about CGN**.**

* Identify and rectify deficiencies in existing trails and routes.

* Identify potential alternate routes and trails that would enhance travel about the training area.

* Identify potential adverse effects of developing new transportation routes.

* Avoid locating access routes in sensitive habitat areas, scenic, or culturally rich areas.

Project planning is essential for successful execution of LRAM projects. The Training Site Environmental Specialist will identify erosion problems, prioritize LRAM projects for implementation, and design projects to resolve problems. Environmental and Training Offices must communicate with each other frequently to maximize efficient use of resources and ensure successful project execution.

In the future project planning, coordination, and design will include the following:

* Identification of sites needing rehabilitation following training activities

* Standards for vegetation types, cover, and seasonal time period

* Annual Site Rehabilitation Prioritization (SRP)

* Resource requirements (e.g. labor, materials, cost, equipment and monitoring)

* Potential impact to training and the environment

* Maintenance requirements

* Schedule for completion of project, coordination, and notification requirements

Projects will be designed in accordance with current knowledge of soils, vegetation, and seed production. The design process will be followed by requests for funding. Funding for projects will come from two sources; ITAM and Status Tool for the Environmental Program (STEP). Private contractors, in-house personnel, universities and/or state/federal agencies may accomplish execution of projects.

Prevention and/or treatment of disturbed surfaces are required in areas where disturbances of the active layer could result in erosion or other aggravating conditions. Disturbed areas, such as, access trails and the cantonment area will be inspected following major training events. Treatment of the disturbed area will commence immediately or as soon thereafter as the weather allows. Treatment will also require periodic inspections until the area is completely stabilized. Prevention and minimization of disturbances (where possible) is an economical approach, because treatment is time consuming, labor intensive and costly. Options for rehabilitation of disturbed areas are:

* Re-seeding of grasses, sodding, re-sodding

* Backfilling of ruts, fighting positions

* Perform maintenance on new vegetation

LRAM projects will be monitored by the yearly SRP process, periodic evaluations and reports. Each project should be completed in accordance with design specifications, costs, and schedules.

3.1.3.6 Sustainable Range Awareness (SRA)

The SRA provides a means to educate land users on their environmental stewardship responsibilities. It provides for the development and distribution of educational materials to land users. These materials relate the principles of land stewardship and the practices of reducing training and/or testing impacts. SRA also provides environmental information to NDARNG professionals concerning operational requirements.

The NDARNG has implemented SRA through a cooperative effort with North Dakota State University (NDSU) developing training maps that identify environmentally sensitive and off-limit areas. In addition, waterproof cards for soldiers have been developed depicting environmental issues at the training site. SRA is further enhanced through the creation of an environmental awareness video. The video presentation of environmental stewardship was professionally produced and includes subject matter specific to training areas of the NDARNG. The video has been distributed statewide and is made available to all Units utilizing CGN to improve and enhance environmental awareness.

As part of the INRMP development process, the NDARNG utilizes data obtained from research conducted by NDSU as the result of a cooperative effort. The research data collected and monitored under the terms of this cooperative agreement provides insight to the program status

of both NDARNG's INRMP and ITAM program. The NDARNG's INRMP is so tightly linked to the ITAM that INRMP also serves as the ITAM Long Range Management Plan.

SRA Goals include:

1. Create a conservation ethic in those who use CGN lands to minimize disturbance to the land and its natural resources.

    * Design, produce, and update soldier education materials that identify environmental guidelines for military tenants utilizing the facilities and resources at CGN (calendars, posters. ITAM video and soldier field card)

    * Provide decision-makers with information needed to make sound natural resources judgments.

    * Enhance the professional skills of the NDARNG Environmental staff.

2. Develop and implement a public education program to increase public awareness and acceptance of ecosystem management.

    * Provide an understanding of the CGN natural resources program to training site personnel and surrounding communities.

    * Publish and/or broadcast public service announcements of CGN training events.

    * Use media effectively.

3.1.3.7 Integrating Military Training with Training Site

The INRMP lists all training exercises currently conducted at CGN. Each exercise is categorized according to their potential impacts upon the resources found at CGN. Precautionary guidelines for training exercises conducted at CGN can be found the CGTC SOP. The guidelines will help to minimize the severity of the impacts created by the various training exercises. To assure the NDARNG training mission at CGN is not compromised, some training activities are restricted to designated locations in order to adequately protect natural and cultural resources found at CGN.

* It is of the utmost importance that personnel contact the CGTC prior to conducting training, construction, and conservation efforts that create ground disturbances to insure their activities won't adversely impact sensitive or environmentally fragile areas identified at CGN**.** Areas classified as "sensitive" included CGN cultural sites which are maintained as confidential to protect them from being disturbed by scavengers.

* Impacts to insignificant cultural resources, those found to be ineligible for the NRHP as part of a comprehensive evaluation program, need not be avoided.

* Sites known or suspected to contain human remains are afforded protection under the Native American Graves Protection and Repatriation Act (NAGPRA) and/or state of North Dakota burial laws. Traditional cultural properties and sacred sites identified by Native American groups are also afforded protection under federal law, particularly if they are located on federal property, even though they may not meet NRHP significance criteria. In addition, access to and use of traditional cultural properties and sacred sites by Native Americans is guaranteed under federal law, particularly when such sites are located on federal property.

3.1.3.7.1 Requirements for All Training at the CGN

All Unit Commanders training at CGN will be responsible for complying with CGN Standard Operating Procedures. The goals of the INRMP for CGN are to maximize the military training available within the real estate available. The objectives to reach this goal are to sustain the current natural resources, to enhance those natural resources that are depleted or in need of modification, and insure CGN's viability for future realistic training exercises.

An explanation of the training goals and INRMP objectives are explained by first outlining the different types of training, their impacts on the natural resources, followed by how the resource will be sustained, maintained or enhanced.

3.1.3.7.2 Minimum Impact Training

The following NDARNG training activities are classified as having a minimal impact on the CGN's natural resources. Minimal impact exercises result in no greater disturbance than walking across the prairie or through woods and normally require no precautions or restrictions.

* Reconnaissance

* Patrolling

* Terrain/map analyses

The INRMP objective is to sustain and maintain all areas of CGN, so they are capable of supporting minimum impact training. These objectives are achieved by controlling noxious weeds (leafy spurge, canada thistle, musk thistle, and absinth wormwood). Trails used for patrolling are maintained by controlling erosion from occasional deluge type rains. Erosion problems will be continually monitored and addressed by reseeding when necessary. Preservation of minimum impact training areas can also be accomplished by curtailing training activity when wet or saturated ground conditions occur. Often curtailing training for a 24-hour period is ample time for soils to dry out.

3.1.3.7.3 Training that may cause Soil or Vegetative Disturbance

Some types of training may disturb soils and vegetation. These disturbances may require corrective actions, such as, seeding, re-positioning the sod, or mulching. Certain precautions can minimize disturbances during specific exercises and will be implemented to minimize damage, then followed with a corrective practice. The following training activities that occur at CGN may cause soil or vegetative disturbance.

- Tactical bivouac occupation/displacement
- Cover and concealment
- Construct and maintain main supply routes
- Vehicle maneuvers

SOPs help to minimize impacts to natural resources, such as, types and size of trees to use for cover and concealment, erosion control measures on roads and trails, and training in such a way as to minimize fire hazards. Without the use of SOPs, continuous realistic training damages vegetation and disturbs the soils. The INRMP for CGN addresses soil disruption and impacting vegetation. The CGN INRMP goal is to maintain the area(s) for continuous training. The CGN INRMP objective is to attain and sustain this goal is premised on land restoration and management.

Soils are essential natural resources that take centuries to develop, if not thousands of years in the colder climates. They can be drastically altered by erosion, compaction, plant species changes, or removal of top-growth. Sediments resulting from erosion affect surface water quality and aquatic organisms. Plants rely on soil for growth, including water and nutrient uptake and soil stability is the foundation for a healthy ecosystem.

Conducting exercises on soils with a high erosion index, particularity those soils on the steep slopes can create excessive amounts of soil erosion and should be avoided. Even small disturbance upon these soil types can initiate gully erosion and gullies can result in damage to vehicles, impact structures, degrade wildlife habitat, deposits sediments into streams and lakes, and cause bodily harm to humans.

Activities that create soil disturbances are not permitted in areas designated as wetlands or cultural resource sites.

Save excavated soil to fill foxholes or other small holes. Pack the soil to approximate undisturbed soil density. Place the soil layers as they naturally occurred; subsoil first followed by topsoil. Overfill holes to allow for settling. Reseed with recommended grass mixture suitable for your particular situation (Table 2). The unit commander is responsible for ensuring that small excavations are filled properly. If fill is needed for a training activity, take fill from an area of CGN that has already been disturbed (ex. cropland or pits) rather than undisturbed prairie.

Before moving fill, the Training Site Manager must give approval.

Stay on permanent roads during muddy conditions and limit off-road use when soils are wet. Vehicles traveling across wet soil conditions may create soil compaction. Moderate to heavily compacted soils prevents the roots from getting proper aeration and may kill the plants. Native plants become displaced by undesirable plants when compaction becomes high to severe.

3.1.3.7.4 Land Restoration

Some training activities will disturb soil and vegetation, varying by intensity, severity, and amount of land. These disturbances can be good for the natural communities, but to protect the natural integrity of the vegetative community from soil erosion and invasion of exotic plants, the seeding guidelines given in Table 2 for treating sites with disturbed soils should be followed.

Disturbances on CGN will differ depending on activity and fall into categories varying from:

- aboveground vegetation destroyed, soils not disturbed and vegetative roots intact
- sod turned up with upper root mass and soil particles attached, , e.g. as caused by heavy vehicles that turn corners
- soils and vegetative cover opened and removed, e.g. by trenching, foxhole development, or vehicle emplacements for camouflaging vehicles

3.1.3.7.4.1 Aboveground vegetation destroyed, minimum impact to soils and plant roots

The type of activities that destroy aboveground vegetation but cause little to no damage to the soil profile or root mass include off road wheeled vehicles, straight-line travel of off-road tracked vehicles on dry to slightly wet soils on flat terrain (slopes less than 6 percent), fire, and bivouacking on dry to slightly wet soils on flat terrain (slopes less than 6 percent). These disturbances normally do not cause irreversible damage to the natural resource communities and do not require reseeding. These types of activities mimic the grazing activities of large herbivore. The Training Site Environmental Specialist will monitor these sites for possible invasion of exotic plants such as leafy spurge and canadian thistle. Since the native plant species will be under stress for a time period, exotic plants will have the opportunity to invade and will be controlled either mechanically or with herbicides.

Table 2. Grass Seed Mixtures and Guidelines

Land Characteristic	Native Grass Mix[1]	Cool-season Grass Mix	Annual Grass Mix
Mulch Required Slopes<6%	No	No	No
Mulch Required Slopes >6%	Yes Prairie hay	Yes Straw	Yes Straw
Grass to[1] Seed Mix	Green needlegrass (2-3 lb/ac) Slender wheatgrass (2-3 lb/ac) Western wheatgrass (2-3 lb/ac) Little bluestem (2-3 lb/ac) Side-oats grama (2-3 lb/ac) Switchgrass (0.5-1 lb/ac) Annual ryegrass (2-4 lb/ac)	Intermediate wheatgrass or Pubescent wheatgrass or Western wheatgrass or some other cool-season grass	Rye or Oats or Wheat or other
Seeding Rate	See above	8-14 lbs/ac	70 -100 lbs/ac

1 • On loamy/silty soils seed a mixture of green needlegrass, western wheatgrass, little bluestem, side-oats grama, switchgrass, slender wheatgrass, and annual ryegrass.
• On sandy soils seed a mixture of western wheatgrass, little bluestem, side-oats grama, slender wheatgrass, switchgrass, and annual ryegrass.

3.1.3.7.4.2 Vegetation and roots destroyed, soils open and disturbed on areas greater than 15 yards[2]

Activities that destroy vegetative cover and create disturbances greater than 15 yards[2] include bivouacking on wet soils, off-road vehicle lanes on wet soils, engineering, trenching, excavating, and pit development. These disturbances, if they occur on native prairie, will need to be restored by seeding a native grass mix indicative of the natural community (Table 2). If these disturbances occur within a cool season grass located within native prairie, seed with the native grass mix (Table 2). If a cool season grass dominants the area of disturbance or disturbance occurs on a cool-season grass planting, reseed with one of the following grass types (e.g. intermediate wheatgrass, pubescent wheatgrass, or western wheatgrass). In an area that is

heavily disturbed annually and need reseeding, reseed with an annual cover crop. Recommended annual plants to be seeded at CGN include rye, oats, or other small grains. Large areas that are under constant heavily disturbed exercises will be reseeded to a permanent grass cover that is very rhizomatous such as pubescent wheatgrass, intermediate wheatgrass or western wheatgrass. These cool-season rhizomatous grasses are very vigorous and will tolerate a higher level of disturbance.

3.1.3.7.4.3 Seeding Guidelines

Seed grass seed mixtures using a no-till drill or by broadcasting. A no-till drill will be used whenever possible to seed native grasses instead of broadcasting due to amount of seed need for broadcasting and greater likelihood of establishing a successful stand (consult the local Soil Conservation District for use a no-till drill). When using a drill seed to a ¼ inch depth but no more than a 1 inch depth. The corrective actions needed for disturbed soil vary with slope, soil type, and size of disturbance.

The seeding mixtures provide on Table 2 perform several functions. The Annual Grass Mix such as rye or oats will provide a quick cover but will not persist. The cool-season grass seeding will provide cover within the first year or in the second year, providing a vigorous root mass that is rhizomatous. The Native Grass Mix is typical of the native prairie found on CGN, providing a natural community that is stable, environmentally suited, and adapted to the existing soils, moisture, and sunlight conditions. Native grass mixtures generally take three years to establish, so other non-aggressive, short-lived grasses should be added to a native grassland seed mixture to provide cover during years one and two.

When purchasing a grass seed for a mix or as single species seeding, purchase the seed according to quantities of "pure live seed (PLS)", to insure the seed mixture provides the appropriate number of germinating seeds required to replant a desired area. Seeding rates given in pounds of seed per acre may not be reliable for warm-season grasses because seed viability and bulkiness is not taken into account unless specified as PLS.

Use the no-till drill for seeding the native grass mix and cool grass mixtures. A no-till or conventional grass drill is appropriate when seeding cool-season tame grasses. Use a hydro seeder on steep slopes or in areas inaccessible with the drill. When seeding with a conventional drill, seedbed preparation is important in development a good stand of grass. The seedbed must be firm, the seeds should be planted 1/4 to 1 inch (7 to 25 mm) depth, and repacked after seeding.

Weed control and soil nutrients also play an important role in establishing grasses. The use of a pre-emergence or post-emergence chemical application can greatly enhance the chances of a successful grassland stand. The North Dakota Weed Control Guide published by the NDSU Extension Service is an excellent reference when selecting chemical grassland weed control measures When seeding a cool-season grass mixture, it is also wise to determine if soil nutrients need to be added to the soil prior to seeding.

3.2 Natural Resources Consultation Requirements

The NDARNG routinely consults with the NDGF, FWS, and NDSU on natural resource management issues.

NDARNG consultation with FWS & NDGF is required for many projects where natural resources considerations require notification. The NDARNG maintains a good working relationship with both the FWS & NDGF and attempts to consult these agencies to ensure the preservation of the threatened and endangered species and to achieve a sustainable balance of military training and public uses to the CGN area.

The NDARNG has partnered with NDSU in managing natural resources on CGN. NDSU provides trained staff and students with opportunities to conduct studies and gain experience managing natural resources on a large scale. This partnership has provided the NDARNG with a significant amount of information on the flora, fauna, resources and management techniques and enables the NDARNG to create a sustainable training environment.

3.3 Beneficial Partnerships and Collaborative Resource Planning

The NDARNG has established partnerships with the North Dakota State University and the University of North Dakota. Both institutions provide vital roles in managing natural and cultural resources on NDARNG training lands.

The NDARNG has also established working relationships with the NDGF, FWS and USACE. These relationships provide instant access to resource management professionals with experience in managing threatened and endangered species and candidate species/species of concern as well as land management issues pertinent to all NDARNG training lands.

3.4 Community Involvement and Use of CGN

There are numerous situations at CGN in which NDARNG asks for community input and also a number of opportunities for community access and use of CGN.

NDARNG frequently engages with city and community leaders, state agencies, tribal and county representatives, and private organizations regarding a number of projects and issues which take place at CGN. These entities are consulted regarding projects associated with regeneration of woodland areas, noxious weed control efforts, overland flooding projects, wildlife management concerns, construction projects and projects that potentially impact historical buildings and/or known and unknown cultural sites. Community members are also frequently invited to special events held at CGN, such as building dedications, military appreciation days, and ceremonies associated with honoring NDARNG service members. In addition, NDARNG recruiters also bring students to CGN to improve their understanding regarding available training opportunities

The public can also make use of the facilities found at CGN. Requests to use CGN facilities must be routed through and approved by the CGTC, Operations and Training Section. Barring

any conflicts with training events, CGN can provide the public access to CGN's historical buildings, auditoriums, and classroom. The general public is also allowed to hunt at CGN. During the bow deer hunting season, members of the community with a NDGF bow hunting permit are allowed to hunt CGN as long as they possess a CGN access permit issued by the CGTC. Furthermore, disable veterans with a NDGF Deer Gun license and participating in Wounded Worriers Program are also permitted to hunt CGN during the second week of the State's Deer Gun Season.

Members of the community can also access CGN's outdoor facilities, woodlands, wetlands, and grassland sites. CGN offers a 18 hole Frisbee golf course, volleyball court, walking trails, cross country ski trails, and access CGN's shoreline areas. CGN's woodland, wetland, and grassland areas can also provide the public with the opportunity to observe and study a number of plants, birds, mammals, and invertebrate species found at or migrating through the CGN area. Access to these areas must be cleared by contacting CGN's security personnel to ensure the public's use of CGN won't conflicts with any scheduled training activities.

NDARNG also provides the general public a pathway for learning about research conducted at CGN. Findings from woodland regeneration trials and biological weed control projects are made available to the public through the NDSU Extension Service. As a result, the general public can learn and benefit from the natural resource studies conducted at CGN.

3.5 Encroachment Partnering

Two separate and uniquely different encroachment issues are present along CGN's borders. Encroachment upon CGN's 2 mile northern perimeter is primarily associated with residential development (see figure 2) and encroachment concerns on southwestern and eastern perimeters are linked to the rising water levels of Devils Lake.

NDARNG doesn't have any formally identified partners who could assist with preventing further residential encroachment along the northern perimeter. Ramsey County Road 45th Ave NE runs parallel to the northern border, but within a ¼ mile of the northern perimeter there are currently 65 established residential homes.

Along CGN's eastern and southwestern borders, CGN is experiencing encroachment from the rising waters of Devils Lake. Since 1993 the lake elevation has risen 28.1 feet and during that same time frame Devils Lake has swallowed up more than 568 acres of CGN. Fortunately CGN has partners on its eastern border who share concerns with the lakes encroachment and its impact upon State Highway 20. The USACE, Federal Highways, and the North Dakota Department of Transportation have made commitments to building up the highway so it's capable of protecting the community of Devils Lake and the facilities located at CGN. Unfortunately similar resource partnerships are not available for preventing Devils Lake from encroaching along the southwestern perimeter.

CGN's RTI-TA doesn't appear to be pressured by encroachment and RTI-TA encroachment partners haven't been identified at this time.

3.6 Comprehensive Wildlife Conservation Strategy (CWCS)

NDARNG CGN INRMP and the NDGF 2005 CWCS action plan for the Mixed-Grass Prairie Missouri Coteau Region of North Dakota complement one another. These plans are different but their objectives are quite similar. This could partially be the result of yearly consultation meetings between NDARNG and NDGF which focus upon the implementation of natural resource management plans. Objectives common to both the CGN INRMP and the CWCS action plan include:

- Protection and maintenance of the native mix-grass prairie community where possible
- Implementation of alternatives to long term haying of native grassland areas
- Controlling of noxious weeds through biological and chemical methods
- Working with state and federal agencies regarding the compliance of state pesticide regulations
- The implementation and support of natural resource surveys and research efforts that further our knowledge of the state's natural resource baseline information
- Developing brochures and videos for informing the public and/or the troops regarding the need for conserving natural resources and wildlife habitat.
- Researching the use of fire as a best management practice.

4.0 PROGRAM MANAGEMENT GOALS

4.1 Threatened, Endangered, and Candidate Species Management

Threatened and endangered species (T&E) and candidate species require a variety of habitats. Some of these species require key habitats and environmental components found on CGN. These unique requirements strengthen the need to maintain prairie & wetland areas at CGN.

The following management techniques will be employed in order to appropriately manage T&E species most likely to frequent CGN. Further, management techniques for candidate species are also provided, even though candidate species are not afforded protection under ESA. Managing to protect candidate species will not further their decline and is likely to create a healthier, more diverse ecosystem at CGN. A current list of T&E species associated with CGN can be found within Appendix 7. An up-date T&E list can be found at: http://www.fws.gov/northdakotafieldoffice/SEtable.pdf.

Strategy. Using information provided by the FWS and NDGF, decrease the interaction and/or conflict between military activities and T&E species and candidate species.

Goal 1. Conserve breeding areas used by T&E species and candidate species in a manner that does not interfere with military training activities

Objective 1. Conduct annual training for NDARNG personnel and provide information (NDNG Environmental Awareness Video & Soldiers Compliance Field Cards) to CGN users on the protection of T&E and candidate species.

4.1.1 Whooping Crane

The Whooping Crane (*Grus americana*) is in the endangered category. CGN lies within the migratory flyway that Whooping Cranes use during their annual migrations. Whooping Cranes potentially could use wetlands areas at CGN for temporary resting during migration through North Dakota.

Goal 1. Avoid disturbing whooping cranes when sighted and, in accordance to the Cooperative/ Federal/State Whooping Crane Contingency Plan (2006), report all sightings to the FWS and NDGF.

4.1.2 Sprague's Pipit

The Sprague's Pipit (Anthus spragueli) is in the candidate category. CGN lies within the Sprague's Pipit's breeding area and provides the open undisturbed well drained blocks of native grasslands thought to be desired by the Sprague's Pipit for nesting. The introduction of exotic grasses, the planting of trees, and the encroachment of shrubs renders native grasslands areas unsuitable to the Sprague's Pipit.

Goal 1. Avoid breaking up those blocks of native grassland found at CGN with new roads, trails, trees plantings, or exotic plants.

Objective 1. Research and implement biological control methods for exotic plant species and volunteer woody shrubs encroaching into CGN's native grassland areas.

4.1.3 Northern Long Eared Bat

The Northern long eared bat is a species proposed for listing. It has been identified using area of North Dakota for its summer habitat. During the summer the bat can be found roosting singly or in colonies underneath bark, in cavities or in crevices of both live and dead trees. Breeding begins in late summer or early fall with males swarm near hibernacula. Pregnant females migrate to areas used as summer habitat and give birth to a single pup. Northern long eared bats emerge at dusk to fly through the understory of forested areas to feed upon moths, flies, beetles etc. which they catch while in flight using echolocation. White-nose syndrome associated with the bats winter hibernacula is primarily responsible for the bat's significant decline.

Goal 1: Adapted woodland management efforts which maximize the bats efforts to rear its young successfully.

Objective 1: Plant trees to help sustain those areas sought out by the Northern long eared bat for feeding, roosting and rearing young.

4.2 Wetland Management

The U.S. Congress enacted the Clean Water Act in 1972 to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Section 404 of the Clean Water Act delegates jurisdictional authority over wetlands to the US Army Corps of Engineers (USACE) and the Environmental Protection Agency (EPA). Waters of the United States protected by the Clean Water Act include rivers, streams, estuaries, and most ponds, lakes, and wetlands. USACE and the EPA jointly define wetlands as ... areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

There are five wetland systems recognized by the FWS: Marine, Estuarine, Riverine, Lacustrine, and Palustrine. These are not necessarily jurisdictional wetlands. CGN wetlands fit the lacustrine category.

Strategy. Submit 404 permit applications to USACE for all projects requiring dredge and fill of wetlands and maintain open communication with NDGF & FWS regarding projects concerning CGN wetlands.

Goal 1. Develop a comprehensive wetlands plan for all CGN wetlands.

Objective 1. Conduct training for NDARNG personnel and provide information to CGN users on wetlands protection.

Objective 2. Where practical, establish (100 ft) buffer zones around wetlands areas for vehicular training, maintenance and pesticide applications, and pedestrian related training.

Objective 3. Survey wetlands associated with CGN, to verify information provided by the FWS Wetland Inventory and to obtain an accurate account of the wetland acres associate with CGN.

4.3 Law Enforcement of Natural Resources Laws

Many aspects of natural resources management require effective enforcement. Programs, such as, the protection of endangered species, forest products production, harvest controls, protection of sensitive areas, pollution prevention, hunting and fishing recreation, etc. are very dependent upon effective environmental law enforcement.

Currently, CGN does not have trained staff to cover law enforcement on the training site. CGN relies on local law enforcement agencies to perform these actions. CGN maintains close working relationships with local law enforcement agencies and will continue to provide information on suspected violations and violators.

Strategy. Partner with local, state and federal law enforcement agencies to conduct appropriate enforcement actions.

Goal 1. Assure legal compliance of military and civilian activities on CGN.

Objective 1. Maintain a program regulating all military and civilian activities on CGN range areas with an awareness campaign for all users.

Goal 2. Coordinate enforcement activities with other agencies and organizations & use enforcement as an integral part of the overall natural resources program.

4.4 Fish and Wildlife Management

Habitat management is accomplished through training land rehabilitation, wetlands management, erosion control, and wildlife habitat management projects. CGN does not actively manage habitat for the propagation of wildlife although this is a benefit resultant from NDARNG's land management efforts which support military training activities.

CGN military training activities strive to avoid impacting the local flora utilized by native wildlife species for food, water, and shelter. NDARNG management and training lands rehabilitation efforts also attempt to use native plants to protect the soil resources and indirectly enhance CGN's wildlife habitat. CGN's mammals, birds, amphibians, and reptiles are identified in Appendix 4. The vertebrates identified by these lists can be found at CGN and/or located

within close proximity to CGN. NDARNG land management efforts are believed to benefit all the residential wildlife species listed.

The public will be allowed access to CGN after being granted permission by the CGTC and as long as their activities don't interfere with NDARNG training activities.

Strategy. Enhance or avoid adversely impacting native wildlife species and or wildlife habitat identified at CGN and also provide the public with access to CGN in a manner that will not interfere with military training activities

Goal 1. Work with NDGF, USACE, and FWS to protect and enhance identified habitat requirements of native wildlife species utilizing CGN.

