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December 20, 2012

**RECEIVED**

DEC 20 2012

HAND DELIVERY

**PUBLIC SERVICE COMMISSION**

Mr. Darrell Nitschke  
Executive Director  
NORTH DAKOTA PUBLIC  
SERVICE COMMISSION  
600 E. Boulevard Avenue, Dept. 408  
Bismarck, ND 58505-0480

Dear Mr. Nitschke:

In re: Tesoro High Plains Pipeline Company LLC  
Certification for Tioga Station Construction  
Our File No. 90-532-001

In accordance with North Dakota Century Code § 49-22-03(3), the purpose of this letter is to notify the Public Service Commission ("Commission") that Tesoro High Plains Pipeline Company LLC ("Tesoro") intends to construct certain facilities adjacent to its pipeline, which has been in service since the 1950s.

As Tesoro's existing pipeline predates the siting act codified at NDCC Chapter 49-22, this project qualifies for construction under the certification process as all construction will take place within 350' on either side of the pipeline centerline.

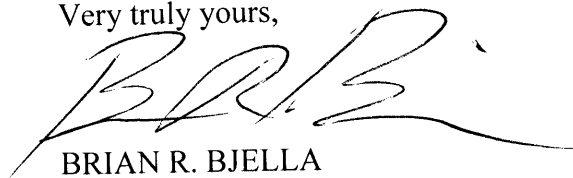
Enclosed herewith is an Affidavit of a Tesoro agent setting forth the certification requirements of the siting act, along with a report from Groundwater and Environmental Services, Inc. entitled "Exclusion/Avoidance Area Resources Evaluation Tioga Station Expansion, Williams County, North Dakota."

Presently, Tesoro plans to commence construction in mid to late January, 2013.

1 PU-12-819 Filed 12/20/2012 Pages: 36  
Letter enclosing certification  
Tesoro High Plains Pipeline Company, LLC  
Brian Bjella, Crowley Fleck, PLLP

BILLINGS BISMARCK BOZEMAN HELEN  
C R O W L E Y F L E C K C O

Very truly yours,

A handwritten signature in black ink, appearing to read 'B.R.B.', with a long horizontal flourish extending to the right.

BRIAN R. BJELLA

bw  
Enc.

BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF NORTH DAKOTA

Tesoro High Plains Pipeline Company LLC

CASE NO. PU-\_\_\_\_\_

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**CERTIFICATION OF APPLICANT PURSUANT TO  
NORTH DAKOTA CENTURY CODE § 49-22-03(3)**

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The undersigned, a duly authorized agent of Tesoro High Plains Pipeline Company LLC (“Tesoro”), having authority to act on behalf of and by Tesoro, does hereby certify under oath:

1. That Tesoro owns and operates a pipeline located in the vicinity of Tioga, North Dakota, adjacent to Hess Corporation’s Tioga Gas Plant. The pipeline has been in service since the 1950s, thus being prior to adoption of the siting act on April 9, 1975, codified at NDCC Chapter 49-22.
2. That Tesoro recently acquired a tract of land adjacent to its pipeline. The former owner had engaged in construction work on this tract prior to Tesoro’s acquisition.
3. That Tesoro intends to construct the following described facilities within 350 feet of either side of the centerline of its existing pipeline, thus utilizing the certification process as provided for in NDCC § 49-22-03(3)(a).
4. That attached hereto and made a part hereof is the Exclusion/Avoidance Area Resources Evaluation Tioga Station Expansion, Williams County, North Dakota, prepared for Tesoro by Groundwater and Environmental Services, Inc. (“Evaluation”).
5. That the Evaluation indicates that Tesoro intends to construct what is known as its Tioga Station by construction of two 145,000 barrel storage tanks, multiple pumps and pipeline



**Exclusion/Avoidance Area Resources Evaluation  
Tioga Station Expansion, Williams County, North Dakota**

**Prepared for:**

Tesoro High Plains Pipeline  
1900 Ridgewood Parkway  
San Antonio, Texas 78259

**Prepared by:**



Groundwater and Environmental Services, Inc.  
1630 Welton Street, Suite 300  
Denver, Colorado 80202

**December 18, 2012**

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## Background and Proposed Project

Groundwater Environmental Services, Inc. (GES) prepared the following document on behalf of Tesoro High Plains Pipeline (TESORO). This document presents the evaluation and understanding of the proposed project.

TESORO owns and operates a 233-mile existing underground petroleum gathering and mainline pipeline system that extends from eastern Montana to Mandan, North Dakota. The pipeline also extends northward to the US-Canadian International Border, where a TESORO transmission line ties into a pipeline system near the Town of Lignite in Burke County, North Dakota.

TESORO is proposing to upgrade their existing Tioga Station, which is located within Williams County, east of the Town of Tioga, North Dakota. The existing station is further described as portions of the NE $\frac{1}{4}$  in Section 26, Township 157 North, Range 95 West of the 5th Principal Meridian, Williams County, North Dakota. The existing Tioga Station is zoned for industrial use. Tioga Station is located wholly within the County's jurisdiction and beyond the Town of Tioga's boundaries.

The proposed expansion consists of two (2) 120,000 barrel storage tanks, multiple pumps and pipeline to storage tank interconnects to allow transportation of crude oil to multiple destinations via TESORO's North Dakota pipeline system.

### Resource Evaluation

GES's efforts were based upon the North Dakota Public Service Commission's (NDPSC) Administrative Code Rules, Article 69-06, for Energy Conversion and Transmission Facility Siting. GES conducted a primarily evaluation of wetlands, biological, and water resources associated with the defined study area. Additionally, GES engaged the services of Archaeological Consulting Services, Inc. (ACS) to conduct a Class I survey of the cultural resources associated within the defined study area.

The purpose of this evaluation is to identify exclusion and avoidance areas that may be impacted by the proposed project. The following sections describe "exclusion" and "avoidance" area in detail and how these areas were accessed.

### Study Area

TESORO defines the Tioga Station Project Area as follows:

A portion of NE $\frac{1}{4}$  NE  $\frac{1}{4}$  of Section 26, Township 157 North, Range 95 West, less and excepting road and deeded parts, containing 24.53 acres, more or less, identified by property tax no. 14-157-95-00-26-020 less 5.75 acres, more or less, on the west side.

The "Study Area" is defined as the area within an approximate 1.5-mile radius of the Project Area as defined above. The Project Area and Study Area are illustrated on **Figure 1**.

## **Exclusion Areas**

Based upon GES' understanding of the NDPSC Administrative Code Rules, Article 69-06, the following geographical areas shall be excluded in the consideration of a site for an energy conversion facility, and shall include a buffer zone of a reasonable width to protect the integrity of the area. Natural screening may be considered in determining the width of the buffer zone.

- Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; historic districts; monuments; wilderness areas; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.
- Designated or registered state: parks; forests; forest management lands; historic sites; monuments; historical markers; archaeological sites; grasslands; wild, scenic, or recreational rivers; game refuges; game management areas; management areas; and nature preserves.
- County parks and recreational areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.
- Prime farmland and unique farmland, as defined by the land inventory and monitoring division of the soil conservation service, United States department of agriculture, in 7 C.F.R. part 657; provided, however, that if the commission finds that the prime farmland and unique farmland that will be removed from use for the life of the facility is of such small acreage as to be of negligible impact on agricultural productions, such exclusion shall not apply.
- Irrigated land.
- Areas critical to the life stages of threatened or endangered animal or plant species.
- Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged.

## **Avoidance Areas**

Based upon NDPSC Administrative Code Rules, Article 69-06, the following geographical areas shall not be approved as a site for an energy conversion facility unless the applicant shows that under the circumstances there is no reasonable alternative.

In determining whether an avoidance area should be designated for a facility the commission may consider, among other things, the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative sites. Economic considerations alone shall not justify approval of these areas. A buffer zone of a reasonable width to protect the integrity of the area shall be included. Natural screening may be considered in determining the width of the buffer zone.

- Historical resources which are not designated as exclusion areas.
- Areas within the city limits of a city or the boundaries of a military installation.
- Areas within known floodplains as defined by the geographical boundaries of the hundred-year flood.
- Areas that are geologically unstable.
- Woodlands and wetlands.

- Areas of recreational significance which are not designated as exclusion areas.

## **Exclusion and Avoidance Areas and Resources Evaluation**

An evaluation of environmental factors impacting potential avoidance and exclusion areas and resource analysis was conducted for the study area as defined above. This evaluation consisted of a desk top study of available public information and did not include an on-site assessment.

### **National, State and Local Parks, Wilderness Areas, Wildlife Refuges, Grasslands, Nature Preserves and Recreation Areas**

#### **National Parks**

National parks are special places saved by the American people so that all may experience our heritage. Based upon review of the United States Department of the Interior, National Parks Service (NPS) website for the state of North Dakota, no National Parks are located within the study area (NPS 2012). The NPR also provides information concerning and the location of the following:

- American Battlefield Protection Program promotes the preservation of historic battlefields associated with wars on American soil,
- Certified Local Governments are grass-roots partners in historic preservation. They are eligible to receive grants and technical expertise,
- Federal Lands to Parks program helps states and communities acquire surplus federal land to create new parks and recreation places,
- Federal Historic Preservation Tax Incentives revitalize communities by encouraging private sector rehabilitation and re-use of historic buildings,
- Land & Water Conservation Fund matching grants help states and communities provide open spaces and healthy recreation places for people,
- National Register of Historic Places is the official list of the nation's historic places worthy of preservation,
- Preserve America matching grants protect community character and economic vitality through heritage tourism, education, and historic preservation,
- Rivers, trails and conservation assistance (RTCA) projects provides expertise and empowers communities to protect their own special places for conservation and outdoor recreation,
- Save America's Treasures matching grants to historic properties and museum collections preserve our nation's unique, irreplaceable cultural heritage.

There are two Land & Water Conservation Fund sites within the general project vicinity. Both are in part located near the northwest corner of the study area; however, neither will be affected by the proposed project:

- Tioga Dam
- Tioga Main Park

There are three National Register of Historic Places located within the general project vicinity. None are located within the study area and will not to be affected by the proposed project:

- Ray Opera House – listed 1978

- Mountrail County Courthouse – listed 1978
- Great Northern Railway Underpass – listed 1997

### **North Dakota Parks and Recreation Department**

The North Dakota Parks and Recreation Department (NDPRD) manages both the North Dakota Nature Preserves Act (NDCC 55-11) and the North Dakota Code, Title 20.1, Chapter 20.1-04, § 20.1-04-05 – Golden Eagle, Bald Eagle Protection Act. The NDPRD Nature Preserve Act is discussed below, the Golden Eagle, Bald Eagle Protected Act is discussed in the Biological Resources, Threatened and Endangered Species section of this document.