Objective 1. Work with Federal, State, and private organizations to complete an up-dated survey of plant & wildlife species found at CGN.

Objective 2. Continue to work with Universities and private organization researching native wildlife and plant species found at or likely to utilize CGN.

4.4.1 Fish

Devils Lake is one of North Dakota's largest lakes with excellent fishing during all seasons of the year. Fish regulation applicable to Devils lake are set and enforced by NDGF

Goal 1. Encourage individuals fishing the waters of Devils Lake and to follow the NDGF fishing guidelines and regulations.

4.4.2 Hunting

The public is allowed to use CGN for hunting with written permission from CGTC's Range Officer. All state and federal hunting regulations apply to CGN.

Hunting on CGN mimics the effects of predators. Large predators, such as, wolves and mountain lions that preyed on deer and other game in pre-settlement times are no longer present in North Dakota. Without predation, deer populations may increase to the point where they may damage habitat for other wildlife species, cause outbreaks in diseases, and pose greater hazards to passenger vehicles in the area.

Strategy: Provide public access for hunting on CGN in a manner that does not interfere with military training activities.

Goal 1: Ensure that soldiers and civilians have an opportunity to harvest big game, upland birds and/or waterfowl @ CGN in a clean, safe environment during those times when NDARNG training activities aren't taking place.

4.4.2.1 Big Game

Whitetail deer are the only big game species to inhabit CGN. CGN does not support a large herd of whitetail deer, although there are CGN sites where whitetail deer can be found throughout the year.

4.4.2.2 Upland birds

There are several species of upland game birds which may be pursued at CGN, including sharp-tailed grouse, gray partridge, ringed-necked pheasant, and mourning doves.

Goal 1: Participate with NDGF upon wildlife initiatives which will enhance upland game bird programs in Eddy County.

4.4.2.3 Waterfowl

Waterfowl are typically associated with wetlands at CGN. Hunting opportunities may be sparse given the waterfowl hunting season occurs when active training is taking place at CGN.

Goal 1: Actively participate with the FWS and NDGF regarding wildlife initiatives related to waterfowl programs in Eddy County.

4.4.3 Trapping

Personnel are allowed to trap fur-bearing animals, such as coyote, red fox, raccoon, badger, and beaver at CGN providing they have written permission from CGTC's Range Officer. All state and federal trapping regulations adhered to CGN. Trapping seasons and requirements are established by NDGF.

Strategy: Control populations of fur-bearers on the training site and ensure realistic training while limiting potential human-animal conflicts.

Goal: Enhance training site management and active control of fur-bearing species by offering the general public opportunities for trapping and thereby reducing NDARNG costs associated with trapping, relocation and/or carcass disposal.

4.5 Woodland Management

There are limited woodlands at CGN; therefore, CGN has no active management program of forested lands. Currently, CGN has 288 acres of woodlands which consist of approximately 58 acres of bottomland hardwoods and 230 acres of upland hardwoods.

Goal 1 Maintain the health and vigor of CGN 288 acres of woodlands.

Objective 1. Monitor tree stands for disease and insect infestation and remove infected trees before further damages become widespread.

Goal 2. Avoid overly utilizing and impacting woodland areas. Maintain woodland areas so they are capable of being used during future training efforts for overhead cover, military training operations, and habitat for wildlife species.

- Avoid off road vehicle use in woodlands areas.

- Avoid cutting woody vegetation with trunk diameters over 1 inch for use as camouflage

Objective 1. Plant additional trees in select training areas to enhance woodlands for military operations and as habitat for wildlife species.

4.6 Vegetation Management

Although most of CGN is virgin native rangeland that has never been cultivated, some areas of the CGN have been cropped, mechanically disturbed and/or used for training activities. Other disturbed areas include roadsides and roads, areas planted to non-native species, the mowed cantonment area, and areas from which vegetation or topsoil was removed for fill or training activities.

Strategy. Maintain and expand the biological diversity of native plants inherit to CGN

Goal. Enhance the training site's natural environment and provide a realistic training area with as few training limitations as possible.

Objective 1. Study the effects of Kentucky bluegrass, an invasive species, on the ecosystem.

Objective 2. Study the use of mowing and prescribed burning as a management tools for areas where the accumulation of biomass has restricted the vitality of the native prairie ecosystem and/or has enabled the introduction of woody shrubs and non-native invasive plant species.

4.7 Migratory Birds Management

It should be noted that training activities have the potential to inadvertently injure or kill migratory birds. In an effort to avoided or minimized adverse impacts upon migratory birds and their nests, during the nesting season training activities will be restricted to established trails or performed in the designated areas used for excavation training activities. Migratory birds are protected through International Treaties and the Migratory Bird Treaty Act. Federal regulations (50 CFR) and Executive Order 13186 provide the framework for regulations of migratory bird take and possession. For any take that does not occur as a direct result of military readiness activities, as defined in the Director's Order detailing specifics of the exemption, Federal permits

are required to take, possess, transport, and dispose of migratory birds, bird parts, feathers, nests, or eggs. When necessary, application for permits will be made to the FWS Migratory Bird Permit Office in Denver, CO.

Strategy. Maintain current habitat opportunities at CGN and during the nesting period restrict training activities to established trails or designated area used for excavation training activities.

Goal 1. Conserve breeding areas used by migratory birds in a manner that does not interfere with military training activities and ensure military training activities have limited impacts upon migratory birds and the areas they utilize.

Objective 1. Conduct annual training for NDARNG personnel and provide information (NDNG Environmental Awareness Video & Soldiers Compliance Field Cards) to CGN users on the protection areas utilized by migratory bird species.

Goal 2. Limit ground disturbances from military training activities during the breeding season (April 1 through July 15, annually) to the extent practical.

4.8 Invasive Noxious Weed Management

Aggressive weed species have been introduced to CGN. The most aggressive of these species are listed by North Dakota Agricultural Department as Noxious Weeds. Noxious weeds are governed under North Dakota Law (NDCC 4.1-47-02). Weed species which are both found at CGN and identified by the state of North Dakota as noxious weeds include: Leafy spurge, Canada thistle, and Absinth wormwood.

Leafy spurge (Euphorbia esula) is found throughout CGN. It is an aggressive weed introduced from Eurasia that displaces native plants even under ideal conditions. It is one of the earliest plants to emerge in the spring and has no natural animals, insects, diseases, or bacteria to control its spread, giving it an advantage to dominate native rangeland. Leafy spurge spreads by a deep root system and seeds, and in combination with the other advantages, becomes a highly competitive to native North Dakota plants.

Canada thistle (Cirsium arvense) has been noted growing within swales and disturbed areas of CGN. It is an aggressive perennial plant introduced from Europe. Each Canada thistle flower can produce 40 to 80 light weight seeds the wind can transport long distances. Its active underground root system can form dense infestations by vegetative reproduction and it is capable of displacing native grasses and forbs. Canada thistle's above ground biomass is normally abundant and its flammability has the potential to increase fire severity.

Absinth wormwood (Artemisia absinthium) has been observed growing at CGN, especially along roadways. Absinth wormwood is an introduced biennial weed species capable of producing hundreds of thousands of seeds. Relative to leafy spurge, it is a weed that can be effectively and economically controlled.

Musk thistle (*Carduus nutans*) small areas of musk thistle are present on CGN. This weed is easily controlled when only a few plants are present, but can spread rapidly and infest many acres, increasing the control costs.

Goal 1: Ensuring the viability and health native plant species which have the ability to sustain CGN during adverse climatic conditions by maintain compliance with North Dakota State Agricultural Regulations which mandate the control of invasive plants listed as noxious weeds.

Objective 1. Actively monitor CGN for noxious weeds and implement control measures before these noxious weed become established.

Objective 2. Introduce biological control measures to CGN to assist with controlling noxious weeds and reduce the need for noxious weed chemical control applications.

Goal 2. Apply pesticide in accordance to labeled instructions, in a manner which will not create a threat to the surrounding natural resources, and in accordance to North Dakota Pesticide Laws and Regulation.

4.9 Pest management - Insects and Vertebrates

Insect and vertebrate pest management operations are performed in such a manner as to cause no harm to personnel or the environment. Non-chemical control efforts will be used to the greatest extent possible to reduce reliance on pesticides, minimize cost, enhance environmental protection, and maximize the use of integrated pest management techniques.

Pest management includes surveillance and control of mosquitoes, miscellaneous insects (bees, wasps, ants, crickets, and cockroaches), spiders, mice, and miscellaneous vertebrate pests; such as, skunks, raccoons and squirrels. Without control, these pests could interfere with the military mission, damage real property, increase maintenance costs, and expose personnel to diseases. Actual pest management procedures are found in the NDARNG's Integrated Pest Management Plan.

Strategy Minimize unwanted encounters with pests which can disrupt the training mission and/or damage NDARNG facilities within the CGN training area.

Goal 1. Implement NDARNG Integrated Pesticide Management Plan at CGN which will minimize the use of pesticides, prevent the potential occurrence infectious diseases (Hantavirus, Lymes Disease, West Nile Virus, Equine Encephalitis, or Rabies), and improve the environmental safety of CGN.

Objective 1. Conduct annual reviews to insure pest related concerns aren't adversely impacting training area and/or the structures located at CGN.

Goal 2. Control pests before they become a health concern or interfere with training activities.

Goal 3. Apply pesticides in accordance to labeled instructions, in a manner which will not create a threat to the surrounding natural resources, and in accordance to North Dakota Pesticide Laws and Regulation.

4.10 Land Management

Soil erosion potential at CGN is relatively high given the soil types, topography, the intensity and variable amounts of annual precipitation, and the duration and the types of military training activities conducted at CGN. Approximately 30% of CGN acreage falls within the erodible to highly erodible category. Activities which contribute to soil erosion at CGN include the following field training exercises; cover and concealment, convoy operations training, bivouac operations, land navigation, engineering obstacle training, mobility/counter mobility training, and trail maintenance activities.

Strategy. Protect and maintain soil resources so they're able to fully sustain military training actions and capable of supporting CGN's native vegetation and wildlife species.

Goal 1. Manage land resources for military training without damaging the ecosystem and natural environment.

Goal 2. Ensure impacts derived from military training activities are rehabilitated quickly and efficiently.

Objective 1. Provide educational training materials to soldiers regarding training rules and restriction put in place to prevent and/or minimize impacts upon natural resources at CGN

- Digging fighting positions, tank trenches and kitchen sumps is permitted when cleared and permitted by CGTC Range Control. Digging is not permitted for trench latrines or burying of garbage, refuse, or sewage.

- To the maximum extent practical, remain on combat trails when maneuvering in the training areas.

- Obey speed limits to avoid creating dust.

- Site reclamation requirements are contained in the CGTC SOP (Appendix 9).

4.11 Agricultural Out-lease

Camp Grafton South is a state owned training area and federal agricultural out-lease issues are not applicable for CGN.

4.12 Geographical Information Systems (GIS) Management

The NDNG GIS is an operating web mapping enterprise available internally to NDARNG web users. The GIS system provides a spatially review by overlaying data, buffering areas of concern, running analytical functions, and updating resource data using mobile equipment.

The GIS web mapping capabilities supports NDARNG efforts to operate sustainable environmental programs. The NDARNG CGN GIS data records, helps to track environmental assessments, and provides NDARNG users the ability to determine area sizes, proposed scenarios, and natural resources areas at stake.

Strategy. Using digital aerial photographs, track and record on-going whereabouts of CGN environmental issues of interest.

Goal. Create, maintain, track, and make accessible spatially environmental data which will enable NDARNG personnel to development and conduct training in a manner that will avoid and prevent adverse impacts to CGN soil, vegetative, fauna, and cultural resources.

Objective 1: Record those areas where noxious weeds have been identified and mapped, track the acreage and locations where these noxious weeds have been identified, and over time determine if control measures have been effective.

Objective 2: Digitally record sites where birds of concern, threaten & endangered species, and plants of interest to Native Americans have been identified and over time determine if sightings are more or less frequent.

Objective 3: Develop maps for military training activities and training site development which display environmental sensitive areas (wetlands, water bodies, cultural sites, T&E nesting areas etc.) with setbacks areas indicating where training activities are off limits.

4.13 Outdoor Recreation

CGN is a small open space training area with few outdoor recreation opportunities (fishing, hunting, and birding) available to the public as well as military personnel; however, if hunting and fishing (or other outdoor recreational activities) are to continue to thrive on CGN, the military mission priority must not be compromised. If recreational or management activities conflict with military activities, the military mission will come first in order to provide our soldiers with the training they require and to insure public safety isn't compromised.

Over the past century the Army has been training soldiers to win on battlefields around the world while providing quality recreational opportunities for soldiers, their families, employees, and the general public. CGN is consistent with its Army leadership role and has shown that training and recreational opportunities can be achieved simultaneously.

Strategy. Maintain communication with local communities to provide access to CGN natural resources for public use.

Goal 1. Provide opportunities to the military community and general public for exceptional quality, safe, and equitable hunting, fishing, and other outdoor recreation.

Goal 2. Manage outdoor recreation consistent with the needs of the CGN military mission.

Goal 3. Encourage the development of facilities that improve use and enjoyment of fishing, hunting, and other natural resources-based recreation.

Goal 4. Integrate recreation activities with endangered species management.

4.13.1 Public Access

CGN is open to the public for educational and/or recreational use (hunting, access to fishing, birding etc.) when the activities are compatible with the military mission activities. Public access to the CGN is permitted upon request on an equitably and impartially bases.

Restrictions will be enforced to insure sensitive areas remain undisturbed. Sensitive areas include cultural sites and habitat areas of value to threatened and endangered (T&E) species. NDARNG will take steps where possible to protect the numerous cultural sites identified at CGN which have been identified as eligible for the National Register of Historic Places (NRHP) and/or cultural sites that remain unevaluated. NDARNG will also steps to protect those areas of CGN that potentially provide habitat for T&E species.

Goal 1. Maintain recreation areas 100 meters (328 ft) from all sensitive areas (archeological sites and areas with threaten & endangered species and or habitat suitable to their needs).

Objective 1. Post information at CGN's entrance with the CGTC's Range Officer's contact information .

Objective 2. Post interpretative signs near recreational areas explaining access restrictions.

4.13.2 Native American Access

CGN is proud to offer Native American Tribes access to the training lands for conducting religious rites, ceremonies and/or for gathering sacred and/or medicinal plants. NDARNG's main concern is safety when these activities are conducted, both for training soldiers and tribal members. Permission to access CGN can be obtained by contacting CGTC's Range officer.

This is consistent with AR 200-1, Section 6-4.c and implements the requirements of American Indian Religious Freedom Act, Executive Order 13007 and 13175.

Goal 1: Permit Native American access to CGN per request via the CGTC's Range Officer when conditions are compatible with military training activities.

4.13.3 Outdoor Recreation Programs

Priority activities support military training first, then the National Guard's morale, welfare and recreation programs and lastly public uses. Outdoor recreation programs are designed to provide access to uniformed personnel, family members and the general public that are consistent with the Army's security requirements and safety concerns. Outdoor recreation programs will seek to provide access to disabled veterans, military dependents with disabilities, persons with disabilities when public access is available and when topographic, vegetative, and water resources allow for such access without substantial modification to the natural environment.

4.13.3.1 Recreational Shooting

There are no recreational shooting opportunities available at CGN. This includes firearms, archery and paintball.

4.13.3.2 Off-Road Vehicles

Off-road vehicles (ORVs), both motorized and non-motorized, have great potential to damage natural resources. AR 200-1 is very restrictive on the use of ORVs for recreation. No recreational ORV driving is allowed on CGN. Vehicles commonly used as ORVs must be licensed and remain on roads and trails and follow all rules of the road, just as other vehicles. ORVs include, but are not limited to, off road motorcycles, four wheelers, four wheel drive vehicles, and mountain bikes. Exceptions to this policy include military use, law enforcement, rural firing fighters with their equipment, and natural resources management personnel.

4.13.3.3 Camping

The public is not allowed to use CGN for overnight camping unless provided with written permission from range control. Signs are posted at CGN's entrance with contact information

4.13.3.4 Hiking and Picnicking

Hiking and picnicking are popular activities during the summer months in North Dakota. Currently, there are no facilities to support either of these activities at CGN.

4.13.3.5 Boating and Canoeing

CGN offers no recreational boating and/or canoeing opportunities; however, the general public and military members can gain access to the waters of Lake Coe by using the NDGF boat ramp located on the western edge of Lake Coe.

4.13.3.6 Other Recreational Activities

Other outdoor recreation activities include activities, such as, nature study and photography, berry picking, horseback riding, and general nature enjoyment; however, these activities are not encouraged during on-going training activities at CGN.

4.14 Bird Aircraft Strike Hazard

NDARNG doesn't have a BASH exclusively developed for CGN; however, portions of the nationwide BASH have been implemented at CGN.

The landing areas for fixed winged aircraft and helicopters have been placed in areas where projected interactions between air craft and birds will be minimal. The landing sites are in areas relatively distant from local water bodies and wetlands and outside the flight paths used by birds to reach feeding, loafing and roasting areas. CGN's firing range is also located adjacent to the landing sites. When in use the firing range will help to detour birds away from the landing sites.

Strategy: The preservation of war fighting capabilities through the reduction of wildlife hazards to aircraft operations

Goal 1: Implement avoidance, control, & habitat modifications measures which will discourage birds from the using landing sites and minimize collisions between birds and NDARNG aircraft. Avoid using CGN landing sites during the early evening and early morning hours during the months of October and November when the migration activities are highest and most hazardous.

Goal 2: Insure equipment and similar perching sites aren't available near the landing area and minimize open areas near landing sites and/or maintain open areas in grass to prevent birds from routinely accessing these sites for grit needed by the birds for digestive reasons. Brush control measures capable of preventing weed seed production should be implemented to prevent foraging activities by birds and the growth of plant stalks which can serve as roasting and/or perching sites.

Goal 3; Mow grassed areas on and around landing sites to a height of 7 to 15 inches. This will help to prevent seed development for foraging birds. It will also reduce a bird's ability see and hide from natural predators.

4.15 Wildland Fire Management

CGN doesn't have a recognizable history of wildland fires. During 2009, NDARNG was approved for an Integrated Wildland Fire Management Plan Waiver.

Fire protection procedures for CGN are listed in the Camp Grafton Training Center Standard Operating Procedures (Appendix 9).

Strategy. Manage variables where possible that contribute to wildland fires.

Goal 1: Insure that fires imitated on CGN by NDARNG training activities etc. don't threaten NDARNG personnel, NDARNG facilities, and/or both people and properties located outside of CGN.

Goal 2: Control vegetative growth within CGN and limit its ability to feed a fire that can't be controlled.

Objective 1: Research management concepts and ideas that will limit the build-up of bio-mass and reduce the fuel available for a wildfire.

Goal 3: Work with training personnel to insure off trail training exercises are limited when environmental conditions warrant a fire danger warning.

4.16 Training of Natural Resource Personnel

The NDARNG currently supports INRMP implementation with the following staff:

Table 3. Natural Resource Management Personnel Training Needs

Organization/Position	Current manning	Type	Needed to fully implement	Notes
Environmental Office				
Environmental Program Manager	1	FT	1	
Natural Resources Manager	0.5	SE		NR and CR positions combined into one position
Cultural Resources Manager	0.5	SE		
GIS Program staff	1.5	SE	2	GIS personnel include: 0.5 Manager 1 GIS Specialist 0.5 GIS Specialist at training site
Camp Grafton Training Center				
Training Site Environmental Specialist (TSES)	1	SE	1	Acts as ITAM coordinator
ITAM Coordinator	0	Cont	0.5	Need is for 8 month training year
LRAM/LCTA Coordinator	1	Cont	1	NDSU contract
Field Crew	1-3 (varies)	Cont	1-3 (varies)	NDSU contract
Intern	1	Cont	1	NDSU contract – assists TSES

Current a staffing shortfall for full implementation results from:
• Authorizations do not match current manning model.
• Required projects currently not implemented due to staff limitations.
• Increased military training and subsequent increased training impacts and natural resource management needs.
• Deployments over the past 6 years have caused decreased overall use leading to reduced funding under the ITAM program.
The personnel list shown on Table 5 does not include all personnel who have significant roles in implementation of this INRMP.

Strategy. Insure natural NDARNG management activities are incompliance with all federal, state, and local laws and regulations and NDARNG staff are adequately trained regarding the implementation of best management practices capable of sustain training areas for military activities.

Goal 1. Manage NDARNG training area in a manner which sustains them for the long term and does not interfere with military training activities.

Objective 1. Efforts will be made to employ and retain experienced personnel with the knowledge and the ability manage NDARNG's natural resources

Objective 2. Insure natural resource staff members have the funding and the opportunity to attend NGB sponsored natural resource training program pertinent to operating CGN.

Objective 3. Insure natural resource staff members have the funding and the opportunity to travel to state sponsored regulatory and education natural resource training program pertinent to operating CGN.

4.17 Coastal/Marine Management

NA. CGN doesn't have coastal or marine areas.

4.18 Floodplains Management

CGN doesn't have the need for a flood management plan. CGN is the beginning of several minor watersheds and also contains several closed depressions or wetlands within its parameters.

4.19 Research Projects.

Increasing regulatory demands have lead NDARNG to recruit outside assistance in gathering natural resources information and management input for CGN. The assistance provided by outside organizations has yielded benefits particularly in the areas of wildlife research, erosion control, biological surveys, and gathering biological baseline data. The growth of environmental compliance requirements has increased NDARNG's need to expand its partners in other areas, including on-the ground personnel support. NDSU, UND, USACE, and the NDGF are examples

of organizations which NDARNG has worked with or contracted to gather resource information pertinent to the management of CGN. Based upon favorable experiences gained from working with these agencies, NDARNG will continue to seek out their assistance and/or the assistance from like organizations and agencies.

Strategy. Insure CGN is managed based upon sound and current information.

Goal 1. Provide research, data support, and survey support for CGN natural resources management and natural resource programs

Objective 1. Resurvey CGN's fauna and flora, up-date current CGN species lists, and record changes that may have taken place since the prior flora & fauna surveys completed during the late 1990's.

Goal 2. Cooperate with Federal, state, and private groups with the expertise to enhance CGN's natural resources programs.

Objective 1. Use a 4-5 person Student Conservation Association crew to assist with habitat mapping and other management duties.

Objective 2. Utilize universities assistance during implementation of CGN's INRMP.

Objective 3. Support the NDGF during their efforts to conduct wildlife surveys and up-dates to the North Dakota Comprehensive Wildlife Conservation Strategy.

Goal 3. Use volunteers as available for project assistance and military units when such projects meet their capabilities and/or training requirements.

4.19.1 Private Research Organizations

Whenever possible NDARNG will make an effort to work with non-governmental conservation organizations such as The Nature Conservancy (rare species inventories), National Wild Turkey Federation (turkey stocking), Tall Timbers Research Station (ecosystem research), Institute for Bird Populations (Neotropical bird monitoring), and the Vermont Center for Ecostudies (Grasshopper Sparrows and Upland Sandpipers migratory flight and habitat study).

Goal 1. Continue to create new partnerships with non-governmental organizations and offer support for those research projects with value to NDARNG, FWS, and the NDGF.

4.19.2 Habitat and Species-specific Research

Goal 1. Use research to adjust management programs and adapt effective management process.

Objective 1. Work with local researchers and the FWS to determine demographic and genetic variability of the Piping Plover population which nest on the shoreline area of CGN.

Goal 2. Continuously improve the scientific basis for natural resources management decisions. Prioritize, initiate, fund, and steer cooperative research projects on aspects of ecosystem management for which there is a lack of scientific information regarding effective management options.

Goal 3. Establish and maintain working partnerships and contractual agreements for research and other coordinated activities with federal and state wildlife and research agencies, cooperative research units, universities, and private research organizations.

4.19.2.1 Habitat Research Projects

Goal 1. Design research projects to provide habitat management options which can directly support ecosystem management programs.

Objective 1. Initiate research of habitat associations and land-use impacts on wildlife communities. Address priority species and management issues.

Objective 2. Initiate research to assess insect, seed, forage, and cover production potential of natural communities subjected to various land management practices.

Objective 3. Initiate research to determine the availability and importance of litter to ground nesting birds in areas of different burning regimes.

4.19.2.2 Species-specific Research

The below list may be changed to meet changing needs and respond to research results from other studies which may answer some of CGN needs.

Goal 1. Design research projects to provide habitat management options which can directly support ecosystem management programs.

Objective 1. Initiate research to assess the ability of birds to relocate and/or re-nest after burning or other habitat alterations. Analyze effects of forced relocation on birds in established territories that are closely tied to habitat research projects.

4.19.2.3 Planned Research and Special Projects

Table 6 outlines needed external support projects in three priorities. In the plan period many of these projects will be determined by funding availability. These are described in more detail in appropriate sections of this INRMP.

739 Table 4. Planned Research and Special Projects
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Project	Priority*	Agency	Completion	Comments
Habitat mapping/modeling	1	FWS, NDGF	Indefinite	Ongoing
Wetlands delineation	1	USACE, FWS	Indefinite	As needed
Affects of prescribed burns on training lands	3	NDSU		Recommended
Review creel survey data	3	Unknown, NDGF		Recommended
Affects of prescribed burns on invasive plants (Kentucky bluegrass)	3	NDSU	Initiated	Recommended
Affects of prescribed burns on biological controls for leafy spurge	Low priority @ CGN	NDSU		Recommended
Multiyear effects of prescribed burns on ground nesting birds	3	NDSU, FWS		Recommended
Identify Area Piping Plovers nesting sites	1	FWS, NDGF	Indefinite	Ongoing

741
742 1 Needed as soon as possible for immediate management application.
743 2 Useful for improving management to a significant degree over a long period.
744 3 Has good potential to improve long-term management.

5.0 Implementation & Environmental Compliance

Preparation and implementation of the CGN INRMP is required by the Sikes Act (16 U.S.C. 670a *et seq*.), Department of Defense Instruction 4715.3 (*Environmental Conservation Program*), and Army Regulation 200-1.

The CGN INRMP will help North Dakota Army National Guard comply with other federal and state laws, most notably laws associated with environmental documentation, wetlands, endangered species, water quality, and wildlife management in general. This plan describes how the NDARNG will implement provisions of AR 200-1 and local regulations at the CGN.

This INRMP has the signatory approval of the FWS. This signature approval includes agreement that the INRMP complies with the Endangered Species Act. Review of the INRMP is informal consultation with regard to the Endangered Species Act.

5.1 Summary

The CGN INRMP states how the NDARNG plans to comply with environmental laws, conserve and protect CGN's natural resources, insure NDARNG's favorable relationship with the public, and enhance the military mission. This Plan will not resolve all existing and/or future environmental issues. It does; however, provide guidance strategy, personnel, and means to minimize training impacts to the environment and natural resources identified at CGN.