### **North Dakota Nature Preserves Act**

In 1975, the North Dakota Legislature passed the Nature Preserves Act (NDCC 55-11), which gives the NDPRD the responsibility to set aside a system of natural areas and nature preserves for the benefit of North Dakota citizens. North Dakota is one of roughly thirty states that have a state-level nature preserve or natural area protection program.

The State of North Dakota currently has five designated state nature preserves. These areas have been formally dedicated and are owned either by various state agencies or by private groups.

The NDPRD manages the following dedicated state nature preserves in the general project area:

- Gunlogson State Nature Preserve, located within Icelandic State Park, Pembina County, ND.
- Head of the Mountain State Nature Preserve, located approximately, 9 miles southeast of Rutland, Sargent County, ND.
- H.R. Morgan State Nature Preserve, located 24 miles east northeast of Lisbon, Ransom & Richland Counties, ND.
- Sentinel Butte State Nature Preserve, located 3 miles south of Sentinel Butte, Golden Valley County, ND.

The Nature Conservancy manages the follow dedicated state nature preserves in the general project area:

- Cross Ranch State Nature Preserve, located 20 miles north of Mandan, in Oliver County.

None of the above listed state nature preserves are located within the study area and will not be affected by the proposed project.

### **Local Parks**

According to the City of Tioga's webpage there are numerous city parks located within the Town of Tioga, North Dakota, and quality outdoor spaces are abundant (<http://www.tiogand.net/>).

Local parks are located within the Town of Tioga located in the western portion of the study area; however, local parks will not to be affected by the proposed project.

### **Wilderness Areas**

Wilderness can be defined as, the land that was - wild land beyond the frontier...land that shaped the growth of our nation and the character of its people. Wilderness is the land that is - rare, wild places where one can retreat from civilization, reconnect with the Earth, and find healing, meaning and significance (<http://www.wilderness.net/NWPS/>).

The Wilderness Act was passed in 1964 to established under law areas as part of the National Wilderness Preservation System (NWPS). America's wilderness areas are managed by the Bureau of Land Management (BLM), US Fish and Wildlife Service (USFWS), US Forest Service (USFS) and the NPS (Dawson, C. P. & Hendee, J. C., 2009).

There are three designated Wilderness Areas in the state of North Dakota:

- Chase Lake Wilderness was designated as Wilderness Area by the United States Congress in 1975 and it now has a total of 4,155 acres and is managed by the USFWS.
- Lostwood Wilderness was designated as Wilderness Area by the United States Congress in 1975 and it now has a total of 5,577 acres and is managed by the USFWS. The 26,902-acre Lostwood National Wildlife Refuge protects some of the best native prairie in North Dakota. Approximately 70 percent of the refuge is considered virgin prairie. Lostwood Wilderness is also part of the National Wildlife Refuge System, described in the next section.
- Theodore Roosevelt Wilderness was designated as Wilderness Area by the United States Congress in 1978 and it now has a total of 29,920 acres and is managed by the NPS. Divided into three units along the Little Missouri River, Theodore Roosevelt National Park encompasses 70,000 acres in the heart of the scenic North Dakota badlands.

No wilderness areas appear to be located within the study area; wilderness areas will not be affected by the proposed project.

### **National Wildlife Refuge System**

The Mission of the National Wildlife Refuge System (NWR) is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. As described below there are three NWR near the project area; however they are not located within the study area.

- The Lake Zahl National NWR is located approximately 30 miles from Williston, ND and 40 miles northwest of the project area. Lake Zahl NWR was established in 1939 as a refuge and breeding ground for migratory birds and other wildlife. The Refuge encompasses a total of 3,739 acres. Lake Zahl NWR lies at the juncture of the Missouri Coteau and the Missouri Slope. Water flowing from Lake Zahl enters the Little Muddy

River, goes into Lake Sakakawea, and then enters the Missouri River approximately 28 miles south of the Refuge. Lake Zahl is not staffed; it is managed by the Crosby Wetland Management District staff.

The Refuge is managed primarily as a nesting and resting area for waterfowl and other migratory birds. The Refuge uplands are managed using rotational grazing and prescribed burning to provide a diversity of prairie habitat.

- Lostwood NWR lies in the heart of the Missouri Coteau region, an ancient glacial moraine area. The Lostwood NWR headquarters is located 22 miles north of Stanley, North Dakota, along State Highway 8. Stanley is located 55 miles west of Minot on State Highway 2.

Topography ranges from rolling to steep hills and is covered by mixed-grass prairie. The area is dotted with wetlands that are often called "potholes." At 26,904 acres, the Refuge contains a 5,577-acre Wilderness Area established in 1975 (USFWS 2012).

Lostwood NWR has been designated a "Globally Important Bird Area" by the American Bird Conservancy. The Refuge provides breeding habitat for the Great Plains population of the threatened piping plover. Also, many declining grassland-associated bird species, such as Baird's sparrow, benefit from the intensive grassland management programs on the Refuge. Using prescribed burning and grazing, refuge staff reduces encroachment by exotic plants and woody vegetation. The native mixed-grass community is slowly being restored (USFWS 2012).