5.2 Achieving No Net Loss

As required by the Sikes Act, this INRMP has been prepared in cooperation with the FWS and the NDGF. The completed and approved INRMP exemplifies the cooperative effort and mutual agreement between the NDARNG, FWS and the NDGF addressing the conservation, protection and management of fish and wildlife resources.

The CGN INRMP ensures the "no net loss in the capability of military lands to support the military mission" of the training site has occurred as a result of natural resources management set out in this plan. Specific objectives of management to maintain the training mission capabilities of the site are identified within this plan. Revisions to this plan will take place should major changes to the resources, mission, or laws occur and result in significant impacts upon the management of CGN's natural resources.

5.3 Cooperative Agreements

NDARNG has no formal cooperative agreements.

The 1855 acre area of CGN is owned by the state of North Dakota and designated as NDARNG training property.

NDARNG has a good working relationship with the FWS and the NDGF. The absence of a cooperative agreement between FWS and/or NDGF hasn't prevented these agencies from providing NDARNG input and/or from participating in annual consultation meetings.

NDARNG research studies, biological inventories, wildlife surveys, and cultural evaluations have been conducted and completed under the condition of a contract by either North Dakota State University or University of North Dakota.

NDARNG periodically works with the Ramsey County Soil Conservation District regarding issues related to best management practices for erosion control, land rehabilitation and seeding recommendations. Services provided by the Conservation District have been conducted using purchase agreements.

5.4 Funding

5.4.1 INRMP IMPLEMENTATION COSTS

Implementation of the INRMP will be realized through the accomplishment of specific goals and objectives as measured by the completion of the projects identified in each major section of this plan (See Implementation of LCTA, TM, LRAM, Environmental Awareness, and Ecosystem Management). It should be noted that project implementation dates are estimated and subject to change depending upon funding and staffing availability. The implementation schedules found within this chapter will provide a basis for monitoring and evaluating accomplishments towards reaching the goals.

Estimates of implementation costs are listed in Appendix 2 & 3. All implementation costs are rough estimates (based on estimated materials and direct costs) and are subject to change. If a contractor completes projects, implementation costs could be much higher due to indirect costs of the contractor, travel, principal investigator expenses, or equipment.

The cost to implement all Natural Resources and ITAM projects within this plan are set in the appropriate tables. It should be noted that this implementation expense include only those projects scheduled to occur at CGN.

5.4.2 FUNDING OPTIONS

The following discussion of funding options is not a complete listing of funding sources. In fact, funding sources are continuously changing and the focuses, restrictions, and requirements of funding sources are volatile.

5.4.2.1 NDARNG Funding

Status Tool For The Environmental Program (STEP) funding requirements for Army Environmental Programs (including the natural and cultural resources programs) are identified in

the STEP and the reporting process through ARNG-ILE. This source provides funding for natural resource planning level surveys, and any compliance-related projects. The total projected Environmental Conservation Funds projected for all of NDARNG INRMPs is estimated at $2040,900 for FY 2014 through 2018 (Appendix 2). Estimates will be adjusted each year on an as needed basis.

5.4.2.2 Sikes Act Funding

Cooperative agreements may be entered with States, local governments, nongovernmental organizations, and individuals for the improvement of natural resources or to benefit natural and historical research on state-owned training sites. Funding and services may be contributed on a matching basis to defray the cost of programs, projects, and activities under the agreement (16 U.S.C. 670a et seq.). Because the FWS and the NDGF have become cooperating agencies with the NDARNG, an avenue for matching funds and services with them has been created. Naturally, funding and services by both parties will be subject to the availability of funds and personnel of both parties.

5.4.2.3 Other Grant Program Funding

In 1990, Congress passed legislation establishing the Legacy Resource Management Program to provide financial assistance to DoD efforts to preserve natural and cultural heritage. The program assists DoD in Legacy Resource Management Program protecting and enhancing resources while supporting military readiness. A Legacy project may involve regional ecosystem management initiatives, habitat preservation efforts, archaeological investigations, invasive species control, and/or monitoring and predicting migratory patterns of birds and animals. Three principles guide the Legacy program: stewardship, leadership, and partnership. Stewardship initiatives assist DoD in safeguarding its irreplaceable resources for future generations. By embracing a leadership role as part of the program, the Department serves as a model for respectful use of natural and cultural resources. Through partnerships, the program strives to access the knowledge and talents of individuals outside of DoD.
Projects proposals must be submitted by logging onto the Legacy Tracker Homepage at: http://www.dodlegacy.org.

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Appendix 1

List of Acronyms used in the CGS INRMP

A - Acre
Ac - Acre
AHPD - Archeology and Historic Preservation Division
AR - Army Regulations
ARNG - Army National Guard
AUM - Animal Unit Month
BASH - Bird Aircraft Strike Hazard
BMP - Best Management Practices
BOS - Base Operating Systems
C - Cover
CFR - Code of Federal Regulations
CGN - Camp Grafton North
CGS - Camp Grafton South
CGTC - Camp Grafton Training Center
CRM - Cultural Resource Manager
CTT - Common Tasks Training
CWCS -Comprehensive Wildlife Conservation Strategy
DC-LTA - Douglas Creek Local Training Area
DoD - Department of Defense
ECAS - Environment Compliance Assessment System
EMS - Environmental Management System
EPR - Environmental Program Requirements
ESA - Endangered Species Act
ES - State Employee
FT - Federal Technician
FWS - Fish and Wildlife Service
GPS - Global Positioning System
GTA - Garrison Training Area
HEL - Highly Erodible Lands
I - Soil Erodibility Index
ICRMP - Integrated Cultural Resources Management Plan
IAP - Installation Action Plan
IED - Improvised Explosive Device
ILE - Installation Logistics & Environment
INRMP - Integrated Natural Resource Management Plan
IPMP - Integrated Pest Management Plan
IRE - Division of Installations, Resources and Environment
ITAM - Integrated Training Area Management
K - Soil Texture or Erodibility
LS - Length of Slope

LRAM - Land Rehabilitation and Maintenance
METL - Mission Essential Task Listing
MACOM - Major Army Command
MOS - Military Occupation Specialties
NCO - Noncommissioned Officers
NDFS -North Dakota Forest Service
NDNG - North Dakota National Guard
NDARNG - North Dakota Army National Guard
NDGF - North Dakota Game and Fish Department
NDSHPO - North Dakota State Historical Preservation Office
NDSU - North Dakota State University
NEPA - National Environmental Policy Act
NRCS - Natural Resources Conservation Service
NRHP - National Register of Historic Places
ONRM - Other Natural Resources Management
ORV - Off-road vehicles
P - Special Practices
PR & IA - Project Review & Impact Assessment
PLS - Pure Live Seed
R - Rainfall
RCMP - Range Complex Master Plan
RFMSS - Range Facility Management Support System
RPDP - Real Property Development Plan
RTLA - Range and Training Land Assessment
RTLP - Range and Training Land Program
RTI-TA - Regional Training Institute Training Area
SHSND - State Historical Society of North Dakota
SoCP - Species of Conservation Priority
SOP - Standard Operating Procedures
SRP - Site Rehabilitation Prioritization
SRA - Sustainable Range Awareness
SRP - Sustainable Range Program
T - Soil Erosion Tolerance
TES - Threatened and Endangered Species
TREC - Training Record of Environmental Consideration
TSES - Training Site Environmental Specialist
TRI - Training Requirements Integration
UND - University of North Dakota
USACE - United States Army Corps of Engineer
USFWS - United States Fish and Wildlife Service
USGS - Unites States Geological Survey
WaEI - Water Erosion Index
WiEI - Wind Erosion Index

Appendix 2	2014-2018 NDNG INRMP Project Schedule for all NDARNG Training Sites					
			Funding Requirments			
	Projects titles:	Project Discription	2014	2015	2016	2017	2018
1	Salaries 4.16 Goal 1 Objective 1	Employee salary and benefits for a Natural Resources Manager and Training Site Environmental Specialist. Funding is used for two full time equivalent employees as authorized by state personnel agency. Costs are recurring, and anticipated to rise at no more than 5%/year.	$161,900	$166,000	$170,200	$174,500	$178,900
2	Mission Travel 14.16 Goal 1 Objective 3	Costs associated with travel to support mission requirements	$12,000	$15,000	$15,000	$15,000	$15,000
3	INRMP Implementation 4.1.2 Goal 1 Objective 1; 4.2 Goal 1 Objective 2; 4.5 Goal 1 Objective 1; 4.5 Goal 2 Objective 1; 4.6 Goal 1 Objective 1&2; 4.8 Goal 1 Objective 1&2; 4.9 Goal 1 Objective 1; 4.15 Goal 2 Objective 1; 4.19 Goal 2 Objective 1&2; 4.19.2 Goal 1 Objective 1; 4.19.2.1 Goal 1 Objectives 1,2&3; 4.19.2.2 Goal 1 Objective 1	Expenses linked to implymenting the INRMP and supporting natural resources stewardship activities and projects.	$50,000	$50,000	$50,000	$50,000	$50,000
4	Salaries -Contractor & Intern 4.4 Goal 1 Objective 2; 4.19 Goal 2 Objective 1&4;	Salary for contractor/intern associated with natural resource management projects.	$15,000	$15,000	$15,000	$15,000	$15,000
6	Environmental Staff Training 4.16 Goal 1 Objective 2	Costs associated with training environmental staff in natural resource management practices.	$17,500	$17,500	$17,500	$17,500	$17,500
7	Ground Water Studies & Monitoring Camp Grafton South Project	Conduct annual and periodic surveys of surface and ground waters at Camp Grafton South to determine the presence of contaminants that can be traced back to NDNG range operations, pesticide applications and/or training.	$3,500	$3,500	$3,500	$3,500	$48,000
8	Gis Coordinator/Analyst 4.12 Goal 1 Objectives 3	Salaries, benefits, and training for GIS technical staff members tasked with managing and updating special data required by the natural resource program.	$51,400	$52,600	$52,800	$55,100	$56,400

	Appendix 2	2014-2018 NDNG INRMP Project Schedule for all NDARNG Training Sites					
			Funding Requirments				
	Projects titles:	Project Discription	2014	2015	2016	2017	2018
9	GIS data development 4.12 Goal 1 Objective 1&2	Costs associated with procuring spatial data, upgrading hardware and software GIS equipment, and obtaining reproduction materials.	$3,900	$8,000	$4,200	$8,500	$15,000
11	Environmental Awareness Training 4.1 Goal 1 Objective 1; 4.2 Goal 1 Objective 1; 4.3 Goal 1 Objective 1; 4.7 Goal 2 Objective 1; 4.10 Goal 2 Objective 1; 4.13.1 Goal 1 Objective 1&2;	Produce environmental awareness products (DVDs, videos, & posters) for the purpose of conducting installation environmental awarness training, and/or public outreach.	$10,000	$20,000	$10,000	$20,000	$10,000
13	Follow-up Invertebrate Surveys for the Dakota Skipper Camp Grafton South and Douglas Creek Local Training Area Project	Follow-up Invertebrate Surveys for the Dakota Skipper @ Camp Grafton South and Douglas Creek Training Area		$20,000			
`14	Fauna, and flora surveys & monitoring at CGS, CGN, and DC-LTA 4.4 Goal 1 Objective 1; 4.19 Goal 1 Objective 3	Conduct surveys	$3,000	$3,000	$53,000	$53,000	$53,000
15	Survey Wetlands at CGN & CGS 4.2 Goal 1 Objective 3	Map CGS and CGN wetlands via areial photography and ground level vegetative and soil verification efforts.				$30,000	$50,000
16	Total per year		$328,200	$370,600	$391,200	$442,100	$508,800
17		Total over 5 years =	$2,040,900				

Appendix 3. NDARNG INRMP Projects List for Camp Grafton South, Camp Grafton North and Douglas Creek Local Training Area.

Planned INRMP projects within this appendix are summarized by general topics (for example, Land Management, Wetlands Management, Pest Management, Endangered Species Management). Individual 'must fund' and other planned projects within each of these general topics are budget items entered into the STEP budget system. Individual projects are described in a standard format to facilitate input into the STEP system and provide a means of monitoring overall INRMP implementation. Project format is as follows:

Project: Title
Description: A brief summary of the planned action.
Driver: A driver identifies a need to be satisfied in order for the mission to continue without disruption. Management drivers are installation unique and are defined by the mission, land uses to support the mission, and natural resources affected by the mission. Drivers often include compliance with laws and regulations. Military regulatory requirements are not included in driver descriptions since virtually all drivers are tied to general Department of Defense instructions and/or Department of the Army Orders.
Implementation Timeframes: Calendar year the project is planned to be executed. Some projects are ongoing or as-needed.
Required Funding: Funds required by fiscal year, budget classification and general source of funding or operations budget (BOS).
Regulatory Approvals Required: Used if projects are legally required to have some form of coordination, consultation, or permitting from an outside agency.
Project Implementation Vehicle: Generally either in-house or contract with the understanding that even contract projects require in-house support/monitoring.
Priority: A priority system for ranking projects within this INRMP.
Success Monitoring: Quantitative or qualitative means used to determine how well the project is meeting the purposes of the INRMP and the military readiness mission.

Each general section has an objective(s). Under each objective is a list of projects in the above format. Projects for each objective are grouped as either "must fund projects" or "other planned projects." Must fund projects are either budget class 0 or 1; other planned projects are either budget class 2 or 3.

DoD Instruction 4715.3 describes funding classifications that pertain to "must fund" projects (Class 0 and Class 1) and other planned projects that are not required to meet INRMP implementation status (Class 2 and Class 3).

Description of Required Funding Priorities.

Class 0, Recurring Natural and Cultural Resources Conservation Requirements "Federal and State laws, regulations, Presidential Executive orders, and DoD policies" shall also include actions necessary to rehabilitate or prevent resources degradation that may affect military readiness.

Class 1, Current Compliance shall contain requirements to managed federally listed threatened or endangered species. Class 1 includes projects needed because an installation is currently out of compliance.

Class 2, Maintenance Requirements shall include those projects that are not currently out of compliance but shall be out of compliance (with applicable laws, regulations, standards, Executive Orders, or DoD Policy) if projects are not implemented in time to meet an established deadline beyond the current program year.

Class 3, Enhancement Actions Beyond Compliance shall include projects that enhance conservation resources or the integrity of the installation mission, or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or executive order and are not of an immediate nature.

FY	Local Priority	Standard Practice Category	Project Title	Funding Priority	Cost ($000)
14	1	PR&IA	Salaries – Civilian employees	0H	161.9
14	2	GIS	GIS Coordinator/Analyst	OH	51
14	3	Admin	Mission travel	0H	12
14	4	RE&T	Environmental Staff Training	0H	17.5
14	5	ONRM	Groundwater Studies	0H	3.5
14	6	INRM	INRMP Project Implementation	0H	35
14	7	GIS	GIS equipment, supplies, and data development for Conservation	0H	8
14	8	PR&IA	Salaries – Contractor/intern	0H	15
14	9	ONRM	Fauna & Flora Surveys / Up-dates	1H	3

FY	Local Priority	Standard Practice Category	Project Title	Funding Priority	Cost ($000)
15	1	PR&IA	Salaries – Civilian employees	0H	166
15	2	GIS	Salary GIS Coordinator	0H	52
15	3	Admin	Mission travel	0H	12
15	7	ONRM	Groundwater Studies	0H	3.5
15	8	INRM	INRMP Project Implementation	0H	50
15	9	SRA	Conduct SRA Training	0H	1.5
15	5	RE&T	Environmental Staff Training	0H	17.5
15	12	GIS	GIS equipment, supplies, and data development for Conservation	0H	8
15	10	ONRM	Invertebrate Survey CGS	1H	20
15	4	PR&IA	Salaries – Contractor/intern	0H	5
15	11	ONRM	Fauna & Flora Surveys / Up-dates	1H	3

FY	Local Priority	Standard Practice Category	Project Title	Funding Priority	Cost ($000)
16	1	PR&IA	Salaries – Civilian employees	0H	170.2
16	2	GIS	GIS Coordinator/Analyst	0H	52.8
16	3	Admin	Mission travel	0H	15
16	4	PR&IA	Salaries – Contractor/intern	0H	15
16	5	INRM	INRMP Project Implementation	0H	50
16	6	RE&T	Environmental Staff Training	0H	17.5
16	7	ONRM	Fauna & Flora Surveys / Up-dates	1H	3
16	8	ONRM	Groundwater Studies	0H	3.5
16	9	GIS	GIS equipment, supplies, and data development for Conservation	0H	8

FY	Local Priority	Standard Practice Category	Project Title	Funding Priority	Cost ($000)
17	1	PR&IA	Salaries – Civilian employees	0H	174.5
17	2	GIS	GIS Coordinator/Analyst	0H	55.1
17	3	Admin	Mission travel	0H	15
17	4	PR&IA	Salaries – Contractor/intern	0H	15
17	5	RE&T	Environmental Staff Training	0H	17.5
17	6	INRM	INRMP Project Implementation	0H	50
17	7	SRA	Conduct SRA Training	0H	1.5
17	9	ONRM	Fauna & Flora Surveys / Up-dates	1H	53
17	10	ONRM	Wetland Survey	1H	30
17	11	ONRM	Groundwater Studies (CWA)	0H	3.5
17	12	GIS	GIS equipment, supplies, and data development for Conservation	0H	15

FY	Local Priority	Standard Practice Category	Project Title	Funding Priority	Cost ($000)
18	1	PR&IA	Salaries – Civilian employees	0H	178.9.5
18	2	GIS	GIS Coordinator/Analyst	0H	56.4
18	3	Admin	Mission travel	0H	15
18	4	RE&T	Environmental Staff Training	0H	17.5
18	5	PR&IA	Salaries – Contractor/intern	0H	15
18	6	INRM	INRMP Project Implementation	0H	50
18	7	ONRM	Groundwater Studies	0H	48
18	8	ONRM	Fauna & Flora Surveys / Up-dates	1H	53
18	9	ONRM	Wetland Survey	1H	30
18	10	GIS	GIS equipment, supplies, and data development for Conservation	0H	15

Project: Salaries – Civilian employees
Description: Employee salary and benefits for a Natural Resources Manager, Training Site Environmental Specialist . Funding is used for two full time equivalent employees as authorized by state personnel agency. Costs are recurring, and anticipated to rise at no more than 5%/year.
Driver: AR 200-1; Comply with various natural resources-related laws to allow completion of the military mission and operate a natural resources management program to maintain fully functioning native ecosystems that can support military training activities.
Implementation Timeframes: Annual requirement.
Required Funding: FY14, $161,900, Class 0H, Environmental funding. FY15, $166,000; FY16, $170,200; FY17, $174,500; FY18, $178,00.
Regulatory Approvals Required: None
Project Implementation Vehicle: In-house through hiring of state employees.
Priority: 0H
Success Monitoring: There is adequate staffing to ensure that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by the INRMP.
CGN Goals & Objectives: 4.16 Goal 1 Objectives 1

Project: Mission travel
Description: Costs associated with travel to support mission requirements.
Driver: AR 200-1; Understand requirements to comply with various natural resources-related laws in order to allow completion of the military mission and manage an effective, efficient natural resources management program to support the military mission.
Implementation Timeframes: Annual requirement.
Required Funding: FY14, $12000, FY 15 $15,000, FY 16 $15,000, FY 17 $15,000, FY 18 $15,000 Class 0H, Environmental funding.
Regulatory Approvals Required: None.
Project Implementation Vehicle: In house
Priority: 0H
Success Monitoring: There is adequate training to ensure that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by this INRMP.
CGN Goals & Objectives: 4.16 Goal 1 Objectives 3

Project: INRMP Implementation
Description: Costs associated with monitoring efforts, studies, and efforts necessary to guide management decisions and activities that will sustain natural resources associated with NDARNG's training sites.
Driver: SIKES Act, AR 200-1; Comply with various natural resources-related laws to allow completion of the military mission and operate a natural resources management program to maintain fully functioning native ecosystems that can support military training activities.
Implementation Timeframes: Annual requirement.
Required Funding: FY14 $35,000, FY15 $50,000, FY16 $50,000 FY17$50,000, FY18 $50,000, 3H, Environmental funding.
Regulatory Approvals Required: None
Project Implementation Vehicle: Contract.

Priority: 0H
Success Monitoring: Natural resource documentation with measurable changes, reports of notable impacts, and evaluations regarding biological issues that may guide NDARNG resource management decisions.
CGN Goals & Objectives : 4.1.2 Goal 1 Objective 1; 4.2 Goal 1 Objective 2; 4.5 Goal 1 Objective 1; 4.5 Goal 2 Objective 1; 4.6 Goal 1 Objective 1&2; 4.8 Goal 1 Objective 1&2; 4.9 Goal 1 Objective 1: 4.13.1 Objective 1; 4.15 Goal 2 Objective 1; 4.19 Goal 2 Objective 1&2; 4.19.2 Goal 1 Objective 1; 4.19.2.1 Goal 1 Objectives 1,2&3; 4.19.2.2 Goal 1 Objective 1

Project: Salary – Contractor/intern
Description: Salary for contractor/intern associated with natural resource management projects.
Driver: AR 200-1; Comply with various natural resources-related laws to allow completion of the military mission and operate a natural resources management program to maintain fully functioning native ecosystems that can support military training activities.
Implementation Timeframes: Annual requirement.
Required Funding: FY14 $15,000, FY15 $15,000, FY16 $15,000, FY17 $15,000, FY18 $15,000, Class 0H, Environmental funding.
Regulatory Approvals Required: None.
Project Implementation Vehicle: Contract.
Priority: 0H
Success Monitoring: There is adequate staffing to ensure that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by the INRMP.
CGN Goals & Objectives: 4.4 Goal 1Objective 2; 4.19 Goal 2 Objective 1, 2, & 3

Project: Environmental Staff Training
Description: Costs associated with training environmental staff in natural resource management practices.
Driver: AR 200-1, SIKES Act; Understand requirements to comply with various natural resources-related laws in order to allow completion of the military mission and manage an effective, efficient natural resources management program to support the military mission.
Implementation Timeframes: Annual requirement.
Required Funding: FY14 $17500, FY15 $17500, FY16 $17500, FY17 $17500, FY18 $17500, 0H, Environmental funding.
Regulatory Approvals Required: None.
Project Implementation Vehicle:
Priority: 0H
Success Monitoring: There is adequate training to ensure that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by this INRMP.
CGN Goals & Objectives: 4.16 Goal 1 Objective 1;

Project: Groundwater studies
Description: Conduct annual and periodic water surveys of surface and ground waters at Camp Grafton South to determine the presence of contaminants that can be directly traced back to military activities such as range operations, pesticide operations and/or training.
Driver: CWA, SIKES Act, NEPA, AR 200-1; Provide data to analyze planned mission and mission support projects and to provide information needed to manage for naturally functioning ecosystems to support the military mission.
Implementation Timeframes: Annual requirement.
Required Funding: FY14, $3500, 3H, Environmental funding. FY 15, $3500; FY16, $3500; FY17, $3500, FY18, $48,000.
Regulatory Approvals Required: None.
Project Implementation Vehicle: Contract.
Priority: 0H
Success Monitoring: Delivery of water quality report that is provides analysis of changes and an initial evaluation of the causes of changes in water quality parameters.
CGN Goals & Objectives: Camp Grafton South Project

Project: GIS Coordinator/Analyst
Description: Employee salary and benefits for a training site GIS technician. Funding may be used for one-half full time equivalent employee if hiring is authorized by state personnel agency or to contract services on an as needed basis for up to 9 months per year. Costs are recurring, and anticipated to rise at no more than 5%/year.
Driver: SIKES Act; Comply with various natural resources-related laws to allow completion of the military mission and operate a natural resources management program to maintain fully functioning native ecosystems that can support military training activities.
Implementation Timeframes: Annual requirement.
Required Funding: FY14, $51,400, Class A,. Subsequent years: FY15, $52,600; FY16, $52,800; FY17, $55,100; FY18, $56,400.
Regulatory Approvals Required: None.
Project Implementation Vehicle: In-house state employee salary or contract, depending upon convenience to the State.
Priority: 0H
Success Monitoring: There is adequate staffing to ensure that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by the INRMP.
CGN Goals & Objectives: 4.12 Goal 1 Objective 3

Project: Spatial Data Development for Conservation
Description: Costs associated with procurement of spatial data, development of data sources/resources, integration of data into existing geodatabases and other functions of the enterprise GIS program.
Driver: Provide data to analyze planned mission and mission support projects and to provide information needed to manage for naturally functioning ecosystems to support the military mission.

Implementation Timeframes: Annual requirement.
Required Funding: FY14 $3900, 0H, Environmental funding. FY15 $8000; FY16 $4.200; FY17 $8,500, $; FY18 $15000.
Regulatory Approvals Required: None.
Project Implementation Vehicle: Contract.
Priority: 0H
Success Monitoring: Delivery of GIS database and analysis report, spatial data, or other information that is compatible with current databases and is necessary to provide analysis of changes over time.
CGN INRMP Goals & Objectives: 4.12 Goal 1 Objective 1&2

Project: SRA Training/Environmental Awareness
Description: Create printed material for soldiers and leaders discussing natural and cultural resources protection at all NDARNG training sites.
Driver: AR 200-1; SIKES Act; NHPA; Understand requirements to comply with various natural resources-related laws in order to allow completion of the military mission and manage an effective, efficient natural resources management program to support the military mission.
Implementation Timeframes: CY11. Project is ongoing and recurs when supplies are exhausted.
Required Funding: FY15 $20,00, FY 2017 $20,000. Future years costs not anticipated to exceed $4000 per printing.
Regulatory Approvals Required: None.
Project Implementation Vehicle: In house or contract.
Priority: 0H
Success Monitoring: There are adequate supplies of printed materials on hand for distribution to training site users in support of tasks required by the INRMP.
CGN INRMP Goals & Objectives: 4.1 Goal 1 Objective 1; 4.2 Goal 1 Objective 1; 4.3 Goal 1 Objective 1; 4.7 Goal 2 Objective 1; 4.10 Goal 2 Objective 1; 4.13.1 Goal 1 Objective 1&2;

Project: Conduct invertebrate study of DC-LTA & CGS
Description: Project necessary to obtain baseline data of invertebrates inhabiting the DC-LTA & CGS.
Driver: EO 13112, SIKES Act, Conduct invertebrates survey for use with determining if invertebrates listed on future T&E listings may be located at DC-LTA and management effort NDARNG can take to avoid negatively impacting eligible listed T&E invertebrate species. Information also necessary to avoid damaging vegetation that could be associated with non-compliance with natural resources management laws (CWA, ESA, etc.), or NDARNG capability to train on identified lands.
Implementation Timeframes: Annual requirement.
Required Funding: FY15, $20000, BOS. Anticipated costs not to exceed $35000 annually.
Regulatory Approvals Required: None.
Project Implementation Vehicle: Contract.
Priority: 1H
Success Monitoring: Monitoring occurs by 1) site visits, 2) repeated assessments of native ecosystem functionality, 3) initiation of any appropriate restoration, 4) consistent quality assurance and 5) conducting any appropriate regulatory consultations.

CGN INRMP Goals & Objectives: Surveys for the Dakota Skipper @ Camp Grafton South and Douglas Creek Local Training Area

Project: Fauna & Flora studies at CGS, CGN, and DC-LTA
Description: Project necessary to up-date data the status birds & mammals once reported on NDARNG training area and currently being considered for T &E listing. Funding would verify their status also assist with mapping out the location of vegetative plant species thought to be necessary for invertebrate species identified at CGS & DC-LTA.
Driver: EO 13112, SIKES Act, Conduct fauna and flora surveys for use with determining if birds, bats, and plants that support invertebrates listed on future T&E listings may be located, so management adaptation can be implemented and NDARNG training can avoid negatively impacting eligible listed T&E invertebrate species. Information also necessary to avoid damaging vegetation that could be associated with non-compliance with natural resources management laws (CWA, ESA, etc.), that my impact NDARNG training on identified lands.
Implementation Timeframes: Annual requirement.
Required Funding: FY14, $3000, FY 15 $3000, FY 16 $53,000 FY 17 $53,000 FY 18 $53,000 BOS. Anticipated costs not to exceed $53,000 annually.
Regulatory Approvals Required: None.
Project Implementation Vehicle: Contract.
Priority: 1H
Success Monitoring: Monitoring occurs by 1) site visits, 2) repeated assessments of native ecosystem functionality, 3) initiation of any appropriate restoration, 4) consistent quality assurance and 5) conducting any appropriate regulatory consultations.
CGN INRMP Goals & Objectives: 4.4 Goal 1 Objective 1&2; 4.19 Goal 1 Objective 1

Project: Conduct Wetland Survey @ CGN & CGS
Description: Project necessary to verify wetlands and obtain electronic coordinates / GIS data for wetland areas.
Driver: EO 13112, Clean Water Act, Conduct planning level surveys. Information is necessary to adequate address wetland compliance and to avoid damaging jurisdictional wetland and FWS easement wetlands. Not completing this project may lead to non-compliance with natural resources management laws (CWA, ESA, etc.), may impact NDARNG training on identified lands.
Implementation Timeframes: Annual requirement.
Required Funding: FY 17 $30,000 FY 18 $50,000 BOS. Anticipated costs not to exceed $55,000 annually.
Regulatory Approvals Required: None.
Project Implementation Vehicle: Contract.
Priority: 1H
Success Monitoring: Monitoring occurs by 1) site visits, 2) repeated assessments of native ecosystem functionality, 3) initiation of any appropriate restoration, 4) consistent quality assurance and 5) conducting any appropriate regulatory consultations.
CGN INRMP Goals & Objectives: 4.2 Goal 1 Objectives 2 & 3

Appendix 4

Resource Inventories (Soils, Vascular Plants , Birds, Mammuls & Reptiles)

CGN Soils & Water Erosion Prediction Factors

Water erosion prediction factors for soils of Camp Grafton North

Soils Name[3]	Map[1] Symbol	Slope (%)	K	R	LS	(T) Erosion Tolerance (Tons/ac/yr)
Tonka	F2A	0-1	0.32	50	0.105	5
Parnell	F3A	0-1	0.32	50	0.159	5
Southham	F4A	0-1	0.37	50	0.170	5
Hamerly-Wyard	F101A	1-3	0.15	50	0.324	5
Hamerly-Wyard (wooded)	F114A	1-3	0.15	50	0.324	5
Svea	F142A	1-3	0.28	50	0.418	5
Bottineau	F180A	1-3	0.28	50	0.353	5
Bottineau- Aastad	F180B	0-3	0.28	50	0.353	5
Lallie	414A	0-1	0.37	50	0.154	5
Fargo	F410A	0-1	0.32	50	0.159	5
Mauvais	F425B	0-6	0.32	50	0.582	5
Wamduska-Mauvais	F427A	1-9	0.15	50	1.436	5
Bearden	F430A	0-1	0.28	50	0.129	5
Lallie (saline)	F450A	0-1	0.37	50	0.129	5
Aberdeen- Fargo	F459A	0-1	0.32	50	0.128	5
Towner-Barnes	F737A	1-6	0.17	50	1.164	5
Dickey-Buse-Embden Complex	F738C	3-9	0.15	50	0.823	5

[1] Abbreviations for each column and definition include K=soil erodibility factor; R=rainfall factor; LS=length slope factor; T=soil erosion tolerance; EI=erodibility index;

[2] Surface texture abbreviations and definition include S=sandy, sands; L=loamy, loam; Si=silty, silt; C=clayey, clay; F=fine; GR=gravelly.

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CGN Soils & Wind Erosion Prediction Factors

Wind erosion prediction factors for soils of Camp Grafton North

Soils Name[3]	Map[1] Symbol	Slope (%)	C	I	Erosion Tolerance (Tons/ac/yr)
Tonka	F2A	0-1	0.4	48	5
Parnell	F3A	0-1	0.4	48	5
Southham	F4A	0-1	0.4	86	5
Hamerly-Wyard	F101A	1-3	0.4	86	5
Hamerly-Wyard (wooded)	F114A	1-3	0.4	86	5
Svea	F142A	1-3	0.4	48	5
Bottineau	F180A	1-3	0.4	48	5
Bottineau- Aastad	F180B	0-3	0.4	48	5
Lallie	414A	0-1	0.4	86	5
Fargo	F410A	0-1	0.4	86	5
Mauvais	F425B	0-6	0.4	86	5
Wamduska-Mauvais	F427A	1-9	0.4	134	5
Bearden	F430A	0-1	0.4	86	5
Lallie (saline)	F450A	0-1	0.4	86	5
Aberdeen- Fargo	F459A	0-1	0.4	48	5
Towner-Barnes	F737A	1-6	0.4	86	5
Dickey-Buse-Embden Complex	F738C	3-9	0.4	134	5

[1] Abbreviations for each column and definition include K=soil erodibility factor; R=rainfall factor; LS=length slope factor; T=soil erosion tolerance; EI=erodibility index;
[2] Surface texture abbreviations and definition include S=sandy, sands; L=loamy, loam; Si=silty, silt; C=clayey, clay; F=fine; GR=gravelly.

Soil erosion potential (highly erodible if index greater than 8) for water (WaEI) and wind (WiEI) and those soils that are classified as HEL by soil type at Camp Grafton (North Unit) (Bigler and Liudahl 1986).

Soil Name[3]	Map Number	Surface Texture	Slope (%)	WaEI	WiEI	HEL
Tonka	1	SiL	0-1	0.370	4.48	
Parnell	2	SiCL	0-1	0.490	3.04	
Southham	4	SiCL	0-1	0.692	6.88	
Fargo	7	SiC	0-1	0.560	6.88	
Bottineau-Aastad	25	L L	0-3	1.087	3.84	
Zell-Maddock	28C	LSi SL	3-9	5.055	4.48	
Svea	31	L	1-3	1.287	4.48	
Bearden	36	SiCL	0-1	0.397	6.88	
Aberdeen-Fargo	46	SiCL SiC	0-1 0-1	0.757	11.47	X
Towner	50B	SL	1-6	2.177	6.88	
Lallie	70	CL	0-1	0.627	6.88	
Lallie	75	CLSa	0-1	0.525	6.88	
Minnewauken	77	LS	1-3	0.668	13.40	X
Wamduska	78C	LS	1-9	5.924	26.80	X
Mauvais	81B	L	0-6	2.049	3.84	
Bottineau	84	L	1-3	1.087	3.84	
Bottineau	84B	L	3-6	2.535	3.84	
Bottineau	113D	L	9-15	5.924	30.64	X

[1] Abbreviations for each column and definition include WaEI=Water erodibility index; WiEI =Wind erodibility index; HEL=highly erodible level soils.
[2] Surface texture abbreviations are definition include S=sandy, sands; L=loamy, loam; Si=silty, silt; C=clayey, clay; Sa=Saline.
[3] C (Cropping Management Factor) is 0.04 for all soils, P (Support Practice Factor) is 1 for all soils.

Checklist of Vascular Plants of Camp Grafton Nouth

EQUISETACEAE (Horsetail Family)

Equisetum arvense L. (field horsetail)
Common, in the understory of wet woodlands and in wet meadows. Sporangiophores present in May.

Equisetum X *ferrissii* Clute (intermediate scouring rush)
Occasional, in moist roadside ditches and wet prairie. Sporangiophores present June to August.

Equisetum hyemale L. var. *affine* (Englem.) A. A. Eat. (common scouring rush)
Occasional, in moist roadside ditches. Sporangiophores present June to August.

Equisetum laevigatum A. Br. (smooth scouring rush)
Occasional, on sandy shorelines, sedge meadows, low prairie, roadside ditches, and other moist disturbed areas. Sporangiophores present June to August.

OPHIOGLOSSACEAE (Adder's-tongue Family)

Botrychium virginianum (L.) Sw. (rattlesnake fern)
Rare, in moist, rich woods. Sporangia present May to July.

MARSILEACEAE (Pepperwort Family)

Marsilea vestita Hook. & Grev. (western water clover)
Rare, in temporary pools, ponds, or shallow water. Sporangia present June through September.

PINACEAE (Pine Family)

Pinus ponderosa Laws. (ponderosa pine)
Rare, found in plantings south. Cones present May through June.

CERATOPHYLLACEAE (Hornwort Family)

Ceratophyllum demersum L. (coontail)
Common, submerged throughout lakes and ponds. Flowers late June to mid-July.

RANUNCULACEAE (Buttercup Family)

Anemone canadensis L. (meadow anemone)
Common, in prairie, woodland edges, and roadside ditches. Flowers June through July.

Anemone cylindrica A. Gray (candle anemone)
Common, in open prairie. Flowers June through July.

Anemone patens L. (pasque flower)
Common, in prairie. Flowers mid April through May.

Aquilegia canadensis L. (wild columbine)
Occasional in woodlands. Flowers late May to mid-June.
Delphinium virescens Nutt. (prairie larkspur)
Occasional, in open, moderately flat, sandy prairie. Flowers mid June to mid July.
Ranunculus abortivus L. (early wood buttercup)
Occasional, in the moist understory of woods around wetland ponds and lakes. Flowers late April to early June.
Ranunculus cymbalaria Pursh (shore buttercup)
Common, in wet meadows, muddy shores around lakes and ponds. Flowers mid May to August.
Ranunculus gmelinii DC. var. *limosus* (Nutt.) Hara. (small yellow buttercup)
Occasional, submerged in the shallow water of wetlands. Flowers late May to late July.
Ranunculus macounii Britt. (Macoun's buttercup)
Occasional, in wet meadows. Flowers June through August.
Ranunculus pensylvanicus L. (bristly crowfoot)
Occasional, in wet meadows, and shorelines of lakes and ponds. Flowers July through September.
Ranunculus rhomboideus Goldie (prairie buttercup)
Rare, in open prairie. Flowers mid April to mid June.
Ranunculus sceleratus L. (cursed crowfoot)
Common, on wet soil along the margins of lakes, small ponds, wet meadows, and wet roadside ditches. Flowers late May to August.
Ranunculus subrigidus Drew (white water crowfoot)
Rare, submerged in shallow water of ponds. Flowers June through August.
Thalictrum dasycarpum Fisch. & Ave-Lall. (purple meadow rue)
Occasional, in woods with moist soil. Flowers June to mid-July.
Thalictrum venulosum Trel. (early meadow rue)
Occasional, low prairie, brushy draws, and similar moist areas, either shaded or open. Flowers June to early July.

FUMARIACEAE (Fumitory Family)

Corydalis aurea Willd. subsp. *aurea* (golden corydalis)
Rare, in the understory of a woodland in moist, rocky soil. Flowers May through June.
Fumaria vaillentii Lois. (fumitory)
Occasional, in disturbed open sites or on roadsides. Flowers May through June.

ULMACEAE (Elm Family)

Celtis occidentalis L. (hackberry)
Occasional, in open woodlands. Flowers in May.

Ulmus americana L. (American elm)
Common, in upland woodlands. Flowers late April to mid May.
Ulmus pumila L. (Siberian elm)
Occasional, in roadside ditches and moist low prairie surrounding wetlands. Flowers late April to late May.

CANNABACEAE (Hemp Family)
Humulus lupulus L. (common hops)
Rare, in edges of woodlands. Flowers July through mid September.

URTICACEAE (Nettle Family)
Laportea canadensis (L.) Wedd. (wood nettle)
Occasional, in moist well shaded woodlands. Flowers late June to August.
Parietaria pensylvanica Muhl. ex Willd. (Pennsylvania pellitory)
Occasional, in woodlands and other heavily shaded areas, often in slightly disturbed soils. Flowers in July.
Urtica dioica L. (stinging nettle)
Common, in moist woodlands. Flowers July through August.

FAGACEAE (Oak Family)
Quercus macrocarpa Michx. (bur oak)
Common, in upland woodland. Flowers in May.

BETULACEAE (Birch Family)
Alnus incana (L.) Moench. subsp. *rugosa* (Du Roi) Clausen (speckled alder)
Rare, in wet woodlands. Flowers May through June
Corylus americana Walt. (hazelnut)
Rare, edge of upland woods. Flowers July to early August.

NYCTAGINACEAE (Four-O'Clock Family)
Mirabilis hirsuta (Pursh) MacM. (hairy four-o'clock)
Occasional, on roadsides and in prairie. Flowers July through August.

Mirabilis nyctaginea (Michx.) MacM. (wild four-o'clock)
Occasional, in disturbed prairie, roadsides, and other waste places. Flowers June through August.

CACTACEAE (Cactus Family)
Coryphantha vivipara (Nutt.) Britt. & Rose (pincushion cactus)
Occasional, in dry, sandy high prairie. Flowers mid June to mid July.

CHENOPODIACEAE (Goosefoot Family)

Atriplex subspicata (Nutt.) Rydb. (spearscale)

Occasional, often in saline conditions along lake and wetlands, in moist disturbed soils and in the understory of moist wooded areas. Flowers mid July through September.

Chenopodium gigantospermum Aellen (maple-leaved goosefoot)

Rare, in moist woodland understories. Flowers late July through August.

Chenopodium glaucum L. (oak-leaved goosefoot)

Common, often in moist sandy soils along alkaline shorelines of lakes and ponds. Flowers mid July until a hard freeze in the late fall.

Chenopodium rubrum L. (alkali blite)

Occasional, often in moist alkaline soils along the margins of lakes and ponds and in wet roadside ditches. Flowers August to mid September.

Chenopodium strictum Roth.

Occasional, in disturbed prairie, along roadsides, cultivated fields, and other disturbed areas. Flowers August to mid September.

Kochia scoparia (L.) Schrad. (kochia, fireweed)

Common, on roadsides and other waste areas. Flowers late July to mid September.

Salsola iberica Senn. & Pau (Russian thistle, tumbleweed)

Common, on roadsides, and other disturbed open areas. Flowers late July to mid September.

Suaeda depressa (Pursh) S. Wats. (sea blite)

Occasional, on shorelines that are either saline or alkaline. Flowers late July to late August.

AMARANTHACEAE (Pigweed Family)

Amaranthus graecizans L. (prostrate pigweed)

Common, in disturbed areas such as roadsides, and disturbed prairie. Flowers July to August.

Amaranthus retroflexus L. (rough pigweed)

Occasional, in disturbed habitats such as roadsides, and disturbed prairie. Flowers mid July to September.

PORTULACACEAE (Purslane Family)

Portulaca oleracea L. (common purslane)

Common, in disturbed areas. Flowers late May through August.

CARYOPHYLLACEAE (Pink Family)

Arenaria lateriflora L. (grove sandwort)

Occasional, in woodlands occurring around wetland ponds and lakes in slightly moist soil. Flowers in June.

Cerastium arvense L. (prairie chickweed)
Common, on dry prairie. Flowers mid May through June.

Cerastium brachypodum (Engelm. ex A. Gray) Robins. (short-stalked chickweed)
Common, in pastures, disturbed fields, roadsides; often in sandy and rocky soils and other disturbed areas.

Gypsophila paniculata L. (baby's breath)
Rare, in mowed roadside ditches. Flowers mid July to August.

Silene antirrhina L. (sleepy catchfly)
Common, on roadsides, and other dry disturbed areas. Flowers June through August.

Silene cserei Baumg. (smooth catchfly)
Common, in various disturbed habitats such as roadsides. Flowers mid June to mid August.

Silene noctiflora L. (night-flowering catchfly)
Occasional, in the understory of woodlands. Flowers July to late August.

Stellaria longifolia Muhl. ex Willd. (long-leaved stitchwort)
Occasional, in the understory of moist woodlands. Flowers throughout June.

POLYGONACEAE (Buckwheat Family)

Polygonum achoreum Blake. (knotweed)
Occasional, usually on hard-packed, bare soil such as dirt roads, and roadsides. Flowers July through hard freeze in late fall.

Polygonum amphibium L. var. *emersum* Michx. (swamp smartweed)
Common, in the shallow marsh zone surrounding lakes and ponds and in wet roadside ditches. Flowers mid July to mid September.

Polygonum amphibium L. var. *stipulaceum* Colem. (water smartweed)
Occasional, on the muddy shorelines of ponds and lakes, floating or emerged on ponds, lakes, or streams. Flowers late July through August.

Polygonum arenastrum Jord. es Bor. (knotweed)
Common, usually on hard-packed, bare soil such as dirt roads and roadsides. Flowers June through September.

Polygonum convolvulws L. (climbing or wild buckwheat)
Common, on roadsides, and in disturbed prairie. Flowers early June through September.

Polygonum lapathifolium L. (pale smartweed)
Common, along the shorelines of lakes and ponds, margins of sloughs, and in wet roadside ditches. Flowers early July through August.

Polygonum ramosissimum Michx. (knotweed)
Occasional, often in disturbed, wet soil such as wet meadows, and in wet roadside ditches. Flowers mid July through August.

Rumex crispus L. (curly dock)
Common, often in moist disturbed soil such as wet roadside ditches, also in wet meadows and along wetland ponds. Flowers late June through August.

Rumex maritimus L. var. fueginus (Phil.) Dusen. (golden dock)
Common, along the shorelines of lakes and ponds, sloughs, wet roadside ditches, and other areas frequently inundated by water. Flowers early July through August.

Rumex mexicanus Meisn. (willow-leaved dock)
Common, in wet meadows, the margins around lakes, wetlands, and in wet roadside ditches. Flowers early June to early August.

Rumex occidentalis S. Wats. (western dock)
Occasional, in wet roadside ditches, wet meadows, and around wetland ponds. Flowers late June to mid August.

MALVACEAE (Mallow Family)

Hibiscus trionum L. (flower-of-an-hour)
Common, on roadsides, cultivated fields, barnyards, and other disturbed areas. Flowers mid June through August.

Malva rotundifolia L. (common mallow)
Occasional, on roadsides, barnyards, cultivated field edges and other disturbed sites. Flowers mid July to late August.

Sphaeralcea coccinea (Pursh) Rydb. (red false mallow)
Occasional, in dry upland prairie. Flowers early June to mid July.

VIOLACEAE (Violet Family)

Viola adunca J. E. Sm. var. *adunca* (hook-spurred violet)
Occasional, on sandy prairie. Flowers mid May to mid June.

Viola canadensis L. var. *rugulosa* (Greene) C. L. Hitchc. (tall white violet)
Occasional, in the understory of woodlands surrounding ponds and lakes, woodland edges. Flowers mid May to mid June.

Viola nephrophylla Greene. (northern bog violet)
Occasional, in wet meadows near woodland edges. Flowers mid May to early July.

Viola nuttallii Pursh. (Nuttall's violet or yellow prairie violet)
Common, on prairie. Flowers mid May to early June.

Viola pedatifida G. Don. (prairie violet)
Common, on prairie, in sandy and rocky soils. Flowers mid May to mid June.

Viola pubescens Ait. (downy or smooth yellow violet)
Occasional, in low woodlands surrounding lakes and ponds. Flowers May to mid June.

SALICACEAE (Willow Family)

Populus balsamifera L. (balsam poplar)
Occasional, in moist woodlands. Flowers mid May to early June.

Populus deltoides Marsh. subsp. *monilifera* (Ait.) Eckenw. (cottonwood)
Occasional, in lakeside woodlands. Flowers throughout May.

Populus tremuloides Michx. (quaking aspen)
Common, in pockets inside of lakeside woodlands, washes that are intermittently flooded with water, and other areas of water collection. Flowers throughout May.

Salix alba L. var. *vitellina* (L.) Stokes. (yellowstem white willow)
Occasional, planted in moist areas. Flowers May through June.

Salix amygdaloides Anderss. (peachleaf willow)
Common, on the margins of lakes and ponds. Flowers late May through June.

Salix bebbiana Sarg. (beaked willow)
Common, in wet meadows where streams and springs enter, along the margins of lakes and ponds. Flowers mid May to mid June.

Salix candida Fluegge. (hoary willow)
Occasional, in wet meadows and other marshy, wet areas. Flowers mid May to mid June.

Salix discolor Muhl. (pussy willow)
Occasional, in wet meadows around lakes and ponds. Flowers throughout May.

Salix eriocephala Michx. (diamond willow)
Common, in wet meadows, and wet, boggy areas around lakes and ponds. Flowers early May to early June.

Salix exigua Nutt. subsp. *interior* (Rowlee) Cronq. (sandbar willow)
Common, in wet roadside ditches, along shorelines. Flowers late May through June.

Salix lutea Nutt. (yellow willow)
Occasional, in wet meadows. Flowers May to mid June.

Salix pentandra L. (laurel-leaved willow)
Occasional, on lake or pond shorelines. Flowers June to early July.

Salix petiolaris J. E. Sm. (meadow willow)
Occasional, in wet meadows and the margins around small ponds. Flowers May to early June.

CAPPARACEAE (Caper Family)

Cleome serrulata Pursh. (Rocky Mountain bee plant)
Occasional, on roadsides and disturbed prairie. Flowers throughout July.

BRASSICACEAE (Mustard Family)

Arabis drummondii A. Gray.
Rare, on roadside ditches. Flowers late May to late June.

Arabis hirsuta (L.) Scop. var. *pycnocarpa* (Hopkins) Rollins. (rock cress)
Rare, in sandy prairie. Flowers late May to early July.

Arabis holboellii Hornem. var. *collinsii* (Fern.) Rollins. (rock cress)
Occasional, on dry, sandy and rocky prairie. Flowers in May.

Berteroa incana (L.) DC. (hoary false alyssum)
Occasional, usually in disturbed prairie and woodlands. Flowers June through July.

Brassica campestris L. (wild turnip)
Occasional, on roadsides and other disturbed areas. Flowers June through August.

Brassica juncea (L.) Czern. (Indian mustard, brown mustard)
Common, on rockpiles, roadsides, and other disturbed ground. Flowers June through August.

Brassica kaber (DC.) Wheeler. (charlock)
Occasional, on roadsides and other disturbed areas. Flowers June to mid August.

Capsella bursa-pastoris (L.) Medic. (shepherd's purse)
Common, on roadsides, disturbed prairie, and disturbed woodlands. Flowers early June through August.

Conringia orientalis (L.) Dum. (hare's-ear mustard)
Occasional, on roadsides, and disturbed areas. Flowers May through August.

Descurainia pinnata (Walt.) Britt. subsp. *brachycarpa* (Richard.) Detling. (tansy mustard)
Common, on sandy disturbed prairie, roadsides, and other disturbed areas. Flowers late May through August.

Descurainia richardsonii (Sweet) O. E. Schulz. (Richardson's tansy mustard)
Common, in disturbed woodlands, roadsides, and other disturbed areas. Flowers June through July.

Descurainia sophia (L.) Webb ex Prantl. (flixweed)
Common, in disturbed areas such as roadsides, woodlands, and prairie. Flowers early June through July.

Draba nemorosa L. (yellow whitlowort)
Common, on prairie. Flowers late April to June.

Erysimum asperum (Nutt.) DC. (western wallflower)
Common, on prairie, on rocky, sandy, well-drained soil. Flowers throughout June.

Erysimum cheiranthoides L. (wormseed wallflower)
Common, in wooded communities. Flowers early July to mid August.

Erysimum inconspicuum (S. Wats.) MacM. (smallflower wallflower)
Occasional, on prairie. Flowers mid June through August.

Hesperis matronalis L. (dame's rocket)
Occasional, on roadsides, disturbed prairie, and open woods. Flowers throughout June.

Lepidium densiflorum Schrad. (peppergrass)
Common, in disturbed areas such as roadsides, and prairies. Flowers early June through August.
Lesquerella arenosa (Richardson) Rydb. var. *arenosa*
Occasional, on sandy or rocky prairie. Flowers throughout May.

Lesquerella ludoviciana (Nutt.) S. Wats. (bladderpod)
Occasional, on sandy and rocky prairie, and along sandy roadsides. Flowers May through August.
Rorippa palustris (L.) Bess. subsp. *glabra* (Schulz.) Stuckey var. *glabrata* (Lunell) Stuckey. (bog yellow cress)
Rare, along the margins of lakes and ponds. Flowers mid June through July.
Rorippa palustris (L.) Bess. subsp. *hispida* (Desv.) Jonsell var. *hispida* (bog yellow cress)
Rare, in moist roadside ditches and along the margins of lakes and ponds. Flowers late June through July.
Sisymbrium altissimum L. (tumbling mustard)
Occasional, in roadsides, and disturbed prairie. Flowers mid June to mid August.
Sisymbrium loeselii L. (tall hedge mustard)
Occasional, on roadsides, corners of fencelines, and other disturbed areas. Flowers mid July through August.
Thlaspi arvense L. (field pennycress)
Occasional, in disturbed areas such as rockpiles and roadsides. Flowers late May through July.

PRIMULACEAE (Primrose Family)
Androsace occidentalis Pursh. (western rock jasmine)
Common, on open, bare prairie and on dry, sandy disturbed areas. Flowers May to early June.
Glaux maritima L. (sea milkwort)
Rare, on wet mounds in a seepage area. Flowers late May through June.
Lysimachia ciliata L. (fringed loosestrife)
Occasional, in moist woodland edges and especially in shrubby or woody low prairie situations. Flowers July through August.
Lysimachia hybrida Michx. (loosestrife)
Occasional, on moist low prairie. Flowers early July to mid August.
Lysimachia thyrsiflora L. (tufted loosestrife)
Occasional, in the shallow marsh zone of wetland ponds and along lake shore. Flowers throughout June.