- Des Lacs NWR is found in a 28-mile long river valley with three natural lakes. The Des Lacs NWR headquarters is located 1 mile west of Kenmare, North Dakota, off Ward County Road 1. Kenmare is located 50 miles northwest of Minot on U.S. Highway 52. The northern boundary of the Refuge is at the Canadian border. The Refuge was established during the Dust Bowl era of the 1930s. The original Refuge facilities were constructed by the Civilian Conservation Corps (CCC) to benefit waterfowl production and protection (USFWS 2012).

"Des lacs" is French for "of the lakes." Early trappers originally called this area "riviere des lacs," literally, "river of the lakes," which aptly describes its prominent features. Uplands include gently rolling Drift Plains as well as steep slopes that drop 50-125 feet to the river valley, with numerous wooded draws and coulees that drain the Drift Plain. The upland vegetation is characterized as mixed-grass prairie (USFWS 2012).

No NWRs appear to be located within the study area; NWR areas will not be affected by the proposed project.

### **Grasslands**

The USFS currently administers twenty National Grasslands consisting of 3.8 million acres of public land. These grasslands are managed for a variety of purposes including forage, fish and wildlife, timber, water, and recreation resources. Four National Grasslands are located within the state of North Dakota. The National Grasslands are not solid blocks of National Forest System lands; rather, they are intermingled with other federal, state, and privately owned lands.

This mixed ownership pattern contributes to the uniqueness of the National Grasslands (<http://www.fs.usda.gov/main/dpg/about-forest>).

Established as a unit on October 1, 1998, the Dakota Prairie Grasslands Supervisor's Office, located in Bismarck, ND, oversees:

- The Little Missouri National Grasslands (1,028,000 acres),
- The Sheyenne National Grasslands (70,200 acres),
- The Cedar River National Grasslands (6,700 acres),
- The Grand River National Grasslands (155,000 acres).

No designated National Grasslands are located within the study area; National Grasslands will not be affected by the proposed project.

### **Wild, Scenic or Recreational Rivers**

The Wild and Scenic River Act of 1968, declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The US Congress declares that the established national policy of dams and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes (Wild & Scenic Rivers Act, October 2, 1968).

North Dakota has approximately 54,373 miles of river, but no designated wild & scenic rivers (<http://www.rivers.gov/rivers/north-dakota.php>).

### **Drainages and Water Bodies**

The closest river systems include the Little Muddy River located west of the study area and the White Earth River located to the east of the study area. The Little Muddy River and the White Earth River flow into Lake Sakakawea at the Williams County McKenzie County and the Mountrail County McKenzie County borders, respectively. Lake Sakakawea is the source of the Little Missouri and the Missouri Rivers.

Lake Sakakawea is actually a reservoir its origin at the Garrison Dam. Lake Sakakawea is located within the Missouri River basin and is the largest man-made water body in North Dakota. Lake Sakakawea marks the maximum southwest extent of glaciation during the ice age.

The reservoir was created with the completion of Garrison Dam in 1956, the second (and largest) of six main-stem dams on the Missouri River built and managed by the USACE for flood control, hydroelectric power, navigation and irrigation.

**Figure 2** illustrates the proposed project activities and Google Earth Imagery of the study area. A tributary drainage is located to the east of the project area. A possible spring or prairie pothole can be seen north of the project area from which this small tributary drainage originates (**Figure 2**). The unnamed tributary flows south into Paulson Creek, which flows east to the White Earth River, and then south to the Missouri River. The proposed Tioga Station Expansion will not alter surface drainage patterns in the area.

The disturbance areas are not within 100 feet of the unnamed tributary area; however, TESORO will implement best management practices in the project Project's Environmental Mitigation Plan (EMP), such as silt fencing or straw wattles along the eastern portion of the disturbance area to ensure sediments do not enter or impact the unnamed drainage which is a tributary to Paulson Creek.

### **Recreational Resources**

Rangelands, croplands, wetlands, Lake Sakakawea, rivers and streams, can all be found within the general vicinity of the study area. These areas may be used for recreational purposes such as hunting, bird watching, fishing and boating.

Recreational Resources are likely located within the study area; however, Recreational Resources will not be affected by the proposed project.

### **Historical and Cultural Resources**

GES engaged Archaeological Consulting Services, Ltd. (ACS), on behalf of TESORO, to perform the Class I research for this project. ACS applied to the North Dakota Secretary of State office for a "Foreign Business" license and to the State Historic Society of North Dakota/State Historic Preservation Office (SHSND/SHPO) for a cultural resources state permit; both were granted to ACS, with Dr. Robert J. Stokes listed as the ACS qualified and permitted archaeologist. Dr. Stokes conducted the records check at the SHSND office on October 19, 2012 focusing on the project area footprint and a one-mile review buffer around it.