GROSSULARIACEAE (Currant Family)

Ribes americanum P. Mill. (wild black currant)

Occasional, in woodlands surrounding ponds and lakes. Flowers mid May to late June.

Ribes missouriense Nutt. (Missouri gooseberry)

Occasional, in woody draws and woodlands around lakes and ponds. Flowers late May through June.

Ribes oxyacanthoides L.

Occasional, in woodlands. Flowers early May to mid June.

SAXIFRAGACEAE (Saxifrage Family)

Heuchera richardsonii R. Br. (alumroot)

Common, on prairie, in sandy or rocky soil. Flowers June to mid July.

Parnassia palustris L. (northern grass-of-Parnassus)

Occasional, low-prairie and wet-meadows. Flowers late July to mid August.

ROSACEAE (Rose Family)

Agrimonia striata Michx. (striate agrimony)

Occasional, in densely wooded or shrubby areas around lakes and ponds. Flowers late June through July.

Amelanchier alnifolia Nutt. (Saskatoon service-berry, Juneberry)

Common, woodland edges, and in woodlands around lakes, ponds, and wet meadows. Flowers early May to early June.

Chamaerhodos erecta (L.) Bunge. var. *parviflora* (Nutt.) C. L. Hitchc. (little ground rose)

Occasional, on prairie. Flowers June through July.

Crataegus rotundifolia Moench. (northern hawthorn)

Common, woodland edges. Flowers late May to mid-June.

Fragaria virginiana Duchn. (wild strawberry)

Common, in wet meadows, wet woodlands dominated by willows, and other moist woodland situations. Flowers early May to mid June.

Geum aleppicum Jacq. (yellow avens)

Occasional, in moist woodlands around lakes, ponds, and wet meadows. Flowers late June through August.

Geum canadense Jacq. (white avens)

Occasional, in moist woodlands. Flowers late June through August.

Geum triflorum Pursh. (torch flower)

Common, on prairie. Flowers mid May to mid June.

Potentilla anserina L. (silverweed)

Common, in wet meadows and along the shorelines of lakes and ponds. Flowers late May to early July.

Potentilla arguta Pursh. (tall cinquefoil)
Common, on prairie in sandy, rocky, or silty soil. Flowers late June through August.

Potentilla concinna Richards. var. *concinna*
Occasional, on prairie hilltops in sandy and rocky soil. Flowers throughout May.

Potentilla norvegica L. (Norwegian cinquefoil)
Common, on the wet shores surrounding lakes and ponds, and in wet roadside ditches, and along the banks of small springs. Flowers late June to mid August.

Potentilla paradoxa Nutt. (bushy cinquefoil)
Occasional, on the sandy shorelines of lakes and ponds. Flowers late June through August.

Potentilla pensylvanica L. (cinquefoil)
Common, on prairie. Flowers mid June through July.

Potentilla rivalis Nutt. (brook cinquefoil)
Occasional, on the shorelines of lakes and ponds, and wet roadside ditches. Flowers early June through September.

Prunus americana Marsh. (wild plum)
Occasional, in woodland edges, and woodlands. Flowers mid May to early June.

Prunus virginiana L. (choke cherry)
Common, in lakeside woodlands. Flowers late May through June.

Rosa acicularis Lindl. (prickly wild rose)
Occasional, in woodlands. Flowers mid June to mid July.

Rosa arkansana Porter. (prairie wild rose)
Common, along roadsides, on prairie. Flowers mid June through July.

Rosa blanda Ait. (smooth wild rose)
Occasional, on the shoreline edges of woodlands. Flowers May through June.

Rosa woodsii Lindl. (western wild rose)
Occasional, in woodland edges. Flowers mid June to mid July.

Rubus idaeus L. subsp. *sachalinensis* (Levl.) Focke. var. *sachalinensis* (red raspberry)
Occasional, in wooded areas surrounding lakes and ponds. Flowers June to mid July.

Spiraea alba Du Roi. (meadow-sweet)
Occasional, in low prairie and in shrubby areas, such as western snowberry patches. Flowers early June to early July.

FABACEAE (Bean Family)

Amorpha canescens Pursh. (lead plant)
Common, on prairie. Flowers throughout July.

Amorpha nana Nutt. (dwarf wild indigo)
Occasional, on prairie. Flowers May through July.

Amphicarpea bracteata (L.) Fern. (hog peanut)
Occasional, in woodlands. Flowers late July to late August.

Astragalus adsurgens Pall. var. *robustior* Hook. (standing milk vetch)
Occasional, usually in dry and rocky soil on prairie. Flowers mid June to mid July.

Astragalus agrestis Dougl. ex G. Don. (field milk vetch)
Occasional, on prairie. Flowers late May to early July.

Astragalus bisulcatus (Hook.) A. Gray. (two-grooved vetch)
Common, on prairie, roadsides, and disturbed prairie. Flowers mid June to mid July.

Astragalus canadensis L. (Canada milk vetch)
Occasional, in low prairie. Flowers early July to mid August.

Astragalus crassicarpus Nutt. var. *crassicarpus* (ground plum)
Common, on prairie. Flowers mid May to mid June.

Astragalus flexuosus Hook. G. Don. (pliant milk vetch)
Occasional, on prairie and disturbed prairie. Flowers June through July.

Astragalus gilviflorus Sheld. (plains orophaca)
Occasional, on prairie in sandy, rocky soil. Flowers mid May to June.

Astragalus tenellus Pursh. (pulse milk vetch)
Occasional, on prairie and roadsides. Flowers throughout June.

Dalea candida Michx. ex Willd. var. *candida* (white prairie clover)
Occasional, in prairie, often in sandy and rocky soils. Flowers mid July to mid August.

Dalea purpurea Vent. (purple prairie clover)
Common, on prairie. Flowers late June through August.

Glycyrrhiza lepidota Pursh. (wild licorice)
Common, on moist low prairie and moist roadside ditches, along the margins of lakes and ponds. Flowers late June through August.

Lathyrus palustris L. (marsh vetchling)
Occasional, on low prairie, wet meadows, and in willow thickets. Flowers late June through August.

Lathyrus venosus Muhl. ex Willd. var. *intonsus* Butt. & St. John (bushy vetchling)
Occasional, in open woodlands and woodland edges. Flowers mid June to mid July.

Lotus purshianus Clem. & Clem. (prairie trefoil)
Occasional, on moderately dry, sandy shorelines, dry prairie, and along fencelines. Flowers July to mid August.

Medicago lupulina L. (black medick)
Common, in prairie. Flowers mid June through August.

Medicago sativa L. subsp. *sativa* (alfalfa)
Common, in roadside ditches, disturbed prairie. Flowers mid June through August.

Melilotus alba Medic. (white sweet clover)
Common, on roadsides, sandy shorelines of lakes and ponds, and disturbed prairie. Flowers July through August.

Melilotus officinalis (L.) Pall. (yellow sweet clover)
Common, on roadsides, open prairie, and disturbed areas. Flowers mid June to early September.

Oxytropis campestris (L.) DC. var. *gracilis* (A. Nels.) Barneby. (slender locoweed)
Occasional, on dry prairie. Flowers mid May to mid June.

Oxytropis lambertii Pursh. (purple locoweed)
Occasional, on prairie in sandy, rocky soil. Flowers June through July.

Psoralea argophylla Pursh. (silver-leaf scurf pea)
Common, on prairie. Flowers early July through August.

Psoralea esculenta Pursh. (breadroot scurf pea, prairie-turnip)
Common, on prairie. Flowers early June to mid July.

Trifolium hybridum L. (Alsike clover)
Occasional, in ditches, roadsides, and other moist, disturbed areas. Flowers June through August.

Trifolium pratense L. (red clover)
Occasional, in roadside ditches, drainage trenches, wet meadows, and other moist, disturbed areas. Flowers July to early September.

Trifolium repens L. (white clover)
Common, in the disturbed understory of woodlands, roadside ditches, drainage trenches, and lake and pond shorelines. Flowers June through August.

Vicia americana Muhl ex Willd. var. *americana* (American vetch)
Occasional, on low areas in wooded communities and wooded or shrubby areas around wet meadows, lakes and ponds. Flowers late May to late June.

Vicia americana Muhl ex Willd. var. *minor* Hook. (American vetch)
Occasional, on prairie. Flowers late May through June.

ELAEAGNACEAE (Oleaster Family)

Elaeagnus angustifolia L. (Russian olive)
Occasional, in wet meadows and the shorelines of lakes and ponds. Flowers mid June to early July.

Elaeagnus commutata Bernh. (silverberry)
Common, on prairie. Flowers late May to early July.

Shepherdia argentea (Pursh) Nutt. (buffaloberry)
Occasional, on shoreline woodland edges and other moist shrubby or wooded areas. Flowers May to early June.

HALORAGACEAE (Water Milfoil Family)

Myriophyllum exalbescens Fern. (American milfoil)
Common, submerged in permanent open water in wetland ponds. Flowers late June to mid August.

ONAGRACEAE (Evening Primrose Family)

Calylophus serrulatus (Nutt.) Raven (plains yellow primrose)
Common, on prairie. Flowers mid June through August.

Circaea lutetiana L. subsp. *canadensis* (L.) Asch. & Mag.
Rare, in woodland. Flowers early July to mid August.

Epilobium angustifolium L. subsp. *circumvagum* Mosquin (willow-herb, fireweed)
Occasional, often in disturbed areas such as roadsides, prairie, and woodlands. Flowers mid July to mid August.

Epilobium ciliatum Raf. subsp. *glandulosum* (Lehm.) Hoch & Raven (willow-herb)
Common, in wet meadows; lake shorelines; and willow communities around lakes and ponds. Flowers mid July to late August.

Epilobium leptophyllum Raf. (narrow-leaved willow-herb)
Common, in wet meadows, and in wet wooded areas around lakes and ponds. Flowers July to early August.

Gaura coccinea Pursh (scarlet gaura)
Occasional, on prairie. Flowers mid June to late July.

Oenothera nuttallii Sweet (white-stemmed evening primrose)
Occasional, on roadsides and on prairie. Flowers late June to mid August.

Oenothera villosa Thunb. (common evening primrose)
Occasional, on prairie, roadsides, and the dry sandy shorelines of lakes. Flowers mid July to mid August.

CORNACEAE (Dogwood Family)

Cornus stolonifera Michx. (red osier)
Common, in moist to wet willow thickets and wet woodlands surrounding lakes and ponds. Flowers late May to mid July.

SANTALACEAE (Sandalwood Family)

Comandra umbellata (L.) Nutt. subsp. *pallida* (A. DC.) Piehl. (bastard toadflax)
Occasional, on prairie; often in sandy and rocky soil. Flowers late May to early July.

Comandra umbellata (L.) Nutt. subsp. *umbellata* (bastard toadflax)
Occasional, on prairie. Flowers late May to early July.

CELASTRACEAE (Staff Tree Family)

Celastrus scandens L. (American bittersweet)
Occasional, on woodland edges. Flowers mid June through August.

EUPHORBIACEAE (Spurge Family)

Euphorbia esula L. (leafy spurge)
Occasional, on prairie and a variety of other disturbed and undisturbed areas. Flowers June through August.

Euphorbia glyptosperma Engelm. (ridge-seeded spurge)
Common, along disturbed roadsides and other disturbed areas. Flowers late July through August.

RHAMNACEAE (Buckthorn Family)

Rhamnus cathartica L. (common buckthorn)
Occasional, on woodland edges. Flowers throughout June.

VITACEAE (Grape Family)

Parthenocissus vitacea (Knerr) Hitchc. (woodbine, thicket creeper)
Occasional, in woodlands and woodland edges. Flowers June to early July.

LINACEAE (Flax Family)

Linum perenne L. var. *lewisii* (Pursh.) Eat. & Wright (blue flax)
Occasional, on prairie in silty to sandy soils. Flowers June to mid July.

Linum rigidum Pursh. var. *compactum* (A Nels.) Rogers (compact stiffstem flax)
Common, on prairie often in rocky soil. Flowers June through July.

Linum rigidum Pursh. var. *rigidum* (stiffstem flax)
Occasional, on prairie and roadside ditches. Flowers June through July.

Linum sulcatum Ridd. (grooved flax)
Common, on prairie often in rocky soil. Flowers June to mid August.

Linum usitatissimum L. (common flax)
Occasional, on roadsides, and other disturbed areas. Flowers July through August.

POLYGALACEAE (Milkwort Family)

Polygala alba Nutt. (white milkwort)
Occasional, on prairie. Flowers mid June through August.

Polygala senega L. (Seneca snakeroot)
Occasional, in wet meadows and low prairie. Flowers June to early July.

Polygala verticillata L. var. *isocycla* Fern. (whorled milkwort)
Occasional, on slightly brushy prairie areas, low prairie, and other areas that have thick grass cover. Flowers late June to late August.

ACERACEAE (Maple Family)

Acer negundo L. var. *negundo* (box elder)

Occasional, in woodlands, and even standing alone on mesic prairie. Flowers May to mid June.

Acer negundo L. var. *violaceum* (Kirchn.) Jaeg. (box elder)

Occasional, in woodlands, and even standing alone on mesic prairie. Flowers May to mid June.

ANACARDIACEAE (Cashew Family)

Rhus glabra L. (smooth sumac)

Occasional, in woodland edges.

Toxicodendron rydbergii (Small) Greene (poison ivy)

Occasional, in the understory of woodlands, woodland edges, and roadside ditches with thick grass cover. Flowers June to early July.

OXALIDACEAE (Wood Sorrel Family)

Oxalis stricta L. (yellow wood sorrel)

Occasional, in lakeside woodlands, and upland woodlands. Flowers mid June to mid August.

BALSAMINACEAE (Touch-me-not Family)

Impatiens capensis Meerb. (spotted touch-me-not)

Occasional, in the understory of wet, marshy woodlands. Flowers mid July through August.

ARALIACEAE (Ginseng Family)

Aralia nudicaulis L. (wild sarsaparilla)

Occasional, in the moist understory of woodlands. Flowers late May to late June.

APIACEAE (Parsley Family)

Cicuta bulbifera L. (bulbous water hemlock)

Rare, in wet meadows and other wet, boggy areas. Flowers August to mid September.

Cicuta maculata L. var. *angustifolia* Hook. (common water hemlock)

Occasional, in wet meadows, along streambanks, and the margins around small ponds. Flowers July to mid August.

Cicuta maculata L. var. *maculata* (common water hemlock)

Common, on the margins of ponds, especially in wet meadows. Flowers July to mid August.

Cymopterus acaulis (Pursh.) Raf.
Occasional, on prairie, often in sandy and rocky soil. Flowers May to early June.

Heracleum sphondylium L. subsp. *montanum* (Schleich.) Briq. (cow parsnip)
Occasional, in moist woodlands, moist shrubby draws, and other moist, well-shaded areas. Flowers June to mid July.

Lomatium foeniculaceum (Nutt.) Coult. & Rose. var. *foeniculaceum* (wild parsley)
Occasional, on dry prairie in rocky soil. Flowers May to early June.

Lomatium orientale Coult. & Rose.
Occasional, on prairie in rocky soil. Often found growing along with fringed sage. Flowers May to early June.

Osmorhiza longistylis (Torr.) DC. var. *longistylis* (anise root)
Occasional, in woodlands. Flowers throughout June.

Sanicula marilandica L. (Black snakeroot)
Occasional, in woodlands. Flowers June to mid July.

Sium suave Walt. (water parsnip)
Common, in the shallow water around lakes and ponds, and in wet meadows. Flowers late June through August.

Zizia aptera (A. Gray) Fern (golden alexanders)
Common, on prairie, in woodland edges, wet meadows, and lake and pond shorelines. Flowers late May to early July.

Zizia aurea (L.) Koch. (water parsnip)
Common, in lakeside woodland edges, low prairie, and lake and pond shorelines. Flowers June to early July.

GENTIANACEAE (Gentian Family)

Gentiana affinis Griseb. (northern gentian)
Rare, in wet meadows and boggy areas. Flowers throughout August.

Gentiana andrewsii Griseb. (closed gentian, bottle gentian)
Occasional, in wet meadows, wet roadside ditches, moist low prairie, and moist woodlands. Flowers late August to mid September.

Gentiana puberulenta Pringle (downy gentian, prairie gentian)
Occasional, in moist prairie meadows. Flowers early August to early September.

Gentianella amarella (L.) Borner subsp. *acuta* (Michx.) J. Gillett.
(annual gentian, northern gentian)
Occasional, in prairie. Flowers mid July to mid September.

Gentianopsis crinita (Froel.) Ma. (fringed gentian)
Occasional, in prairie meadows. Flowers August to mid September.

Gentianopsis procera (Holm) Ma. (fringed gentian)
Occasional, in wet meadows and around wet areas. Flowers mid August to mid September.

APOCYNACEAE (Dogbane Family)

Apocynum androsaemifolium L. (spreading dogbane)
Occasional, in the moist understory of lakeside woodlands, and in shrubby low prairie around wet meadows. Flowers throughout July.

Apocynum cannabinum L. (Indian hemp dogbane, prairie dogbane)
Occasional, in woodlands surrounding lakes and ponds and shrubby low prairie. Flowers throughout July.

ASCLEPIADACEAE (Milkweed Family)

Asclepias incarnata L. (swamp milkweed)
Common, in wet meadows; in margins of lakes and ponds. Flowers mid July to mid August.

Asclepias ovalifolia Dcne. (ovalleaf milkweed)
Common, on prairie. Flowers mid June to mid July.

Asclepias speciosa Torr. (showy milkweed)
Common, on prairie, wet meadows, and on sandy roadsides. Flowers throughout July.

Asclepias syriaca L. (common milkweed)
Occasional, on roadsides and disturbed prairie. Flowers late June to early August.

Asclepias verticillata L. (whorled milkweed)
Occasional, on open prairie. Flowers mid July to mid August.

Asclepias viridiflora Raf. (green milkweed)
Occasional, on prairie. Flowers late June to late July.

SOLANACEAE (Potato or Nightshade Family)

Physalis virginiana P. Mill. (Virginia ground cherry)
Common, on roadsides; on dry, sandy, often disturbed, upland prairie. Flowers mid June through August.

Solanum triflorum Nutt. (cut-leaved nightshade)
Occasional, on roadsides, disturbed prairie, and other waste places. Flowers late June to early August.

CONVOLVULACEAE (Morning Glory Family)

Calystegia sepium (L.) R. Br. subsp. *angulata* Brummitt. (hedge bindweed)
Occasional, on low prairie, woody areas, and thickets found around lakes and ponds. Flowers throughout July.

Convolvulus arvensis L. (field bindweed)
Occasional, on roadsides and similarly disturbed areas. Flowers mid June through August.

POLEMONIACEAE (Polemonium Family)

Collomia linearis Nutt. (collomia)
Occasional, on prairie. Flowers June to early July.

Phlox hoodii Rich. (Hood's phlox)
Occasional, on prairie. Flowers throughout May.

HYDROPHYLLACEAE (Waterleaf Family)

Ellisia nyctelea L. (waterpod)
Occasional, on disturbed sandy soils near lake shorelines; sandy roadsides, understory of woodlands, and other areas with disturbed, moist, sandy soils. Flowers throughout June.

BORAGINACEAE (Borage Family)

Cynoglossum officinale L. (hound's tongue)
Occasional, on disturbed prairie and roadsides; and in woodland edges. Flowers throughout June.

Hackelia deflexa (Wahl.) Opiz. (stickseed)
Occasional, in woodlands surrounding lakes and ponds. Flowers mid June through August.

Heliotropium curassavicum L.
Rare, in wet saline areas. Flowers late June to mid August.

Lappula echinata Gilib. (blue stickseed)
Occasional, on roadsides, disturbed prairie, and other disturbed areas. Flowers early June through August.

Lappula redowskii (Hornem.) Greene. (stickseed)
Common, in the disturbed soil of woodlands, roadsides, disturbed prairie, and similarly disturbed areas. Flowers mid June through August.

Lithospermum canescens (Michx.) Lehm. (hoary puccoon, orange puccoon)
Common, on prairie. Flowers late May through June.

Lithospermum incisum Lehm. (narrow-leaved puccoon, yellow puccoon)
Common, on prairie. Flowers late May through June.

Onosmodium molle Michx. var. *occidentale* (Mack.) Johnst. (false gromwell)
Occasional, on prairie. Flowers July to mid August.

VERBENACEAE (Vervain Family)

Phryma leptostachya L. (lopseed)
Occasional, in the understory of woodland. Flowers early July to mid August.

Verbena bracteata Lag. & Rodr. (prostrate vervain)
Common, on roadsides, disturbed prairie, and other similarly disturbed areas. Flowers July to mid August.

Verbena hastata L. (blue vervain)
Common, in wet meadows; along the margins of lakes and ponds. Flowers July to mid August.

Verbena urticifolia L. (nettle-leaved vervain)
Occasional, in moist woodlands. Flowers late July through August.

LAMIACEAE (Mint Family)

Agastache foeniculum (Pursh) O. Ktze. (lavender hyssop)
Occasional, along woodland edges,and shrubby low prairie. Flowers mid July to early September.

Dracocephalum parviflorum Nutt. (dragonhead)
Occasional, in open woodlands and woodland edges. Flowers June to mid August.

Hedeoma hispidum Pursh. (rough false pennyroyal)
Occasional, on prairie, disturbed prairie, and sandy roadsides. Flowers June through July.

Leonurus cardiaca L. (motherwort)
Occasional, on disturbed prairie, roadsides, and disturbed areas in woodlands. Flowers July to mid August.

Lycopus americanus Muhl. ex Bart. (American bugleweed)
Occasional, in wet understory of woodlands, and on margins of lakes and ponds. Flowers mid July to September.

Lycopus asper Greene (rough bugleweed)
Common, in the wet understory of woodlands, spring seeps, wet meadows, in moist areas around lakes and ponds. Flowers mid July to late August.

Mentha arvensis L. (field mint)
Common, in the understory of moist woodlands, wet meadows, and the margins of lakes and ponds. Flowers mid July to late August.

Monarda fistulosa L. var. *fistulosa* (wild bergamot)
Common, on prairie, often in shrubby areas. Flowers early July to early August.

Nepeta cataria L. (catnip)
Occasional, in disturbed soil of woodlands. Flowers July through August.

Physostegia parviflora Nutt. ex A. Gray (obedient plant)
Occasional, in moist areas around wetlands. Flowers late July to late August.

Prunella vulgaris L. (self-heal)
Occasional, in moist woodlands. Flowers late June through July.

Salvia reflexa Hornem. (Rocky Mountain or lance-leaved sage)
Occasional, often in disturbed areas such as roadsides, gravel pits,and disturbed prairie. Flowers throughout August.

Scutellaria galericulata L. (marsh skullcap)
Occasional, in wet meadows and in moist woodlands. Flowers late June to late August.

Scutellaria lateriflora L. (mad-dog or blue skullcap)
Occasional, in the wet understory of lakeside woodlands. Flowers late July to late August.

Stachys palustris L. subsp. *pilosa* (Nutt.) Epling. (hedge-nettle, marsh betony)
Common, in moist woodlands, wet meadows, low prairie, and the margins of lakes and ponds. Flowers July through August.
Teucrium canadense L. var. *boreale* (Bickn.) Shinners.
(American germander, wood sage)
Common, in wet meadows and the margins of lakes and ponds. Flowers July to late August.

HIPPURIDACEAE (Mare's Tail Family)
Hippuris vulgaris L. (mare's tail)
Occasional, half emergent in the deep marsh zone of lakes and ponds. Flowers mid June to late August.

CALLITRICHACEAE (Water Starwort Family)
Callitriche hermaphroditica L. (water starwort)
Rare, submerged in the shallow water of a pond or lake. Flowers mid June to late July.

PLANTAGINACEAE (Plantain Family)
Plantago eriopoda Torr. (alkali plantain)
Occasional, in moist low prairie and moist ditches; often in alkaline or saline conditions. Flowers June through August.
Plantago major L. (common plantain)
Common, in the understory of woodlands; along roadsides, dirt roads, and other moist, disturbed areas. Flowers July to mid September.
Plantago patagonica Jacq. var. *patagonica* (Patagonian plantain)
Rare, on prairie. Flowers June to mid July.
Plantago rugelii Dcne. (Rugel's plantain)
Occasional, in the disturbed soil of woodlands, roadsides, and similarly disturbed areas. Flowers late June to mid August.

OLEACEAE (Olive Family)
Fraxinus pennsylvanica Marsh. (red or green ash)
Common, in lakeside and upland woodlands. Flowers May to mid June.

SCROPHULARIACEAE (Figwort Family)
Agalinis aspera (Dougl. ex Benth) Britt. (rough gerardia)
Rare, in upland woodlands and prairies. Flowers mid July to late August.
Agalinis tenuifolia (Vahl) Raf. (slender gerardia)
Occasional, on the sandy shorelines of lakes and ponds and wet meadows. Flowers late July to late August.

Castilleja sessiliflora Pursh. (downy paintbrush)
Common, on prairie. Flowers late May to mid June.
Linaria vulgaris Hill (butter-and-eggs)
Occasional, on roadsides, disturbed prairie, and other disturbed areas. Flowers June to August.
Mimulus ringens L. (Alleghany monkey-flower)
Occasional, in the margins around lakes and ponds. Flowers mid July to mid August.
Orthocarpus luteus Nutt. (owl clover)
Common, on prairie, in sandy and rocky soil. Flowers July through August.
Pedicularis lanceolata Michx. (swamp lousewort)
Occasional, in wet meadows. Flowers late July through August.
Penstemon albidus Nutt. (white beardtongue)
Common, on prairie. Flowers late May to mid June.
Penstemon gracilis Nutt. (slender beardtongue)
Common, on prairie. Flowers mid June to mid July.
Veronica americana (Raf.) Schwien. ex Benth. (brooklime speedwell)
Rare, around wetland shores. Flowers June to late August.
Veronica anagallis-aquatica L. (water speedwell)
Occasional, in wet meadows and long wetland shores. Flowers June through August.
Veronica peregrina L. var. *xalapensis* (H.B.K.) St. John & Warren (purslane speedwell)
Occasional, in wet meadows and muddy ditches. Flowers June through August.

OROBANCHACEAE (Broomrape Family)
Orobanche fasciculata Nutt. (purple broomrape)
Occasional, in sandy prairie, often found growing from fringed sage. Flowers mid June to early July.
Orobanche ludoviciana Nutt. (broomrape)
Rare, in sandy prairie. Flowers in August.

LENTIBULARIACEAE (Bladderwort Family)
Utricularia intermedia Hayne.
Rare, submerged in cold shallow water. Flowers July through August.
Utricularia vulgaris L. (common bladderwort)
Common, floating or submerged in open water or in deep marsh zone of lakes and ponds. Flowers mid June to early August.