ACS' background research review for the Tesoro High Plains Pipeline proposed Tioga Station project documented 12 previous projects and 14 previously recorded cultural resources within the project's one mile buffer review area. It is important to note however, that none of the cultural resources occur directly within the Tioga Station project area. The records check also revealed that the project area was recently surveyed at the Class III level. The cultural resources indicate that the general area has a prehistoric/protohistoric Native American presence, although the sites appear to be related to resource procurement and processing and not longer-term habitation. The later Historic period sites are all related to post-1880 Euroamerican settlement and expansion into the Tioga area, including an 1880s era railroad and post-1900 churches, homes, and farm/ranching related architecture and cultural artifacts. ACS recommends that previous survey coverage should be viewed as moderately dense and known cultural resources as low to moderately dense.

As a result of this Class I background research and a recently conducted Class III Survey of the project location demonstrating there are no cultural resources present (Lechert 2010); ACS recommends Tesoro be allowed to proceed without performing additional cultural resource surveys and/or reports.

Sources examined include site and project files at the SHSND/SHPO archives, online National Register of Historic Places, and historic GLO plats for the review area. Data from the SHSND and GLO maps were digitized and are shown on the previous projects map (Figure 2) and previously recorded sites map (Appendix A). ACS principal investigator, Robert J. Stokes, performed the records check at the SHSND on October 19, 2012.

## **Wetlands**

United States Army Corp of Engineers (USACE) has jurisdiction of the determination of wetland areas. USACE defines a wetland as: "those 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" (Environmental Laboratory, 1987). USACE's definition of a "wetland" includes three physical indicators within a given area. The physical indicators are: 1) the presence of hydrophytic vegetation, 2) wetland hydrology, and 3) hydric soils. GES conducted a desktop study of public databases to ascertain the likelihood of the presence of the three indicators of a wetland within the Study areas.

According to our review of the National Wetlands Inventory (NWI), maintained by the USFWS, there are no identified wetlands located within the proposed Tioga Station project boundaries. The closest NWI-identified wetland area is located approximately 750 feet southeast of a proposed tank location at the Tioga Station (approximately 520 feet south of the southeastern corner of the parcel).

## **Wetland Hydrology**

Hydrologic processes occurring in wetlands are the same processes that occur outside of wetlands and collectively are referred to as the hydrologic cycle. Major components of the hydrologic cycle are precipitation, surface-water flow, ground-water flow, and evapotranspiration. Geologic setting and an adequate and persistent supply of water are necessary for the existence of wetlands.

Common hydrologic indicators included the presence of surface water, high water table, soil saturation, water marks on trees or other objects, sediment deposits, water-stained leaves, and oxidized rhizospheres on living roots.

## **Hydric Soil**

GES has also reviewed aerial photography, Natural Resource Conservation Service (NRCS) soil maps (<http://soils.usda.gov>) and topographical maps. The soil types within the project footprint include Williams-Zahl-Zahill complex (C132C), Zahl-Max-Arnegard loams (C155F), and Williams-Bowebells loams (C210B). The soil types are identified as being "Partially Hydric" soil types, meaning that at least one component of the map unit is rated as hydric, and at least one component is rated as not hydric. In order for an area to be determined a jurisdictional wetland by the USACE, hydrophilic soil must be present as an indication that a reducing environment has been created by the presence

of saturated soil that supports hydric vegetation and has the hydrological features necessary as well.

GES' review of public database files and available previously completed studies did not encounter evidence of hydric soils. Soil pits to field verify the soil types which are part of the USACE defined wetland delineation have not been completed for the sites. Soil pits advanced and assessed in SWCA's Wetlands Delineation Report for the HESS Gas Plant Station located on the adjoining parcel of the existing Tioga Station did not reveal hydric soils (Hess Corporation [Hess], 2010).

### **Hydrophytic Vegetation**

GES reviewed aerial photography and the wetlands delineation conducted by SWCA on behalf of Hess Corporation on the adjoining property to the immediate west of the Tioga Station (Hess, 2010). Vegetation communities appear to be similar if not identical to the adjoining property to the west. As is the case with the adjoining property to the west, areas of the Tioga Site have been previously disturbed and are devoid of vegetation. The dominate vegetation has been interpolated to be crested wheatgrass (*Agropyron cristatum*). Crested wheatgrass is an herbaceous upland species and is not considered a hydrophytic vegetation type.

### **Wetlands Summary**

GES notes that these findings are based upon the desktop study findings and that a field reconnaissance of vegetation, soil and hydrology was beyond the scope of this study. Based upon the desktop study conducted by GES, no wetland areas were identified within 100 feet of the Project Area. The closest identified wetland is located approximately 750 feet southeast of the proposed tank location at the Tioga Station site.

### **Floodplains**

North Dakota State Water Commission (NDSWC) administers the state's floodplain management program that regulates the construction of structures in floodplains. NDSWC uses floodplain mapping data prepared by the Federal Emergency Management Administration (FEMA); however, the delineation of floodplains is limited municipal locations in North Dakota, as this is where the most damage to people and property will occur during a flood event.

FEMA utilizes a regulatory standard referred to as a 100-year flood in which it identifies map elevations correlating to where an area may have a one percent chance of being equaled or exceeded in a flood in any given year. FEMA floodplain map information exists for the immediate area in and around the Town of Tioga, but this data for the area surrounding the Project area has not been mapped. An area within the southwest portion of the Study Area is designated as FEMA floodplain (along the alignment of an unnamed tributary of Paulson Creek) but this designation stops at the intersection with the Burlington Northern Railroad grade southwest of the Project Area.