CAMPANULACEAE (Bellflower Family)

Campanula rapunculoides L. (creeping or rover bellflower)
Rare, in disturbed areas in lakeside woodlands. Flowers late July to September.

Campanula rotundifolia L. (harebell)
Common, in moist low prairie and in upland woodlands. Flowers mid June to mid July.

Lobelia kalmii L. (Kalm's lobelia)
Occasional, in wet meadows, and the margins around lakes and ponds. Flowers late July to September.

Lobelia spicata Lam. (palespike lobelia)
Occasional, in moist low prairie, wet meadows, and the margins around lakes and ponds. Flowers mid July to mid August.

RUBIACEAE (Madder Family)

Galium aparine L. (catchweed bedstraw)
Occasional, in upland woodlands, and woodlands surrounding lakes and ponds, and wet meadows. Flowers late May through June.

Galium boreale L. (northern bedstraw)
Common, in woody or shrubby areas, upland woodlands and on prairie. Flowers mid June to mid July.

Galium trifidum L. (small bedsvraw)
Rare, in moist woodlands. Flowers mid July to mid August.

Galium triflorum Michx. (sweet-scented bedstraw)
Occasional, in upland woods, shrubby areas, lakeside woodlands, and other well-shaded areas. Flowers mid June to mid July.

Hedyotis longifolia (Gaertn.) Hook. (slender-leaved bluet)
Occasional, in sandy prairie. Flowers June to mid July.

CAPRIFOLIACEAE (Honeysuckle Family)

Lonicera dioica L. (limber or wild honeysuckle)
Occasional, in the understory of woodlands. Flowers from late May to mid June.

Lonicera tatarica L. (Tatarian honeysuckle)
Occasional, in woodlands surrounding lakes, ponds, and wet meadows. Flowers late May to July.

Sambucus canadensis L. (common elderberry)
Rare, in moist woodlands. Flowers late May to August.

Symphoricarpos occidentalis Hook. (western snowberry, wolfberry)
Common, on prairie, and woodland edges. Flowers mid June through July.

ASTERACEAE (Sunflower Family)

Achillea millefolium L. subsp. *lanulosa* (Nutt.) Piper. (yarrow)
Common, on prairie, and in roadside ditches. Flowers mid June to mid August.

Agoseris glauca (Pursh) Dietr. (false dandelion)
Common, in prairie, and wet meadows. Flowers mid June to mid July.

Ambrosia artemisiifolia L. (common ragweed, short ragweed)
Occasional, on the sandy shorelines of lakes and ponds, roadsides, and disturbed prairie. Flowers late July to mid September.

Ambrosia psilostachya DC. (western ragweed)
Common, in disturbed areas such as roadsides. Flowers late July to mid September.

Ambrosia trifida L. (giant ragweed)
Occasional, often in disturbed areas such as roadsides. Flowers late July to late August.

Antennaria microphylla Rydb. (pink pussy-toes)
Occasional, on prairie. Flowers late May to early July.

Antennaria neglecta Greene. (field pussy-toes)
Occasional, in open meadows, low prairie, and roadside ditches. Flowers early May to mid June.

Antennaria parvifolia Nutt. (pussy-toes)
Common, in open prairie meadows, and roadside ditches. Flowers late May through June.

Arctium minus Bernh. (common burdock)
Occasional, in the disturbed understory of rich woods. Flowers mid July to September.

Artemisia absinthium L. (wormwood)
Common, in disturbed areas such as roadsides, gravel pits, disturbed prairie and woodlands. Flowers late July to September.

Artemisia biennis Willd. (biennial wormwood)
Occasional, in wet roadside ditches, around the margins of lakes and ponds. Flowers mid August to mid September.

Artemisia campestris L. subsp. *caudata* (Michx.) Hall & Clem. (western sagewort)
Occasional, on prairie in dry, sandy soil. Flowers early August to mid September.

Artemisia dracunculus L. (silky wormwood)
Occasional, on prairie. Flowers early August to early September.

Artemisia frigida Willd. (fringed sage)
Common, in prairie, also on disturbed, well-drained areas such as gravel pits. Flowers mid August to mid September.

Artemisia ludoviciana Nutt. var. *ludoviciana* (white sage)
Common, in prairie. Flowers mid August to mid September.

Aster brachyactis Blake. (rayless aster)
Common, on the sandy shorelines of lakes and ponds. Flowers late July to late September.

Aster commutatus (T. & G.) A. Gray.
Occasional, on prairie. Flowers mid August to mid September.

Aster ericoides L. (white aster)
Common, in roadside ditches, prairie, and brushy draws. Flowers mid August to mid September.

Aster falcatus Lindl.
Occasional, in open meadows and brushy draws. Flowers early August to early September.

Aster hesperius A. Gray. var. *hesperius* (panicled aster)
Occasional, in wet roadside ditches and on the margins around lakes and ponds. Flowers mid August to mid September.

Aster junciformis Rydb.
Occasional, along small wooded springs, wet meadows. Flowers mid July to late August.

Aster laevis L. (smooth blue aster)
Common, in moist woodlands, low prairie, shrubby draws, and other moist, shaded areas. Flowers August to early September.

Aster novae-angliae L. (New England aster)
Occasional, on the sandy shorelines of lakes and ponds. Flowers mid August to mid September.

Aster oblongifolius Nutt. (aromatic aster)
Occasional, on prairie, in sandy or rocky soil. Flowers mid August to mid September.

Aster pansus (Blake) Cronq.
Common, on the sandy shorelines of lakes and ponds, and roadside ditches. Flowers early July to mid August.

Aster pubentior Cronq.
Occasional, on low prairie; in woodlands around lakes and ponds, and wet meadows; in shrubby draws and other moist, shaded areas. Flowers late July to mid September.

Aster simplex Willd. var. *ramosissimus* (T. & G.) Cronq. (panicled aster)
Occasional, on low prairie and margins around lakes and ponds. Flowers mid August to early September.

Aster simplex Willd. var. *simplex* (panicled aster)
Occasional, on low prairie, roadside ditches, and alomg the margins around lakes and ponds. Flowers mid August to early September.

Bidens cernua L. (nodding beggar-ticks)
Occasional, in wet meadows, along woodland wetlands, on margins around lakes and ponds. Flowers throughout August.

Bidens comosa (A. Gray.) Wiegand.
Occasional, in the margins around lakes and ponds; in wet meadows and wet woodlands. Flowers throughout August.

Bidens frondosa L. (beggar-ticks)
Common, in wet meadows, along the margins of lakes and ponds. Flowers late July to mid September.

Bidens vulgata Greene. (beggar-ticks)
Occasional, along woodland wetlands and wet meadows, and on the margins of lakes and ponds. Flowers throughout August.

Boltonia asteroides (L.) L'Her. var. *latisquama* (A. Gray) Cronq.
(white boltonia, false aster)
Occasional, along woodland wetlands, on shorelines of man-made ponds and margins around lakes and ponds. Flowers mid July to mid September.

Centaurea repens L. (Russian knapweed)
Occasional, in disturbed areas such as roadsides. Flowers mid July to late August.

Chrysanthemum leucanthemum L. (ox-eye daisy, marguerite)
Occasional, on roadsides, and other disturbed areas. Flowers May through July.

Chrysopsis villosa (Pursh) Nutt. var. *villosa* (golden aster)
Common, on prairie. Flowers early July to mid-August.

Cirsium arvense (L.) Scop. (Canada thistle, field thistle)
Common, in wet roadside ditches, wet meadows, and low prairie, and along margins around lakes and ponds. Flowers late June to early August.

Cirsium flodmanii (Rydb.) Arthur. (Flodman's thistle)
Occasional, on prairie and along roadsides. Flowers July through August.

Cirsium undulatum (Nutt.) Spreng. (wavy-leaf thistle)
Common, on prairie and along roadsides. Flowers mid July through August.

Conyza canadensis (L.) Cronq. (horse-weed)
Common, often in disturbed sandy areas such as roadsides, disturbed prairie, gravel pits, and similar disturbed areas. Flowers mid July through August.

Crepis runcinata (James) T. & G. subsp. *runcinata* (hawk's beard)
Common, in wet meadows, wet roadside ditches, and moist low prairie. Flowers mid June to mid July.

Echinacea angustifolia DC. (purple coneflower)
Common, on rocky and sandy prairie and sandy roadsides. Flowers late June to August.

Erigeron glabellus Nutt. subsp. *pubescens* (Hook.) Cronq. (smooth fleabane)
Common, on prairie. Flowers June to early July.

Erigeron lonchophyllus Hook. (spearleaf fleabane)
Occasional, on the shorelines of lakes and ponds. Flowers late July to early August.

Erigeron philadelphicus L. (Philadelphia fleabane)
Occasional, in the understory of woodlands around lakes and ponds, and wet meadows. Flowers mid June to mid July.

Erigeron strigosus Muhl. ex Willd. var. *strigosus* (daisy fleabane)
Common, in roadside ditches, and prairie. Flowers early July to mid August.

Eupatorium maculatum L. var. *bruneri* (A. Gray) Breitung. (joe-pye weed)
Occasional, in wet meadows, and similar wet areas. Flowers late July through August.

Euthamia graminifolia (L.) Nutt.
Occasional, in low prairie, wet meadows, and around the margins of lakes and ponds. Flowers mid July through August.

Gaillardia aristata Pursh. (blanket flower)
Common, on prairie. Flowers mid June to early July.

Grindelia squarrosa (Pursh) Dun. var. *quasiperennis* Lunell. (curly-top gumweed)
Common, on sandy roadsides, dry ditches, rocky prairie, and many disturbed habitats. Flowers late June through August.

Grindelia squarrosa (Pursh) Dun. var. *squarrosa* (curly-top gumweed)
Common, on sandy roadsides, dry ditches, rocky prairie, and many disturbed habitats. Flowers late June through August.

Gutierrezia sarothrae (Pursh) Britt. & Rusby. (snakeweed)
Common, on prairie. Flowers throughout August.

Haplopappus spinulosus (Pursh) DC. (cutleaf ironplant)
Occasional, on rocky prairie. Flowers late July to late August.

Helenium autumnale L. (sneezeweed)
Occasional, in wet meadows, wet ditches, and along lake and pond shorelines. Flowers late July to late August.

Helianthus annuus L. (common sunflower)
Occasional, along roadsides, and disturbed prairie. Flowers mid July to mid September.

Helianthus maximilianii Schrad. (Maximilian sunflower)
Common, on low prairie, wet meadows, wet roadsides, and similarly moist areas. Flowers early August to early September.

Helianthus nuttallii T. & G. subsp. *nuttallii* (Nuttall's sunflower)
Occasional, in wet meadows, low prairie, wet ditches, and the shorelines of ponds and lakes. Flowers July through August.

Helianthus nuttallii T. & G. subsp. *rydbergii* (Britt.) Long. (Nuttall's sunflower)
Occasional, in wet meadows, low prairie, and wet roadside ditches; along margins around lakes and ponds. Flowers late July to late August.

Helianthus petiolaris Nutt. (plains sunflower)
Occasional, on roadsides, disturbed prairie, and similarly disturbed habitats. Flowers mid July to mid August.

Helianthus rigidus (Cass.) Desf. subsp. *subrhomboideus* (Rydb.) Heiser. (stiff sunflower)
Common, on prairie, and sandy roadsides. Flowers mid-July through August.

Helianthus tuberosus L. (Jerusaslem artichoke)
Occasional, in open woodlands and meadows. Flowers throughout August.

Heliopsis helianthoides (L.) Sweet. var. *scabra* (Dun.) Fern. (false sunflower)
Occasional, in roadside ditches, woodland margins and disturbed prairie. Flowers late June to mid August.

Hieracium umbellatum L.
Occasional, in open woodlands around lakes and ponds. Flowers throughout August.

Iva xanthifolia Nutt. (marsh elder)
Common, on disturbed soils such as roadsides, dirt roads, and similar habitats. Flowers late July to mid September.

Kuhnia eupatorioides L. var. *corymbulosa* T. & G. (false boneset)
Occasional, on upland prairie and prairie hillsides. Flowers throughout August.

Lactuca biennis (Moench) Fern. (blue wood lettuce)
Occasional, in woodlands found around lakes and ponds. Flowers early August to early September.

Lactuca ludoviciana (Nutt.) Ridd. (western wild lettuce)
Occasional, on prairie, and open meadows. Flowers July through August.

Lactuca oblongifolia Nutt. (blue lettuce)
Common, on prairie open meadows, and roadside ditches. Flowers July to mid-August.

Lactuca serriola L. (prickly lettuce)
Occasional, often in disturbed areas such as roadsides, field edges, and disturbed prairie. Flowers late July to late August.

Liatris aspera Michx.
Occasional, on low prairie. Flowers early August to mid September.

Liatris ligulistylis (A. Nels.) K. Schum. (round-headed blazing star)
Common, on low prairie and wet meadows and moist roadside ditches. Flowers late July to early September.

Liatris punctata Hook. (dotted gayfeather)
Common, on prairie and roadsides. Flowers late July to late August.

Lygodesmia juncea (Pursh) Hook. (skeletonweed)
Common, on prairie and roadsides. Flowers late June to late July.

Matricaria matricarioides (Less.) Porter. (pineapple weed)
Occasional, in disturbed areas such as roadsides, disturbed prairie, and disturbed woodlands. Flowers mid June to mid August.

Microseris cuspidata (Pursh) Sch.-Bip. (false dandelion)
Occasional, on prairie. Flowers mid May to mid June.

Prenanthes racemosa Michx. subsp. *multiflora* Cronq.
(rattlesnake-root, white lettuce)
Occasional, in moist low prairie, wet meadows, and similarly moist areas. Flowers throughout August.

Ratibida columnifera (Nutt.) Woot. & Standl. (prairie coneflower)
Common, often on dry, open prairie, roadsides, and similarly dry areas. Flowers late June through August.

Ratibida columnifera (Nutt.) Woot. & Standl. forma *pulcherrima* Fern.
(prairie coneflower)
Rare, found where large colonies of the prairie coneflower are growing. Flowers late June through August.

Rudbeckia hirta L. (black-eyed susan)
Common, on low prairie and wet meadows, and along the margins around lakes and ponds. Flowers July through August.

Rudbeckia laciniata L. (golden glow)
Occasional, in low prairie and on the outskirts of wooded areas near lakes, ponds, or wet meadows. Flowers late July to late August.

Senecio canus Hook. (gray ragwort)
Occasional, on prairie in dry rocky soil. Flowers June through July.

Senecio congestus (R. Br.) DC. (swamp ragwort)
Occasional, on the shorelines of lakes and ponds. Flowers late May through July.

Senecio integerrimus Nutt. var. *integerrimus* (lambstongue ragwort)
Occasional, on low prairie. Flowers throughout June.

Senecio plattensis Nutt. (prairie ragwort)
Common, on prairie. Flowers late May through June.

Senecio pseudaureus Rydb, var. *semicordatus* (Mack. & Bush) T. Barkley
(golden ragwort)
Occasional, on low prairie and wet meadows. Flowers throughout June.

Solidago canadensis L. var. *gilvocanescens* Rydb. (canada goldenrod)
Common, on prairie, roadside ditches, and woodland edges. Flowers late July through August.

Solidago canadensis L. var. *scabra* T. & G. (canada goldenrod)
Occasional, on prairie, woodland edges, and shrubby areas near lakes and ponds, and wet meadows. Flowers late July through August.

Solidago gigantea Ait. var. *serotina* (O. Ktze.) Cronq. (late goldenrod)
Occasional, by woody or shrubby areas near ponds and wet meadows. Flowers early August to early September.

Solidago missouriensis Nutt. var. *fasciculata* Holz. (prairie goldenrod)
Common, on prairie, and roadside ditches. Flowers mid July to mid August.

Solidago mollis Bartl. (soft goldenrod)
Occasional, on prairie and roadsides. Flowers early August to mid September.

Solidago nemoralis Ait. (gray goldenrod)
Occasional, on dry, sandy prairie and along roadsides. Flowers early August to early September.

Solidago ptarmicoides (Nees) Boivin. (sneezewort aster)
Common, on well-drained prairie. Flowers mid July to mid August.

Solidago rigida L. var. *humilis* Porter. (rigid goldenrod)
Common, on prairie. Flowers late July through August.

Sonchus arvensis L. subsp. *uliginosus* (Bieb.) Nyman. (field sow thistle)
Common, on sandy roadsides, wet meadows, low prairie, and the margins around lakes and ponds. Flowers July through August.

Sonchus asper (L.) Hill. (prickly sow thistle)
Occasional, in disturbed areas such as field edges, roadsides, and disturbed prairie. Flowers June to late August.

Sonchus oleraceus L. (common sow thistle)
Occasional, in disturbed areas such as field edges, roadsides, and disturbed prairie. Flowers July through August.

Taraxacum laevigatum (Willd.) DC. (red-seeded dandelion)
Common, in the understory of woodlands, low prairie, along roadsides and similar habitats. Flowers late May to mid August.

Taraxacum officinale Weber. (common dandelion)
Common, in the understory of woodlands, low prairie, roadsides, and similarly disturbed areas. Flowers late May to mid August.

Tragopogon dubius Scop. (goat's beard)
Common, in roadside ditches, open prairie, and open meadows. Flowers early June to mid July.

Xanthium strumarium L. (cocklebur)
Common, in moist, disturbed situations such as roadsides, and cultivated fields. Flowers throughout August.

ALISMATACEAE (Water Plantain Family)

Alisma gramineum J.G. Gmel. (water plantain)
Common, emerged near the shore in lakes and ponds. Flowers throughout July.

Alisma subcordatum Raf. (water plantain)
Common, emergent near the shore of lakes and ponds. Flowers early July through August.

Alisma triviale Pursh. (water plantain)
Occasional, emergent near the shore of small ponds, muddy areas around wet meadows. Flowers early July through August.

Sagittaria cuneata Sheld. (arrowhead)
Common, emergent in small pools in wet meadows, and the shallow marsh zone of lakes and ponds. Flowers July through August.

Sagittaria latifolia Willd. (arrowhead)
Common, emergent in small pools in wet meadows, and the shallow marsh zone of lakes and ponds. Flowers July through August.

JUNCAGINACEAE (Arrowgrass Family)

Triglochin maritima L. var. *elata* (Nutt.) A. Gray. (seaside arrowgrass)
Common, in the wet, saline, sandy soil on the shores of lakes and ponds, and in wet meadows. Flowers June to mid August.

Triglochin palustris L. (Marsh arrowgrass)
Occasional, in muddy areas found in wet meadows and around small ponds. Flowers June to mid August.

POTAMOGETONACEAE (Pondweed Family)

Potamogeton pectinatus L. (sago pondweed)
Common, submerged in ponds of varying sizes. Flowers late June to mid September.

Potamogeton pusillus L. var. *pusillus* (baby pondweed)
Occasional, submerged in natural and man-made ponds. Flowers mid June through July.

Potamogeton richardsonii (Benn.) Rydb. (claspingleaf pondweed)
Occasional, submerged in lakes and ponds of various sizes, usually found on the deep marsh zone, permanent open water edge. Flowers July to mid August.

RUPPIACEAE (Ditchgrass Family)

Ruppia maritima L. var. *occidentalis* (S. Wats.) Graebn. (ditchgrass, widgeon grass)
Occasional, submerged in lakes and ponds. Flowers mid June through August.

ZANNICHELLIACEAE (Horned Pondweed Family)

Zannichellia palustris L. (horned pondweed)
Occasional, submerged in lakes and ponds. Flowers mid June to late August.

LEMNACEAE (Duckweed Family)

Lemna minor L. (duckweed)
Occasional, floating on small ponds and lakes.

Lemna trisulca L. (star duckweed)
Common, floating in ponds and lakes.

JUNCACEAE (Rush Family)

Juncus alpinus Vill.
Occasional, in wet meadows, spring seeps, and the margins of ponds and lakes. Flowers late July through August.

Juncus balticus Willd. var. *montanus* Engelm. (baltic rush)
Common, in wet meadows, low prairie, wet roadside ditches, and the margins around lakes and ponds. Flowers early June through August.

Juncus bufonius L. (toad rush)
Rare, on the shorelines of lakes and ponds and the muddy areas of wet meadows. Flowers mid June to early August.

Juncus dudleyi Wieg. (Dudley rush)
Occasional, in wet meadows and moist low prairie. Flowers mid June to early August.

Juncus interior Wieg. (inland rush)
Occasional, in wet meadows and low prairie. Flowers June through August.

Juncus longistylis Torr.
Occasional, in wet meadows, spring seeps, and the shorelines of lakes and ponds. Flowers late June through August.

Juncus nodosus L. (knotted rush)
Occasional, in wet meadows and moist low prairie. Flowers June through August.

Juncus torreyi Cov. (Torrey's rush)
Common, in wet meadows, low prairie, wet ditches, and the shorelines of lakes and ponds. Flowers throughout August.

CYPERACEAE (Sedge Family)

Carex aquatilis Wahl. var. *altior* (Rydb.) Fern. (water sedge)
Common, in wet meadows, bog areas, and shallow marsh zone of ponds. Flowers mid June to mid August.

Carex atherodes Spreng. (slough sedge)
Common, in the shallow marsh zone of ponds and wet ditches. Flowers mid June through August.

Carex bebbii (Bailey) Fern.
Rare, in marshy woodlands. Flowers mid July to mid August.

Carex brevior (Dew.) Mack. ex Lunell.
Occasional, in moist low prairie, wet meadows, and moist woodlands. Flowers early June to mid August.

Carex cristatella Britt.
Occasional, in wet meadows and the margins of lakes and ponds. Flowers mid July to mid August.

Carex eleocharis Bailey.
Common, on prairie. Flowers mid May to mid June.

Carex filifolia Nutt. (thread-leaved sedge)
Common, on prairie. Flowers mid May to mid June.

Carex gravida Bailey. var. *gravida* (heavy sedge)
Occasional, in brushy low prairie, shrubby areas, and woodlands. Flowers mid June to late August.

Carex hallii Olney. (Hall's sedge)
Occasional, in low prairie, wet meadows. Flowers June to mid July.

Carex heliophila Mack. (sun sedge)
Occasional, on prairie hilltops and hillsides. Flowers late May to late June.

Carex hystericina Muhl. ex Willd. (bottlebrush sedge, porcupine sedge)
Occasional, along woodland wetlands. Flowers mid June to mid August.

Carex interior Bailey. (inland sedge)
Occasional, in wet woodlands. Flowers throughout June.

Carex lacustris Willd.
Occasional, in wet meadows. Flowers June to early July.

Carex laeviconica Dew. (glabrous-fruited sedge)
Occasional, in wet meadows. Flowers mid June to early July.

Carex lanuginosa Michx. (wooly sedge)
Common, in wet meadows. Flowers mid June through August.

Carex meadii Dew.
Rare, in low prairie or a wet meadow. Flowers mid June to mid July.

Carex obtusata Lilj.
Rare, on sandy, well-drained prairie. Flowers early June to mid July.

Carex praegracilis W. Boott. (clustered-field sedge)
Common, in low prairie, wet meadows, wet woodlands, and moist roadside ditches. Flowers late May to early July.

Carex rostrata Stokes ex Willd. (beaked sedge)
Occasional, in wet meadows. Flowers late June through August.

Carex sartwellii Dew. (Sartwell's sedge)
Occasional, in wet meadows. Flowers June to early July.

Carex sprengelii Dew. ex Spreng. (long-beaked sedge)
Common, in the understory of woodlands and in woody draws. Flowers late May through July.

Carex stipata Muhl. ex Willd. (saw-beak sedge)
Occasional, in small ponds, wet woodlands. Flowers mid June to late July.

Carex stricta Lam. (tussock sedge)
Occasional, in wet meadows, spring seeps, stream banks, and the margins around small ponds. Flowers June through July.

Carex sychnocephala Carey. (dense long-beaked sedge)
Occasional, sandy shorelines of lakes and ponds. Flowers mid June through August.

Carex tenera Dew. (slender sedge)
Occasional, in woodlands and shrubby low prairie. Flowers mid June to late July.

Carex viridula Michx. (green sedge)
Occasional, in wet meadows and on shorelines of lakes and ponds. Flowers mid July to late August.

Carex vulpine/dea Michx. (fox sedge)
Occasional, on sandy shorelines, wet woodlands, and in wet meadows. Flowers late June to late July.

Carex xerantica Bailey.
Rare, on open prairie. Flowers mid July to mid September.

Cyperus esculentus L.
Rare, on the margins of lakes and ponds. Flowers mid July to mid September.

Cyperus schweinitzii Torr. (Schweinitz's flatsedge)
Occasional, on sandy prairie. Flowers late June to late July.

Eleocharis acicularis (L.) R. & S. (needle spikerush)
Occasional, on the muddy soil around lakes and ponds and wet meadows. Flowers mid July to early September.

Eleocharis erythropoda Steud. (marsh spikerush)
Common, in wet meadows, and along the margins around lakes and ponds. Flowers mid June to mid August.

Eleocharis macrostachya Britt. (pale spikerush)
Common, in wet meadows and margins around lakes and ponds. Flowers late May through August.

Eriophorum polystachion L. (cottongrass)
Occasional, in wet meadows. Flowers throughout June.

Scirpus acutus Muhl. (hard-stemmed bulrush)
Common, in the deep marsh zone of lakes and ponds. Flowers June through August.

Scirpus atrovirens Willd. (darkgreen bulrush)
Common, in wet meadows, and margins of lakes and ponds. Flowers July to early August.

Scirpus fluviatilis (Torr.) A. Gray. (river bulrush)
Occasional, in the shallow marsh zone of lakes and ponds. Flowers mid June to mid August.

Scirpus heterochaetus Chase. (slender bulrush)
Occasional, in ponds and other wet, marshy areas. Flowers late June through August.

Scirpus maritimus L. var. *paludosus* (A. Nels.) Kukenth. (prairie bulrush)
Common, in the shallow marsh zone of lakes and ponds. Flowers late June to mid August.

Scirpus pallidus (Britt.) Fern. (darkgreen bulrush)
Common, in wet meadows, and margins of lakes and ponds. Flowers July to mid August.

Scirpus pungens Vahl. (American bulrush)
Common, in wet meadows and margins of lakes and ponds. Flowers late June through August.

Scirpus validus Vahl. (soft-stemmed bulrush)
Common, in the deep marsh zone of lakes and ponds. Flowers July to late August.

POACEAE (Grass Family)

Agropyron caninum (L.) Beauv. subsp. *majus* (Vasey) C. L. Hitchc. (slender wheatgrass)
Common, on prairie, along roadsides. Flowers mid June to August.

Agropyron cristatum (L.) Gaertn. (crested wheatgrass)
Common, on disturbed prairie, and roadsides. Flowers June through August.

Agropyron dasystachyum (Hook.) Scribn.
Occasional, on prairie and along roadsides. Flowers mid June to mid July.

Agropyron repens (L.) Beauv. (quackgrass)
Common, on disturbed soil such as roadsides, disturbed prairie, and disturbed woodlands. Flowers early June through August.

Agropyron smithii Rydb. (western wheatgrass)
Common, on prairie. Flowers mid June to mid July.

Agrostis scabra Willd. (ticklegrass)
Occasional, on low prairie, moist meadows, wet meadows, and roadsides. Flowers mid July to late August.

Agrostis stolonifera L. (redtop)
Common, on low prairie, wet meadows, roadside ditches, and similarly moist areas. Flowers June through August.

Alopecurus aequalis Sobol. (short-awn foxtail)
Occasional, in the margins of lakes and ponds and wet meadows. Flowers early June through August.

Andropogon gerardii Vitman (big bluestem)
Common, in moist roadside ditches, low prairie, and more mesic mid prairie. Flowers mid July to early September.

Aristida purpurea Nutt. var. *robusta* (Merrill) A. Holmgren & N. Holmgren (red three-awn)
Occasional, on prairie. Flowers mid July to early August.

Avena fatua L. (wild oats)
Common, in disturbed habitats such as cultivated fields and roadsides. Flowers July to early August.

Beckmannia syzigachne (Steud.) Fern. (American sloughgrass)
Common, in wet meadows, and in margins of lakes and ponds. Flowers July to early August.

Bouteloua curtipendula (Michx.) Torr. (sideoats grama)
Common, on prairie hillsides. Flowers throughout August.

Bouteloua gracilis (H.B.K.) Lag. ex Griffiths (blue grama)
Common, on prairie Flowers July to early August.

Bromus inermis Leyss. subsp. *inermis* (smooth brome)
Common, in roadside ditches, fencelines, woodlands, shrubby draws, and planted areas. Flowers mid May to mid August.

Bromus japonicus Thunb. ex Murr. (Japanese brome)
Occasional, on roadsides, ditches, and other disturbed areas. Flowers mid June to early July.

Bromus latiglumis (Scribn. ex Shear) Hitchc.
Occasional, in moist woodlands next to lakes and ponds. Flowers late July to early September.

Bromus tectorum L. (downy brome)
Common, on roadsides, cultivated fields, disturbed prairie, and other disturbed sites. Flowers June through July.

Buchloe dactyloides (Nutt.) Engelm. (buffalo grass)
Occasional, on prairie. Flowers mid June to mid July.

Calamagrostis canadensis (Michx.) Beauv. (bluejoint)
Occasional, in wet meadows, and margins around lakes and ponds. Flowers June through August.

Calamagrostis stricta (Timm.) Koel. (northern reedgrass)
Common, in wet meadows and margins of lakes and ponds. Flowers July to late August.

Calamovilfa longifolia (Hook.) Scribn. (prairie sandreed)
Common, on prairie. Flowers late July to late August.

Dichanthelium leibergii (Vasey) Freckmann (Leiberg dichanthelium)
Occasional, in prairie. Flowers mid June to mid July.

Dichanthelium wilcoxianum (Vasey) Freckmann (Wilcox dichanthelium)
Occasional, on well-drained prairie. Flowers early June to early July.

Distichlis spicata (L.) Greene var. *stricta* (Torr.) Beetle (inland saltgrass)
Common, on the sandy, alkaline shorelines of lakes and ponds. Flowers late June to mid August.

Echinochloa crusgalli (L.) Beauv. (barnyard grass)
Occasional, in cultivated fields and roadside ditches, and similarly disturbed areas. Flowers late July to mid September.

Echinochloa muricata (Beauv.) Fern. var. *microstachya* Wieg.
Common, in cultivated fields and roadside ditches.
Flowers late July to mid September.

Elymus canadensis L. (Canada wild rye)
Occasional, on prairie and open woodlands. Flowers mid July to mid August.

Elymus villosus Muhl. ex Willd. (hairy wild rye)
Occasional, in woodlands, woody draws, and shrubby draws. Flowers late May through June.

Elymus virginicus L. (Virginia wild rye)
Occasional, in woodlands and woody draws. Flowers mid July to mid September.

Eragrostis cilianensis (All.) E. Mosher (stinkgrass)
Common, on roadsides, dirt roads, and disturbed prairie. Flowers August to mid September.

Festuca obtusa Biehler. (nodding fescue)
Rare, in woodlands found by lakes and ponds. Flowers late June to late July.

Festuca octoflora Walt. (sixweeks fescue)
Occasional, on prairie. Flowers mid June to early July.

Festuca ovina L. var. *rydbergii* St. Yves (sheep's fescue)
Occasional, on prairie. Flowers June to mid July.

Glyceria borealis (Nash) Batch. (northern mannagrass)
Occasional, in wet meadows, and margins of lakes and ponds. Flowers mid June to mid August.

Glyceria grandis S. Wats. ex A. Gray (tall mannagrass)
Common, in the shallow marsh zone of lakes and ponds. Flowers late June to early August.

Glyceria striata (Lam.) Hitchc. (fowl mannagrass)
Occasional, in wet meadows, and shorelines of lakes and ponds. Flowers early June to mid July.

Helictotrichon hookeri (Scribn.) Henr. (spike oat)
Common, on prairie. Flowers June to early July.

Hierochloe odorata (L.) Beauv. (sweetgrass)
Occasional, in wet meadows, wet woodlands, and moist low prairie. Flowers mid May to mid June.

Hordeum jubatum L. (foxtail barley)
Common, in wet roadside ditches, wet meadows, and margins of lakes and ponds. Flowers late June to mid September.

Koeleria pyramidata (Lam.) Beauv. (Junegrass)
Common, on prairie. Flowers mid June to mid July.

Leersia oryzoides (L.) Sw. (rice cutgrass)
Occasional, on the shorelines of lakes and ponds. Flowers throughout August.

Muhlenbergia asperifolia (Nees & Mey.) Parodi (scratchgrass)
Common, on the sandy shorelines of lakes and ponds, wet meadows, and roadside ditches. Flowers late July to mid August.

Muhlenbergia cuspidata (Torr.) Rydb. (plains muhly)
Occasional, on prairie. Flowers mid July to early September.

Muhlenbergia glomerata (Willd.) Trin.
Occasional, in wet meadows, wet roadside ditches, and similarly moist areas. Flowers mid August to early September.

Muhlenbergia mexicana (L.) Trin. (wirestem muhly)
Occasional, in wet meadows and wet woodlands. Flowers late July to early September.

Muhlenbergia racemosa (Michx.) B.S.P. (marsh muhly)
Occasional, in shrubby low prairie, wet meadows, wet roadside ditches, and woodlands. Flowers mid July to early September.

Muhlenbergia richardsonis (Trin.) Rydberg. (mat muhly)
Occasional, in low prairie and wet meadows. Flowers August to early September.

Panicum capillare L. (common witchgrass)
Common, on roadsides, cultivated fields, and other disturbed areas. Flowers August to early September.

Panicum virgatum L. (switchgrass)
Common, low prairie, wet meadows, and moist roadside ditches. Flowers mid July to early September.

Phalaris arundinacea L. (reed canary grass)
Occasional, in wet roadside ditches and marshy areas in standing water. Flowers mid June to late August.

Phleum pratense L. (timothy)
Common, in wet meadows, wet woodlands, wet ditches, and margins around lakes and ponds. Flowers mid June to mid July.

Phragmites australis (Cav.) Trin. ex Steud. (common reed)
Common, in the deep marsh zone of lakes and ponds and roadsides. Flowers July to late August.

Poa interior Rydb. (inland bluegrass)
Occasional, on prairie. Flowers mid June to early July.
Poa palustris L. (fowl bluegrass)
Common, in wet meadows, low prairie, woodlands, and roadside ditches. Flowers late June to early August.
Poa pratensis L. (Kentucky bluegrass)
Common, in woodland edges, woody to shrubby draws; and prairie. Flowers mid June to mid July.
Puccinellia cusickii Weath. (alkali-grass)
Occasional, on low prairie, wet meadows, and the alkaline shores of lakes and ponds. Flowers late May to mid July.
Puccinellia nuttalliana (Schult.) A. Hitchc. (alkali-grass)
Common, on the alkaline shorelines of lakes and ponds, wet meadows, and wet roadside ditches. Flowers mid June to mid August.
Schedonnardus paniculatus (Nutt.) Trel. (tumblegrass)
Occasional, low prairie, open meadows, and roadsides. Flowers mid June to mid July.
Scolochloa festucacea (Willd.) Link. (sprangletop)
Occasional, in the shallow marsh zone of lakes and ponds. Flowers throughout July.
Setaria glauca (L.) Beauv. (yellow foxtail)
Common, on roadsides, cultivated fields, disturbed prairie, and similarly disturbed areas. Flowers August to early September.
Setaria italica (L.) Beauv. (foxtail millet)
Occasional, on disturbed sites such as fence lines, and roadsides. Flowers July through August.
Setaria viridis (L.) Beauv. (green foxtail)
Common, on roadsides, disturbed prairie, and other disturbed areas. Flowers late July to mid September.
Sorghastrum nutans (L.) Nash (Indian grass)
Occasional, on low prairie, and wet meadows. Flowers throughout August.
Spartina gracilis Trin. (alkali cordgrass)
Occasional, in wet meadows, wet roadside ditches, and margins of lakes and ponds. Flowers July to late August.
Spartina pectinata Link. (prairie cordgrass)
Common, in wet meadows, wet roadside ditches, and margins of lakes and ponds. Flowers July to late August.
Sphenopholis obtusata (Michx.) Scribn. var. *obtusata* (wedgegrass)
Occasional, on low prairie and in wet meadows. Flowers July to late August.
Sporobolus asper (Michx.) Kunth var. *asper* (rough dropseed)

Occasional, in prairie, and open meadows. Flowers throughout August.

Sporobolus cryptandrus (Torr.) A. Gray. (sand dropseed)
Common, on disturbed, sandy prairie, and roadsides. Flowers July through August.

Sporobolus heterolepis (A. Gray) A. Gray (prarie dropseed)
Occasional, on prairie. Flowers early August to early September.

Stipa comata Trin. ex Rupr. (needle-and-thread)
Common, on prairie. Flowers early June to early July.

Stipa spartea Trin. (porcupine-grass)
Common, on prairie. Flowers June through July.

Stipa viridula Trin. (green needlegrass)
Common, on prairie. Flowers early June to mid July.

Triticum aestivum L. (wheat)
Occasional, on roadsides. Flowers mid June to late July.

SPARGANIACEAE (Bur-reed Family)

Sparganium eurycarpum Engelm. (bur-reed)
Common, in the shallow marsh zone of lakes and ponds. Flowers early July to late August.

TYPHACEAE (Cat-tail Family)

Typha angustifolia L. (narrow-leaved cat-tail)
Common, in the deep marsh zone of lakes and ponds. Flowers early July to late August.

Typha latifolia L. (broad-leaved cat-tail)
Common, in the deep marsh zone of lakes and ponds. Flowers July to late August.

Typha x glauca Godr. (hybrid cat-tail)
Common, in the deep marsh zone of lakes and ponds. Flowers July to late August.

LILIACEAE (Lily Family)

Allium stellatum Ker. (pink wild onion)
Occasional, on prairie. Flowers late July to mid August.

Allium textile A. Nels. & Macbr. (white wild onion)
Common, on prairie. Flowers mid May to early June.

Asparagus officinalis L. (asparagus)
Occasional, in woody draws and woodlands by lakes and ponds. Flowers mid June to early August.

Disporum trachycarpum (S. Wats.) Benth. & Hook. (fairybells)
Rare, in lakeside woodlands. Flowers June to early July.

Hypoxis hirsuta (L.) Cov. (yellow stargrass)
Occasional, in wet meadows, low prairie, and margins around lakes and ponds. Flowers mid June to mid July.

Lilium philadelphicum L. var. *andinum* (Nutt.) Ker. (wild lily)
Occasional, in wet meadows, low prairie, and wet roadside ditches. Flowers throughout July.

Polygonatum biflorum (Walt.) Ell.
Occasional, in woodlands. Flowers early June to early July.

Smilacina stellata (L.) Desf. (spikenard)
Occasional, in woodlands found next to lakes and ponds. Flowers mid May to mid June.

Zigadenus elegans Pursh (white camas)
Occasional, on low prairie, and in wet meadows. Flowers mid June to early July.

IRIDACEAE (Iris Family)

Sisyrinchium angustifolium P. Mill. (blue-eyed grass)
Occasional, on prairie and roadside ditches. Flowers late May through June.

Sisyrinchium montanum Greene. (blue-eyed grass)
Occasional, on low prairie, wet meadows, and wet roadside ditches. Flowers late May to early July.

SMILACACEAE (Catbrier Family)

Smilax herbacea L. var. *lasioneura* (Small) Rydb. (carrion-flower)
Occasional, in a wet woodland. Flowers June to mid July.

ORCHIDACEAE (Orchid Family)

Cypripedium calceolus L. var. *pubescens* (Willd.) Correll
(large yellow lady's-slipper)
Rare, along the course of an underground spring entering a wet meadow. Flowers mid May to mid June.

Habenaria hyperborea (L.) R. Br. (northern green orchid)
Rare, in a wet woodland. Flowers mid June to mid July.

Habenaria viridis (L.) R. Br. var. *bracteata* (Muhl.) A. Gray

Checklist of Bird Fauna on Camp Grafton North

Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
FAMILY PODICIPEDIDAE			
Podilymbus podiceps	Pied-billed grebe	X	
Podiceps auritus	Horned grebe	X	
Podiceps grisegena	Red-necked grebe	X	
Podiceps nigrivollis	Eared grebe	X	
Aechmophorus occidentalis	Western grebe	X	
Aechmophorus clarkii	Clark's grebe	?	
FAMILY PELECANIDAE			
Pelecanus erythrorhynchos	American white pelican	X	
FAMILY PHALACROCORACIDAE			
Phalacrocorax auritus	Double-crested cormorant	X	
FAMILY ARDEIDAE			
Botaurus lentiginosus	American bittern	X	X
Ixobrychus exilis	Least bittern	?	
Ardea herodias	Great blue heron	X	X
Egretta caerulea	Little blue heron	?	
Egretta tricolor	Tricolored heron	?	
Bubulcus ibis	Cattle egret	X	
Butorides striatus	Green-backed heron	?	
Nycticorax nycticorax	Black-crowned night-heron	?	X
FAMILY THRESKIORNITHIDAE			
Plegadis chihi	White-faced ibis	?	
FAMILY ANATIDAE			
Dendrocygna bicolor	Fulvous whistling-duck		
Cygnus columbianus	Tundra swan	X	
Anser albifrons	Greater white-fronted goose	X	
Chen caerulescens	Snow goose	X	X
Branta canadensis	Canada goose	X	X
Aix sponsa	Wood duck	X	X
Anas discors	Blue-winged teal	X	X

Checklist of Bird Fauna on Camp Grafton North (continued)

Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
Anas crecca	Green-winged teal	X	X
Anas rubripes	American black duck	X	
Anas platyrhynchos	Mallard	X	X
Anas acuta	Northern pintail	X	X
Anas cyanoptera	Cinnamon teal	X	
Anas clypeata	Northern shoveler	X	X
Anas strepera	Gadwall	X	X
Anas americana	American wigeon	X	X
Aythya valisineria	Canvasback	X	X
Aythya americana	Redhead	X	X
Aythya collaris	Ring-necked duck	X	X
Aythya affinis	Lesser scaup	X	X
Bucephala clangula	Common goldeye	X	
Bucephala islandica	Barrow's goldeneye		
Bucephala albeola	Bufflehead	X	X
Lophodytes cucullatus	Hooded merganser	X	X
Mergus merganser	Common merganser	X	X
Oxyura jamaicensis	Ruddy duck	X	X
FAMILY ACCIPITRIDAE			
Subfamily Pandion			
Pandion haliatus	Osprey	X	
Subfamily Accipitrinae			
Haliaeetus leucocephalus	Bald eagle	X	X
Ciricus cyaneus	Northern harrier	X	
Accipiter striatus	Sharp-shinned hawk	X	
Accipiter cooperii	Cooper's hawk	X	
Accipiter gentilis	Northern goshawk	X	
Buteo platypterus	Broad-winged hawk	X	
Buteo swainsoni	Swainson's hawk	X	X
Buteo jamaicensis	Red-tailed hawk	X	X
Buteo regalis	Ferruginous hawk	X	X
Aquila chrysaetos	Golden eagle	X	
FAMILY FALCONIDAE			
Falco sparverius	American kestrel	X	X
Falco columbarius	Merlin	X	
Falco peregrinus	Peregrine falcon	X	
Falco mexicanus	Prairie falcon	X	

Checklist of Bird Fauna on Camp Grafton North (continued)

Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
FAMILY PHASIANIDAE			
Subfamily Phasianinae			
Perdix perdix	Gray partridge	X	
Phasianus colchicus	Ring-necked pheasant	X	
Subfamily Tetraoninae			
Bonasas umbellus	Ruffed grouse	X	
Tympanuchus phasianellus	Sharp-tailed grouse	X	
Subfamily Meleagridinae			
Meleagris gallopavo	Wild turkey	X	
FAMILY RALLIDAE			
Coturnicops noveboracensis	Yellow rail	X	
Rallus limicola	Virginia rail	X	X
Porxana carolina	Sora	X	X
Fulica americana	American coot	X	X
FAMILY GRUIDAE			
Grus canadensis	Sandhill crane	X	
Grus americana	Whooping crane		
FAMILY CHARADRIIDAE			
Charadrius semipalmatus	Semipalmated plover		
Charadrius melodus	Piping plover	X	
Charadrius vociferus	Killdeer	X	X
Charadrius montanus	Mountain plover		
FAMILY RECURVIROSTRIDAE			
Recurvirostra americana	American avocet	X	X
FAMILY COLUMBIDAE			
Columba livia	Rock dove	X	X
Zenaida macroura	Mourning dove	X	X
FAMILY CUCULIDAE			
Coccyzus erythropthalmus	Black-billed cuckoo	X	
Coccyzus americanus	Yellow-billed cuckoo	?	

Checklist of Bird Fauna on Camp Grafton North (continued)

Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
FAMILY TYTONIDAE			
Tyto alba	Common barn-owl	?	
FAMILY CAPRIMULGIDAE			
Subfamily Chordelinae			
Chordeiles minor	Common nighthawk	X	X
FAMILY APODIDAE			
Chaetura pelagica	Chimney swift	X	
FAMILY TROCHILIDAE			
Archilochus colubris	Ruby-throated	X	
FAMILY ALCEDINIDAE			
Ceryle alcyon	Belted kingfisher	X	X
FAMILY SCOLOPACIDAE			
Subfamily Scolopacinae			
Catoptrophorus semipalmatus	Willet	X	X
Actitis macularia	Spotted sandpiper	?	
Bartramia longicanda	Upland sandpiper	X	X
Numenius americanus	Long-billed curlew	?	
Limosa haemastica	Hudsonian godwit		
Limosa fedoa	Marbled godwit	X	
Calidris pusilla	Semipalmated sandpiper		
Gallinago gallinago	Common snipe	X	X
Scolopax minor	American woodcock	?	
Subfamily Phalaropinae			
Phalaropus tricolor	Wilson's phalarope	X	X
Phalaropus lobatus	Red-necked phalarope		
Phalaropus fulicaria	Red phalarope		

Checklist of Bird Fauna on Camp Grafton North (continued)

Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
FAMILY LARIDAE			
Subfamily Larinae			
Larus pipixcan	Franklin's gull	X	X
Larus delawarensis	Ring-billed gull	X	
Larus californicus	California gull	X	X
Subfamily Sterninae			
Sterna caspia	Caspian tern	?	
Sterna hirundo	Common tern	X	X
Sterna forsteri	Forster's tern	?	
Sterna antillarum	Least tern	?	
Chlidonias niger	Black tern	X	X
FAMILY STRIGIDAE			
Ottus asio	Eastern screech-owl	?	
Bubo virginianus	Great horned owl	X	X
Nyctea scandiaca	Snowy owl		
Athene cunicularia	Burrowing owl	?	
Strix varia	Barred owl		
Asio otus	Long-eared owl	?	
Asio flammeus	Short-eared owl	X	
Aegolius acadicus	Northern saw-whet owl		
FAMILY PICIDAE			
Melanerpes erythrocephalus	Red-headed woodpecker	X	X
Melanerpes carolinus	Red-bellied woodpecker	X	
Sphyrapicus varius	Yellow-bellied sapsucker	X	
Picoides pubescens	Downy woodpecker	X	X
Picoides villosus	Hairy woodpecker	X	X
Colaptes auratus	Northern flicker	X	X
Dryocopus pileatus	Pileated woodpecker	X	
FAMILY TYRANNIDAE			
Subfamily Fluvicolinae			
Contopus virens	Eastern wood-pewee	X	

Checklist of Bird Fauna on Camp Grafton North (continued)

Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
Empidonax alnorum	Alder flycatcher	?	
Empidonax trailii	Willow flycatcher	X	
Empidonax minimus	Least flycatcher	X	X
Sayornis phoebe	Eastern phoebe	?	
Sayornis saya	Say's phoebe	?	
Subfamily Tyranninae			
Myiarchus crinitus	Great crested flycatcher	X	X
Tyrannus verticalis	Western kingbird	X	X
Tyrannus tyrannus	Eastern kingbird	X	X
Tyrannus forficatus	Scissor-tailed flycatcher		
FAMILY ALAUDIDAE			
Eremophila alpestris	Horned lark	X	X
FAMILY HIRUNDINIDAE			
Progne subis	Purple martin	X	
Tachycineta bicolor	Tree swallow	X	X
Stelgidopteryx serripennis	Northern rough-winged swallow	X	
Riparia riparia	Bank swallow	X	X
Hirundo pyrrhonota	Cliff swallow	X	X
Hirundo rustica	Barn swallow	X	X
FAMILY CORVIDAE			
Perisoreus canadensis	Gray jay		
Cyanocitta cristata	Blue jay	X	X
Pica pica	Black-billed magpie	X	X
Corvus brachyrhynchos	American crow	X	X
Corvus corax	Common raven	X	
FAMILY PARIDAE			
Parus atricapillus	Black-capped chickadee	X	X
FAMILY SITTIDAE			
Sitta canadensis	Red-breasted nuthatch	?	
Sitta carolinensis	White-breasted nuthatch	X	X

Checklist of Bird Fauna on Camp Grafton North (continued)

Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
FAMILY TROGLODYTIDAE			
Salpinctes obsoletus	Rock wren	X	
Troglodytes aedon	House wren	X	X
Cistothorus platensis	Sedge wren	X	
Cistothorus palustris	Marsh wren	X	X
FAMILY MUSICAPIDAE			
Subfamily Turdinae			
Sialia sialis	Eastern bluebird	X	
Sialia currucoides	Mountain bluebird	X	X
Catharus fuscescens	Veery	?	
Hylocichla mustelina	Wood thrush	?	
Turdus migratorius	American robin	X	X
Ixoreus naevius	Varied thrush		
FAMILY MIMIDAE			
Dumetella carolinensis	Gray catbird	X	X
Mimus polyglottos	Northern mockingbird	?	
Toxostoma rufum	Brown thrasher	X	X
FAMILY MOTACILLIDAE			
Antbus spragueii	Sprague's pipit	?	
FAMILY BOMBYCILLIDAE			
Bombycilla garrulus	Bohemian waxwing		
Bombycilla cedrorum	Cedar waxwing	X	
FAMILY LANIDAE			
Lanius excubitor	Northern shrike		
Lanius ludovicianus	Loggerhead shrike	X	X
FAMILY STURNIDAE			
Sturnus vulgaris	European starling	X	X
FAMILY VIREONIDAE			
Vireo bellii	Bell's vireo	?	
Vireo flavifrons	Yellow-throated vireo	?	
Vireo gilvus	Warbling vireo	X	
Vireo olivaceus	Red-eyed vireo	X	X

Checklist of Bird Fauna on Camp Grafton North (continued)

Vireo philadelphicus	Philadelphia vireo	?	
Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
FAMILY FRINGILLIDAE			
Subfamily Carduelinae			
Carpodacus purpureus	Purple finch	?	
Carpodacus mexicanus	House finch		
Loxia curvirostra	Red crossbill	?	
Loxialeucoptera	White-winged crossbill		
Carduelis flammea	Common redpoll		
Carduelis hornemanni	Hoary redpoll		
Carduelis pinus	Pine siskin	?	
Carduelis psaltria	Lesser goldfinch	?	
Carduelis tristis	American goldfinch	X	X
Coccothraustes vespertinus	Evening grosbeak		
FAMILY PASSERIDAE			
Passer domesticus	House sparrow	X	X
FAMILY EMBERIZIDAE			
Subfamily Parulinae			
Vermivora chrysoptera	Golden-winged warbler	?	
Dendroica petechia	Yellow warbler	X	X
Dendroica pensylvanica	Chestnut-sided warbler	X	
Dendroica coronata	Yellow-rumped warbler	X	
Mniotilta varia	Black-and-white warbler	X	X
Setophaga ruticilla	American redstart	X	
Seirus aurocapillus	Ovenbird	X	X
Seiurus noveboracensis	Northern waterthrush	X	
Oporornis philadelphia	Mourning warbler	X	
Geothlypis trichas	Common yellowthroat	X	X
Wilsonia canadensis	Canada warbler		
Icteria virens	Yellow-breasted chat	X	

Checklist of Bird Fauna on Camp Grafton North (continued)

Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
FAMILY EMBERIZIDAE			
Subfamily Thraupinae			
Piranga olivacea	Scarlet tanager	X	
Subfamily Cardinalinae			
Cardinalis cardinalis	Northern cardinal	?	
Pheucticus ludovicianus	Rose-breasted grosbeak	X	X
Pheucticus melanocephalus	Black-headed grosbeak	X	
Guiraca caerulea	Blue grosbeak	?	
Passerina amoena	Lazuli bunting	X	
Passerina cyanea	Indiago bunting	X	
Spiza americana	Dickcissel	X	
Subfamily Emberizinae			
Pipilo erythrophthalmus	Rufous-sided towhee	X	
Spizella arborea	American tree sparrow		
Spizella passerina	Chipping sparrow	X	X
Spizella pallida	Clay-colored sparrow	X	X
Spizella breweri	Brewer's sparrow	X	
Spizella pusilla	Field sparrow	X	
Pooecetes gramineus	Vesper sparrow	X	
Chondestes grammacus	Lark sparrow	X	
Calamospiza melanocorys	Lark bunting	X	X
Passerculus sandwichensis	Savannah sparrow	X	X
Ammodramus bairdii	Baird's sparrow	X	
Ammodramus savannarum	Grasshopper sparrow	X	X
Ammodramus henslowii	Henslow's sparrow		
Ammodramus leconteii	Le Conte's sparrow	?	
Ammodramus Caudacutus	Sharp-tailed sparrow	?	
Passerella iliaca	Fox sparrow		
Melospiza melodia	Song sparrow	X	X
Melospiza lincolnii	Lincoln's sparrow		
Melospiza georgiana	Swamp sparrow	?	
Zonotrichia albicollis	White-throated sparrow	X	
Calcarius lapponicus	Lapland longspur		
Zonotrichia atricapilla	Golden-crowned sparrow		
Zonotrichia leucophrys	White-crowned sparrow		
Zonotrichia querula	Harris' sparrow		

Checklist of Bird Fauna on Camp Grafton North (continued)

Family and Scientific Name	Common Name	Could Breed on Camp Grafton	Reported
Junco hyemalis	Dark-eyed junco	X	
Calcarius mccownii	McCown's longspur	?	
FAMILY EMBERIZIDAE			
Subfamily Emberizinae			
Calcarius ornatus	Chestnut-collared Longspur	X	X
Plectrophenax nivalis	Snow bunting		
Subfamily Icterinae			
Dolichonyx oryzivorus	Bobolink	X	X
Agelaius phoeniceus	Red-winged blackbird	X	X
Sturnella magna	Eastern meadowlark		
Sturnella neglecta	Western meadowlark	X	X
Xanthocephalus xanthocephalus	Yellow-headed blackbird	X	X
Ekuphagus carolinus	Rusty blackbird		
Euphagus cyanocephalus	Brewer's blackbird	X	X
Quiscalus quiscula	Common grackle	X	X
Molothrus ater	Brown-headed cowbird	X	X
Icterus spurius	Orchard oriole	?	
Icterus galbula	Northern oriole	X	

List of Mammalian Fauna on Camp Grafton (North Unit).