NDSWC has designated each County Engineer's office to administer the floodplain program in rural areas of the state, where FEMA data does not exist. Based on the contours elevation of the proposed project and that of the unnamed tributary located east of the project area floodplain issues are not a concern.

## **Geologically Unstable Areas**

### **Earthquakes**

There have been several earthquakes North Dakota, the first being recorded on October 9, 1872. A 3.7 magnitude Richter magnitude earthquakes was recorded on July 8, 1968 in the vicinity of Huff (south of the Bismarck-Mandan area), North Dakota. There are seven active seismic monitoring stations surrounding the state that are focused on general earthquake monitoring. In addition to, one set of three strong motion sensors that have just recently been installed at the Garrison Dam site, near Riverdale, North Dakota by the USACE. (Biek, 1997).

North Dakota has a low probability of earthquakes; compared to the rest of the U.S., North Dakota is well within the area with the lowest potential ground shaking hazard (0-2%). The reason for low probability of earthquake ground shaking hazards is due to North Dakota's distance from active seismic areas and major fault systems.

### **Landslides**

A landslide occurs when a mass of soil and/or rocks tumble or slide down a slope under its own weight. Slopes may fail for various reasons, including the steepness or angle of the slope, soil and/or rock type, bedding, and moisture content of the soil and/or rocks. Landslides are generally identified in the field by steep, near-vertical slopes. **Attachment A** is the North Dakota Geological Survey map and description of reported landslides and landslide potential in the Study Area (Edward C. Murphy, 2004).

### **Sinkholes**

Sinkholes are considered a geologic hazard in parts of North Dakota where coal mining occurred beneath soft sediments, sometimes resulting in sinkholes. No evidence of historical coal mining activities was found in the study area.

### **City Limits, Boundaries, and Military Installations**

The existing Tioga Station is zoned for industrial use. Tioga Station is located wholly within the County's jurisdiction and beyond the Town of Tioga's boundaries. There are no Military Installations near the project areas; military installations will not be affected by the proposed project. The western portion of the Town of Tioga was included in the Study Area.

### **Municipal Water Supply**

GES conducted a desktop review and used the North Dakota GIS Hub Explorer to conduct research regarding a municipal water supply associated with the Town of Tioga, Williams County, North Dakota.

North Dakota Department of Health (NDDH) has developed a system for prioritizing aquifers to focus efforts in areas that are considered most likely to experience contamination and those areas that would pose the greatest risk if contaminated. NDDH developed the Geographic Targeting System (GTS) to prioritize aquifers for groundwater quality sampling as well as to assist the agency in guiding the Non-Point Source (NPS) Pollution Task Force in identifying aquifers for inclusion in the North Dakota NPS Pollution Management Plan as Priority I and II water bodies. North Dakota Agriculture Department (NDAD) also uses this information in the generic state Management Plan for Pesticides.

Aquifer vulnerability is determined using hydro-geologic data. DRASTIC (Depth to water, net Recharge, Aquifer media, Soil media, Topography, Impact of the vadose zone, and hydraulic Conductivity) model was developed by EPA to standardize a system for evaluating ground water pollution potential (NDDH Geographic Targeting System, February 1997).

### **Prime Farmland, Unique Farmland and Irrigated Land**

The majority of the site consists of disturbed lands; the undisturbed lands in the project area are suitable for agricultural production; however they are not currently being used as such.

Based on review of the Natural Resource Conservation Service (NRCS) soil maps (<http://soils.usda.gov>) the soil types within the project foot include Williams-Zahl-Zahill complex (C132C), Zahl-Max-Arnegard loams (C155F), and Williams-Bowebells loams (C210B).

Potential temporary effects on soil resources include the loss of soil productivity due to erosion, soil mixing, or soil compaction. Soil disturbances associated with clearing, grading and excavating will expose soils to water and wind, increasing the potential for short-term erosion. During construction, the effects of erosion will be mitigated by use of silt fence and other erosion control measures as described in TESORO's EMP.

### **Prime and Unique Farmlands**

Prime and unique farmlands are designations assigned by the U.S. Department of Agriculture (USDA). Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The land is also used as cropland, pastureland, rangeland, forest land, or other land, but cannot be used as urban built-up land or water. According to 7 CFR 657.5, unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops. Such land has a special combination of soil quality, location, growing season, and moisture supply that is required to economically produce sustained high quality of a specific crop when treated and managed according to acceptable farming methods. Examples of such crops are citrus, tree nuts, olives, cranberries, fruit, and vegetables.

USDA keeps account of prime farmland and unique farmland of the nation in cooperation with other interested agencies at the national, state, and local levels of government. Objective of the account is to identify the extent and location of important rural lands that help in producing food, feed, fiber, forage, and oilseed crops.

No prime or unique farmland is located within the Project Area. A small area in the southwest portion of the Study Area is classified by the USDA as prime farmland. Location of the identified

prime farmland is approximately 0.25 mile south of the project area, on the opposite side of the existing Burlington Northern Railroad track, and as such will not be affected by the Project.