Order, Family, Scientific name	Common name	State Range	Could Be Found	Reported
Order Insectivora				
Family Soricidae				
Sorex cinereus Kerr	Masked Shrew	All	X	
Sorex arcticus Kerr	Arctic Shrew	N,E	X	
R *Microsorex hoyi* Baird	Pigmy Shrew	E	X	
Blarina brevicauda Say	Short-tailed Shrew	E	X	X
Order Chiroptera				
Family Vespertilionidae				
Myotis lucifugus Le Conte	Little Brown Myotis	All	X	
Myotis keenii Merriam	Keen's Myotis	E	X	
Lasionycteris noctivagans Le Conte	Silver-haired Bat	All	X	
Eptesicus fuscus Palisot de Beauvois	Big Brown Bat	All	X	X
Lasiurus borealis Muller	Red Bat	All	X	
Lasiurus cinereus Palisot de Beauvois	Hoary Bat	All	X	
Order Lagomorpha				
Family Leporidae				
Sylvilagus floridanus J.A. Allen	Eastern Cottontail	E,SW	X	X
Lepus americanus Erxleben	Snowshoe Hare	N,E	X	
Lepus townsendii Bachman	White-tailed Jackrabbit	All	X	
Order Rodentia				
Family Sciuridae				
Tamias striatus Linnaeus	Eastern Chipmunk	E	X	X
Eutamius minimus (Bachman)	Least Chipmunk	NE,W		
Marmota monax Linnaeus	Woodchuck	E	X	

Checklist of Mammalian Fauna on Camp Grafton North (continued)

Order, Family, Scientific name	Common name	State Range	Could Be Found	Reported
Spermophilus richardsonii Sabine	Richardson's Ground Squirrel	N,E	X	
Spermophilus tridecemlineatus Mitchill	Thirteen-lined Ground Squirrel	All	X	X
Family Sciuridae				
Spermophilus franklinii (Sabine)	Franklin's Ground Squirrel	E,NW	X	
Sciurus carolinensis G melin	Gray Squirrel	E	X	X
Sciurus niger Linnaeus	Fox Squirrel	E,S	X	X
Tamiasciurus hudsonicus Erxleben	Red Squirrel	E	X	
Glaucomys sabrinus Shaw	Northern Flying Squirrel	E	X	
Family Geomyidae				
Thomomys talpoides Richardson	Northern Pocket Gopher	All	X	
Geomy bursarius Shaw	Plains Pocket Gopher	E	X	
Family Heteromyidae				
Perognathus fasciatus Wied-Neuwied	Olive-backed Pocket Mouse	All	X	
Family Heteromyidae				
Castor canadensis Kuhl	Beaver	All	X	
Family Cricetidae				
Peromyscus maniculatus Wagner	Deer Mouse	All	X	X
Peromyscus leucopus Rafinesque	White-footed Mouse	All	X	X
Onychomys leucogaster Wied-Neuwied	Northern Grass hopper Mouse	All	X	

Checklist of Mammalian Fauna on Camp Grafton North (continued)

Order, Family, Scientific name	Common name	State Range	Could Be Found	Reported
Clethrionomys gapperi Vigors	Southern Red-backed Vole	All	X	X
Microtus pennsylvanicus	Meadow Vole	All	X	X
Microtus ochrogaster Wagner	Prairie Vole	All	X	
Ondatra zibethicus Linnaeus	Muskrat	All	X	X
Family Muridae				
I *Rattus norvegicus* Berkenhout	Norway Rat	All	X	
I *Mus musculus* Linnaeus	House Mouse	All	X	
Family Zapodidae				
Napaeozapus insignis	Woodland Jumping Mouse	W,NE	X	X
Zapus hudsonius Zimmerman	Meadow Jumping Mouse	All	X	
Zapus princeps J.A. Allen	Western Jumping Mouse	E,NW	X	
Family Erethizontidae				
Erethizon dorsatum Linnaeus	Porcupine	All	X	
Order Carnivora				
Family Canidae				
Canis latrans Say	Coyote	All	X	
R&T *Canis lupus* Linnaeus	Gray Wolf	NE	X	
Vulpes vulpes Desmarest	Red Fox	All	X	X
Family Procyonidae				
Procyon lotor Linnaeus	Raccoon	All	X	X
Family Mustelidae				
R *Martes pennanti* Erxleben	Fisher	NE		
Mustela erminea Linnaeus	Ermine	E		

Checklist of Mammalian Fauna on Camp Grafton North (continued)

Order, Family, Scientific name	Common name	State Range	Could Be Found	Reported
Mustela nivalis Bangs	Least Weasel	All	X	X
Mustela frenata Lichtenstein	Long-tailed			
Mustela vison Schreber	Mink	All	X	
Taxidea taxus Schreber	Badger	All	X	
R *Spilogale putorius* Linnaeus	Eastern Spotted Skunk	SE		
Mephitis mephitis Schreber	Striped Skunk	All	X	X
Family Felidae				
R *Felis concolor* Kerr	Mountain Lion	N,W	X	
R *Felis rufus* Schreber	Bobcat	All	X	
Family Ursidae				
R *Ursus americanus* Pallas	Black Bear	NE		
Order Artiodactyla				
Family Cervidae				
R *Cervus elaphus* Linnaeus	Wapiti or Elk	W,NE	X	
Odocoileus hemionus Rafinesque	Mule Deer	All	X	
Odocoileus virginianus Zimmerman	White-tailed Deer	All	X	X
R *Alces alces* Linnaeus	Moose	N, E	X	
Family Bovidae				
X&I *Bison bison* Linnaeus	Bison	?	X	
Order Marsupialia				
Family Didelphidae				
R *Didelphis virginiana* Linnaeus	Virginia Opossum	SE		

List of reptile and amphibian fauna on Camp Grafton North.

Scientific name	Common name	State Range	Could Be Found	Reported
Bufo cognatus	Great Plains Toad	All but far N	X	
Bufo americanus	American Toad	E1/3	X	
Bufo hemiophrys	Canadian Toad	N and E of Missouri R.	X	
Hyla versicolor	Gray Tree Frog	E		
Rana pipiens	Northern Leopard Frog	All	X	X
Rana ylvatica	Wood Frog	N and E of Missouri R.	X	X
Pseudacris triseriata	Western Chorus Frog	All	X	
Ambystoma tigrinum trigrinum	Eastern Tiger Salamander	All	X	
Ambystoma tigrinum diaboli	Gray Tiger Salamander	E	X	X
Ambystoma tigrinum melanostictum	Blotched Tiger Salamander	C	X	X
Necturus maculosus	Mudpuppy	E	X	
Eumeces septentrionalis	Northern Prairie Skink	E	X	
Chrysemys picta belli	Western Painted Turtle	All	X	X
Chelydra serpentina	Common Snapping Turtle	All	X	
Thamnophis sirtalis	Common Garter Snake	All	X	X
Thamnophis radixs	Plains Garter Snake	All	X	X
Storeria occipitomaculata	Redbelly Snake	E	X	X
Opheodrys vernalis	Smooth Green Snake	N,E,SC	X	X
Heterdon nasicus	Western Hognose Snake	W,S,NC	X	

County Occurrence of Endangered, Threatened, Proposed and Candidate Species and Designated Critical Habitat in North Dakota

March 2014

Species	Adams	Barnes	Benson	Billings	Bottineau	Bowman	Burke	Burleigh	Cass	Cavalier	Dickey	Divide	Dunn	Eddy	Emmons	Foster	Go. Valley	Gr. Forks	Grant	Griggs	Hettinger	Kidder	Lamoure	Logan	McHenry	McIntosh	McKenzie
Interior Least Tern - E								X					X		X												X
Whooping Crane - E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black-Footed Ferret - E	X			X		X							X				X		X		X						X
Pallid Sturgeon – E								X					X		X												X
Gray Wolf - E	X			X	X	X	X					X	X				X		X		X						X
Piping Plover - T			X				X	X				X	X	X	X	X						X		X	X	X	X
Western Prairie Fringed Orchid - T																											
Dakota Skipper - P		X			X		X						X	X						X					X		X
Poweshiek Skipperling – P																											
Northern Long-Eared Bat - P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rufa Red Knot - P																											
Sprague's Pipit – C	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X
Greater Sage-Grouse - C						X											X										
Designated Critical Habitat																											
Piping Plover			X				X	X				X	X	X	X							X		X	X	X	X

E – Endangered T – Threatened P – Proposed C – Candidate Endangered West of HWY 83 - Delisted East of HWY 83

County Occurrence of Endangered, Threatened, Proposed and Candidate Species and Designated Critical Habitat in North Dakota

March 2014

Species	McLean	Mercer	Morton	Mountrail	Nelson	Oliver	Pembina	Pierce	Ramsey	Ransom	Renville	Richland	Rolette	Sargent	Sheridan	Sioux	Slope	Stark	Steele	Stutsman	Towner	Traill	Walsh	Ward	Wells	Williams
Interior Least Tern - E	X	X	X	X		X										X										X
Whooping Crane - E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black-footed Ferret - E		X	X			X										X	X	X								
Pallid Sturgeon - E	X	X	X	X		X										X										X
Gray Wolf - E	X	X	X	X		X					X					X	X	X						X		X
Piping Plover - T	X	X	X	X		X		X			X				X	X				X				X	X	X
Western Prairie Fringed Orchid - T										X		X														
Dakota Skipper - P	X			X		X		X		X		X		X						X				X	X	
Poweshiek Skipperling – P												X		X												
Northern Long-Eared Bat - P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rufa Red Knot - P																										
Sprague's Pipit - C	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X		X	X		X	X	X	X
Greater Sage-Grouse – C																	X									
Designated Critical Habitat																										
Piping Plover	X	X	X	X		X		X			X				X	X				X				X		X

E – Endangered T – Threatened P – Proposed C – Candidate Endangered West of HWY 83 - Delisted East of HWY 83

Appendix 5

Research Requirements

1. Determine the presence of listed Threaten & Endangered species and those species listed on the North Dakota Species of Conservation Priority (SoCP) which are present at CGN.

2. Vegetation mapping of Native American culturally significant plant species. Create and verify with field results a GIS geo-database of Native American culturally significant plants present on CGN. Ensure that the mapping can be used to protect these plant species from damage during periods in the lifecycle that is the basis of Native American cultural significance. Project would require interaction with federally recognized Native American tribes.

3. Canadian thistle eradication. Conduct a study to determine effective control methods (mechanical, biological and/or chemical) to reduce the spread of Canadian thistle on the training lands and stimulate regrowth of native species of trees and grasses.

4. Invertebrate inventory. Conduct a baseline survey of invertebrates utilizing CGN for the purpose of having a comparative data indicator for determining the impact NDNG training and/or management may have upon environmental conditions and species utilizing CGN.

5. Ornithological survey. Resurvey the birds utilizing CGN, determine population results have changed, and assess if changes can be contributed to NDNG activities.

6. Fauna survey. Resurvey the presents of mammals, amphibians, and reptiles utilizing CGN, determine if previously record species still remain at CGN, and assess if changes can be contributed to NDNG activities.

7. Flora Survey. Resurvey and identify plants growing at CGN, determine if previously record species still remain at CGN, and assess if changes can be contributed to NDNG activities

8. Wetland Survey. Survey wetlands at CGN's CGTC and RTI-TA, record US special date for GIS purposes, and assess if NDNG activities have impacted areas recorded as wetlands by the USFWS wetlands survey.

Appendix 6:

North Dakota Game & Fish Department Comprehensive Wildlife Conservation Strategy can be found at: http://gf.nd.gov/gnf/conservation/docs/North-Dakota-Wildlife-Action-Plan.pdf

Appendix 7.

INRMP Benefits

In accordance to section 101 of the Sikes Act, lands or other geographic areas owned or controlled by the Department of Defense or designated for Department of Defense use are subject to an INRMP and maybe omitted from federal critical habitat designation.

The reasons for the exclusion are:

1. The INRMP provides a benefit to the species.

2. The INRMP provides implementation assurances.

3. The INRMP includes an opportunity for adaptive management techniques.

The USFWS may decline to designate critical habitat where there exists a plan that provides for the adequate management or protection for listed species. The USFWS uses the following three point criteria to determine if an INRMP provides adequate management or protection.

1. **The plan provides a conservation benefit to the endangered and candidate species.** The cumulative benefits of the management activities identified in a management plan, for the length of the plan, must maintain or provide for an increase in a species' population, or the enhancement or restoration of its habitat within the area covered by the plan [i.e., those areas deemed essential to the conservation of the species]. A conservation benefit may result from reducing fragmentation of habitat, maintaining or increasing populations, insuring against catastrophic events, enhancing and restoring habitats, buffering protected areas, or testing and implementing new conservation strategies.

2. **The plan provides certainty that the management plan will be implemented.** Persons charged with plan implementation are capable of accomplishing the objectives of the management plan and have adequate funding for the management plan. They have the authority to implement the plan and have obtained all the necessary authorizations or approvals. An implementation schedule (including completion dates) for the conservation effort is provided in the plan. Camp Grafton's conservation program is adequately funded and has a well-trained staff of personnel, technicians, and contractors to ensure plan implementation.

3. **The plan provides certainty that the conservation effort will be effective.** The following criteria are considered when determining the effectiveness of the conservation effort. The plan includes (1) biological goals (broad guiding principles for the program) and objectives (measurable targets for achieving the goals); (2) quantifiable, scientifically valid parameters that will demonstrate achievement of objectives, and standards for these parameters by which progress will be measured, are identified; (3) provisions for monitoring and, where appropriate, adaptive management; (4) provisions for reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of

quantifiable parameters) of the conservation effort are provided; and (5) a duration sufficient to implement the plan and achieve the benefits of its goals and objectives.

In relation to the candidate species, the Sprague's Pipit which may occur on CGN, the NDNG offers the following list of management and conservation efforts for consideration when making a determination not to designate critical habitat:

The Endangered Species Act was revised via the National Defense Authorization Act of 2004. It states that, "The Secretary [of the Interior] shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation." An installation may have its INRMP obviate the need for critical habitat designation if the INRMP provides a benefit to listed species, and manages for the long-term conservation of the species. This revised INRMP specifically addresses the benefits of management of these actions for these species or habitats. The benefits are clearly identifiable in the document and are included in the table of contents of the INRMP.

INRMP Benefits Environmental Benefits

Actions described in this INRMP provide a clear benefit for all natural resources at CGN.

The INRMP provides support for CGN's natural resources and helps to avoid future military restrictions. The INRMP stresses efforts for protecting migratory birds, threatened, endangered and listed candidate species. Under land protection the INRMP provides for continued planning, updated GIS records, woodland projects minimizing impacts of insects and diseases, and conservation efforts that both prevent soil erosion problems and stabilize CGN's shoreline areas. The INRMP addresses wildlife management actions for both game and non-game species. These include up-dating flora and fauna data collections, developing wildlife management plans and maintaining grassland areas for potential use by the Sprague's Pipit and other non-game species. The INRMP supports actions that address wetland stewardship efforts and monitors training impacts upon wetlands that may attract water fowl and species, such as, the Whooping Crane. Finally, the INRMP provides for environmental benefits through expanded participation in regional conservation efforts, such as, migratory bird counts and conservation education outreach projects.

Military Mission Benefits

Integration of natural resources management with mission support and training requirements and responsibilities will help ensure CGN meets the challenges of combat readiness homeland security, and ecosystem health, while fulfilling its stewardship and regulatory responsibilities. Implementation of this plan will better integrate sustainable natural resource management with mission support and training requirements and responsibilities, affording more realistic training opportunities in support of the base mission.

The INRMP benefits military actions in at least five ways:

1. It facilitates compliance with environmental laws and regulations such as Sikes Act, the Clean Water Act, the Endangered Species Act, and obviates the need for Federal critical habitat designation.

2. It provides actions that support training activities, while still providing protection to the environment and threatened and endangered species (e.g., continuing the military impact monitoring, identifying species of concern before they restrict military actions, reducing wildland fire threat, rotating out and restoring eroded training areas so that they will be available for future use).

3. It provides for programs to deal with bird/aircraft strike hazards and wildlife damage.

4. It provides for increased education of soldiers and visiting units to promote responsible use of training areas and ranges in order to avoid future restrictions of military actions.

5. It provides for regional conservation and encroachment partnering initiatives to reduce or prevent current and future mission restrictions.

Relational Benefits

This INRMP provides continual support for CGN's community relations. It includes specific actions to continue recreational and educational activities, such as maintaining and improving access for fishing and hunting purposes.

The document also considers and recommends actions dealing with encroachment, public and military awareness of on-going environmental efforts, and a program for field trips and presentations for students of local schools.

Finally, as with any planning process, this INRMP allows for continued cooperation with federal and state natural resources agencies such as USFWS and ND Game and Fish.

Benefits to CGN Endangered Species

Threatened or Endangered Species haven't been recorded with the vicinity of the CGN.

It has been determined that NDARNG training activities at CGN are unlikely to have an effect upon threatened, endangered, or candidate species (Whooping Crane & Sprague's Pipit) associated with CGN and/or the greater area of Ramsey County, North Dakota.

Appendix 8

Critical Habitat Issues

Section 4(a)(3) of the Endangered Species Act requires the USFWS to designate "critical habitat" for a species upon its listing as endangered or threatened. The USFWS can choose not to designate a species' critical habitat in only limited circumstances.

Requirements
Section4(b)(2) describes the statutory requirements of determining the impacts of designating areas as critical habitat. The interpretation of the statute is based on previous designations and key court opinions discussed in the sections that follow.

Statutory Language and Consideration of Potential Impacts of Designation

The ESA section 4(b)(2)states:
The Secretary shall designate critical habitat, and make revisions thereto, under subsection (a)(3) of this section on the basis of the best scientific data available and after taking into consideration the economic impact, impact on national security, and any other relevant impact, of specifying any particular area as critical habitat. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned. (16 U.S.C. §1533(b)(2))
Impacts may result from a critical habitat designation primarily through Section 7 of the ESA (16 U.S.C. 1536). Section 7(a)(2) requires each Federal agency to consult with NMFS (or the U.S. Fish and Wildlife Service [USFWS], as applicable) to ensure that any action they authorized, funded, or carried out by such agency will not likely destroy or adversely modify the designated critical habitat of listed species. Federal agencies are required to enter into consultation whenever a proposed action “may affect” listed species or designated critical habitat. If a proposed Federal action will likely destroy or adversely modify critical habitat, NMFS may recommend that the Federal agency or the project permittee or grantee implement a reasonable and prudent alternative (RPA) to the proposed action that would avoid destruction or adverse modification of critical habitat. Thus, impacts that may result from Section 7 consultations include the administrative costs of performing the consultation, costs of modifications to the proposed action in order to implement an RPA, and secondary costs to local or regional economies that result from the project modification. In addition, because critical habitat is by definition “essential to the conservation” of the species, conservation benefits to the listed species would be expected to result when the consultation process avoids destruction or adverse modification of its critical habitat, or avoids lesser adverse effects to critical habitat that may not rise to the level of adverse modification. Adverse impacts to other components of the ecosystem may similarly be avoided through consultation and implementation of RPAs. Designation and protection of critical habitat could result in project modifications that avoid adverse impacts to critical habitat and other components of the ecosystem may result in continued provision of benefits to user groups and economic sectors that utilize these habitats or ecosystem components.

The ESA does not specify methods for identifying and considering the impacts of critical habitat designation, and previous designations have used a variety of approaches based on the relevant circumstances of the species and habitat involved. As described, the legislative history of the ESA informs these analyses, and several important court opinions have evaluated the legal sufficiency of these analyses, and clarified a number of important aspects of these statutory provisions. Section 4(b)(2) consists of two steps: an initial mandatory requirement that the agency consider certain impacts of critical habitat designation, and a discretionary step wherein the agency, informed by those considerations, may propose excluding particular areas from the designation. The ESA's legislative history explains the broad latitude afforded to NMFS in its consideration of impacts:

Economics and any other relevant impact shall be considered by the Secretary in setting the limits of critical habitat for such a species. The Secretary is not required to give economics or any other "relevant impact" predominant consideration in his specification of critical habitat...The consideration and weight given to any particular impact is completely within the Secretary's discretion. (H.R. Rep. No. 95-1625, at 16-17 (1978), 1978 U.S.C.C.A.N. 9453, 9466-67)1

NMFS may then exclude particular areas that otherwise meet the definition of critical habitat from a designation, on a determination that the benefits of exclusion outweigh the benefits of including the area(s), and exclusion will not result in the species' extinction. This step is entirely discretionary, and does not require exclusion in any circumstances.

One court recently held that an agency's decision not to exercise its discretion to exclude areas is not subject to judicial review (*Home Builders Association of No. Calif. et al., v. U.S. Fish and Wildlife Service*, 2006 U.S. Dist. LEXIS 80255 at 45-46 (E.D. Cal., Nov. 1, 2006)). The court based this conclusion on the broad latitude provided to the agency in consideration of impacts described above, the discretionary nature of the exclusion provision, and the fact that the statute provides substantive standards only for the review of actual exclusions, i.e., the Secretary must determine that the benefits of exclusion outweigh the benefits of inclusion for particular areas. In contrast, the statute includes no substantive standards for a court to review a decision not to exclude areas from a designation.

Regarding consideration of economic impacts in the *Home Builders* case, the court noted that the term "impacts" is not specific and can be both positive and negative (*Id*. at 54, citing *Butte Envtl. Council v. Norton*, slip op., 04-0096, at 12 (N.D. Cal. Oct. 28, 2004)); this logic applies equally to national security impacts and other relevant impacts.

Other Laws, Executive Orders, and Policies Applicable to Economic Impact Analysis

The consideration of impacts from a critical habitat designation is subject to other laws, EOs, and policies beyond the ESA. For example, the Regulatory Flexibility Act (RFA, 5 U.S.C. 601 *et seq.*) establishes a regulatory philosophy that agencies shall endeavor, consistent with the objectives of a proposed rule and applicable statutes, to fit regulatory requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. The RFA does not contain decision criteria per se; rather, the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of a proposed action to ensure that the

agency considers alternatives that minimize expected significant adverse impacts of the rule on a substantial number of small entities, while meeting the goals and objectives of the proposed action. A Final Regulatory Flexibility Analysis (FRFA) was conducted for the final critical habitat designation (Appendix B).

EO 12866, Regulatory Planning and Review, provides guidance to Federal agencies on the development and analysis of regulatory actions. The overarching regulatory philosophy established by EO 12866 is:
Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages, distributive impacts, and equity), unless a statute requires another regulatory approach.

The EO includes a list of twelve principles for regulatory program planning and development of individual proposed rules that agencies should adhere to, to the extent permitted by law and where applicable. These principles include identification of market failures or other problems intended to be addressed by the regulation, and whether existing regulations or laws have created or contributed to the problem. If applicable, agencies are directed to identify non-regulatory alternatives to the problem.

Where regulations are necessary or required by law, agencies must design regulations in the most cost effective manner available to achieve the regulatory objective and impose the least burden on society. All costs and benefits of proposed regulations must be assessed. If feasible, agencies should specify performance objectives rather than behavior or compliance requirements. Agencies are directed to seek the views of appropriate State, local, and Tribal officials if such would be significantly or uniquely affected by a proposed rule. Regulations must not be inconsistent, incompatible, or duplicative with other Federal regulations, and must be simply drafted and easy to understand.

Office of Management and Budget (OMB) guidance to Federal agencies on implementing EO 12866 states that good regulatory analyses include three basic elements: (1) a statement of the need for the action, (2) an examination of alternative approaches, and (3) an evaluation of benefits and costs of the final action and the main alternatives (OMB Circular A-4, Sept. 17, 2003). Further, OMB Circular A-4 states that proper evaluation of the benefits and costs of regulations requires:

- Explaining how the actions required by the rule are linked to the expected benefits

- Identifying an appropriate baseline

- Identifying the expected undesirable side effects and ancillary benefits of the final rule

These regulatory principles were integrated into the development of the final rule to the extent consistent with the mandatory duty to designate critical habitat, as defined in the ESA.

The CGN INRMP strives to sustain the natural resources at CGN for future training missions and attempts to insure minimal impacts to soil, vegetative, water, and fauna. It also out-lines monitoring efforts for detecting any training impacts upon these resources, so detected impacts can be corrected. In the event the Secretary of the Interior determines the necessity to add a new species to the list of threatened and endangered species, the NDARNG's CGN ICRMP will provide management guidance assuring CGN's native habitat remains relatively unchanged and potential suitable for supporting a newly listed T&E species requiring the collective natural resources located at CGN.

The designation critical habitat based upon the listing of new T&E listed species could be devastating to the NDARNG training mission at CGN. CGN offers limited training opportunities and designating even small areas of CGN as critical habitat would force the troops to utilize an alternative NDARNG training sites located miles to the south or east of the CGN. The travel to the alternative site would be more costly, but more importantly time investment traveling to the site would deprive NDARNG soldiers of training time needed to prepare for active duty.

An up-dated T&E listed species and canidate species can be obtained at the following web address: http://www.fws.gov/northdakotafieldoffice/SEtable.pdf