### **Irrigated Lands**

At the present time there are about 260,000 acres of irrigated land in North Dakota where water management can be practiced throughout the growing season. This is slightly more than 1 percent of the total cultivated land in the state. Surface irrigation methods such as furrow, border and basin are used on about 40,000 acres and the rest have some type of sprinkler system. Center pivot sprinkler systems are the most popular and are used on about 215,000 acres (<http://www.ag.ndsu.edu/extension-aben/irrigation>).

No evidence of irrigated lands was found within the Project or Study Areas.

### **Biological Resources, Threatened and Endangered Species**

Certain wildlife resources are held in trust by the USFWS for the future enjoyment of the American people; these include threatened and endangered species, migratory birds, bald and golden eagles, interjurisdictional fish, and units of the national wildlife refuge system, including easements on private land.

Following are the wildlife resource laws administered by the USFWS. All parties must ensure that their activities do not result in a violation of these laws even when no Federal permit is needed, or when there is no other Federal nexus to an operation, such as Federal land ownership or Federal funding, all parties must ensure that their activities do not result in a violation of these laws.

- Endangered Species Act (16 U.S.C. 1531 et seq.)
- Migratory Bird Treaty Act (16 U.S.C. 703 et seq.)
- Bald and Golden Eagle Protection Act (16 U.S.C. 668 – 668d, 54 Stat.250)

### **Federal Migratory Bird Treaty Act**

The Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) (MBTA) prohibits the taking, killing, possession, and transportation, (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. Migratory birds including their parts, nests, or eggs are not likely to be adversely affected by the proposed Project. Mitigation measures are discussed below.

### **Federal Bald and Golden Eagle Protection Act**

The Bald and Golden Eagle Protection Act (BGEPA)(16 U.S.C. 668 – 668d, 54 Stat.250) prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald or golden eagles, including their parts, nests, or eggs. Bald and golden eagles including their parts, nests, or eggs are not likely to be adversely affected by the proposed Project. Mitigation measures are discussed below.

## **North Dakota Code, Title 20.1, Chapter 20.1-04, § 20.1-04-05 - Golden Eagle, Bald Eagle Protected**

North Dakota *CHAPTER 30-04-01 RARE AND ENDANGERED ANIMALS* was repealed on December 1, 1982.

- NDCC 55-11 Chapter 20.1-04-02. Game birds protected – No person may hunt, take, kill, possess, convey, ship, or cause to be shipped, by common or private carrier, sell, or barter any game bird or any part thereof taken in this state, except as provided in this title.
- NDCC 55-11 Chapter 20.1-04-04. Nests and eggs of protected birds protected – No person, without a permit issued by the director, may take, have in that person's possession or under that person's control, or needlessly break up or destroy, or in any manner interfere with, the nest or the eggs of any kind of bird, the killing of which is prohibited.
- NDCC 55-11 Chapter 20.1-04-05. Golden eagle, bald eagle protected - No person may take, kill, hunt, possess, sell, purchase, pursue, shoot at, disturb, capture, or destroy any golden eagle, bald eagle, or any nest or egg thereof, within North Dakota.

### Direct Mortality

Direct mortality to migratory birds, including federally listed threatened and endangered species by the US EPA is low to unlikely based upon, current site conditions and viable habitat. The project involves improvements to a previously disturbed area. Existing access roads will be utilized and TESORO will employ the outlined general mitigative measures in the project area related to bald eagles, golden eagles, Sprague's pipits and the whooping crane.

Contractor will conduct environmental training of construction personnel, including details on these species and provide documentation of such training to TESORO. Contractor will suspend construction and notify TESORO, if Bald Eagles, Golden Eagles, Sprague's Pipits, and/or Whooping Cranes are sighted within one-mile of Project Area. On receipt of notification, TESORO will immediately contact the USFWS. For these reasons, the proposed Project is not likely to adversely affect these species

### Habitat Degradation

Two USFWS federally threatened species occur within Williams County, North Dakota, the piping plover and the whooping crane. Designated piping plover critical habitat is also located with Williams County, North Dakota. Although viable habitat exists within Williams County, North Dakota; there is no evidence the Project or Study Areas contain viable Piping Plover or the Whooping Crane habitat.

### Displacement of Individual Birds

As part of pre-construction activities, Contractor will conduct environmental training of construction personnel, including details on these species and provide documentation of such training to TESORO. Contractor will suspend construction and notify TESORO, if whooping crane(s), Piping Plover(s) or Sprague's Pipit(s) are sighted within one-mile of Project Area. On

receipt of notification, TESORO will immediately contact the USFWS. For these reasons, the proposed Project is not likely to adversely affect these species.

### **Federally Listed Threatened and Endangered Species, Williams County, ND**

The Endangered Species Act (16 U.S.C. 1531 et seq.) prohibits anyone, without a permit issued by the Secretary of the Interior, from taking any federally-listed threatened or endangered species. The Act defines the term "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Section 10(a)(1)(B) of the Act allows non-Federal parties planning activities that have no Federal nexus, but which could result in the incidental taking of listed animals, to apply to the Fish and Wildlife Service for an incidental take permit.

Currently, five federally listed species and one candidate species have been listed by the USFWS for Williams County, ND. These species include:

1. Gray Wolf (*Canis lupus*) – federally endangered;
2. Interior Least Tern (*Sterna antillarum*) – federally endangered;
3. Pallid Sturgeon (*Scaphirhynchus albus*) – federally endangered;
4. Whooping Crane (*Grus americana*) – federally endangered;
5. Piping Plover (*Charadrius melodus*) – federally threatened with designated critical habitat within Williams County, ND; and
6. Sprague's Pipit (*Anthus spragueii*) – candidate.

A desktop assessment of federally listed threatened, endangered and candidate species was conducted by evaluating historic and present occurrences, and by determining if potential habitats exist within the study area. This study revealed there are no threatened and/or endangered species habitat areas within the Project or Study Areas.

#### Gray Wolf (*Canis lupus*)

Likely habitat for the gray wolf in North Dakota is the forested areas in north central and northeast North Dakota. There is very limited to no potential habitat located within the survey area. The proposed Project will have *no effect* on this species at this time.

#### Interior Least Tern (*Sterna antillarum*)

In North Dakota, the least tern utilizes sparsely vegetated sandbars on the Missouri and Yellowstone Rivers. The Missouri and Yellowstone River systems are approximately 50 southwest of the project area. As such, there will be no effect on these species.

#### Pallid Sturgeon (*Scaphirhynchus albus*)

The preferred habitat for the pallid sturgeon are large rivers with high turbidity, natural flow, a diversity of depths and velocities formed by braided channels, sandbars, islands, sand flats and gravel bars. There is no potential habitat located within the survey area. The proposed Project will have *no effect* on this species at this time.

#### Piping Plover (*Charadrius melodus*)

In the Great Plains, piping plovers inhabit barren sand and gravel shores of rivers and lakes. Piping plovers avoid dense vegetation. Nearly all natural lakes used by piping plovers in North Dakota are alkaline in nature and have salt-encrusted, white beaches. In North Dakota, this habitat type is found on the Missouri and Yellowstone Rivers systems. Williams County is designated as critical habitat for the Piping Plover. The nearest piping plover designated Critical Habitat is Twin Lakes, located approximately two miles west of the survey area in Section 16, Township 159 North, Range 103 West.

As part of pre-construction activities, Contractor will conduct environmental training of construction personnel, including details on this species. Contractor will suspend construction and notify TESORO, if Piping Plover(s) are sighted within one-mile of Project Area. On receipt of notification, TESORO will immediately contact the USFWS. For these reasons, the proposed Project is not likely to adversely affect these species.

#### Whooping Crane (*Grus americana*)

Whooping cranes inhabit shallow wetlands that are characterized by cattails, bulrushes, and sedges. They can also be found in upland areas, especially during migration.

Whooping cranes may fly over, temporarily feed, or loaf in the area during spring and fall migration. The whooping cranes preferred habitat includes large marshy wetlands where whooping cranes are likely to roost, and croplands where cranes may feed. The closest NWI identified wetland is located approximately 750 feet southeast of the proposed tank location at the Tioga Station. Croplands are located within the study area and general site vicinity. If whooping cranes migrate through the Project area during construction, they will likely avoid the Project area and utilize adjacent croplands or wetland complexes.

#### Sprague's Pipit (*Anthus spragueii*)

Sprague's pipits is a small bird, for which habitats in North Dakota include the open grasslands. Sprague's pipits require grassland habitat for both breeding and wintering and nest on the ground. Sprague pipits are sensitive to habitat fragmentation and the conversion of grassland habitat. Sprague's pipits prefer relatively large prairie patches of at least approximately 72 acres, with larger patches of at least 360 acres preferred.

Currently, five federally listed species and one candidate species have been listed by the USFWS for Williams County, ND. **Table 1** presents the federal listed species described above along with a description of their habitat, and the probability (unlikely, low, moderate and high) of this project negatively affecting the species and/or the species habitat.

Section 10(a)(1)(B) of the Act allows non-Federal parties planning activities that have no Federal nexus, but which could result in the incidental taking of listed animals, to apply to the Fish and Wildlife Service for an incidental take permit. Based on the current site conditions and the desktop study completed by GES, it is unlikely any of the listed species above will be encountered or affected by the proposed project. GES does not believe an incidental take permit is necessary for this projects based upon the finding presented in **Table 1**.

Species occurrence Habitat quality is evaluated in **Table 1** based primarily upon the factors described below:

- **Unlikely** - no recent observation of the species, or no species range overlap and/or ***unsuitable habitat*** in the project vicinity.
- **Low** - species range overlaps project area and ***marginally suitable habitat*** is present in the project area.
- **Moderate** - species range overlaps project area and ***suitable habitat*** is present or species known to occur in habitat similar to the project area.
- **High** - species observed during field survey, ***highly suitable habitat*** present within the project area, or known population exist within the project area.

**TABLE 1  
USFWS LISTED THREATENED AND ENDANGERED SPECIES  
TIOGA STATION STUDY AREA, WILLIAMS COUNTY, ND**

| Scientific Name           | Common Name     | USFWS Status | Recovery Potential | Comments on Habitat and Occurrence   |
|---------------------------|-----------------|--------------|--------------------|--|
| <b>Birds</b>              |                 |              |                    |  |
| <i>Sterna antillarum</i>  | Least tern      | Endangered   | Unlikely           | In North Dakota, the least tern utilizes sparsely vegetated sandbars on the Missouri and Yellowstone Rivers. Birds nest, raise young, and relax on barren river sandbars.  |
| <i>Charadrius melodus</i> | Piping Plover   | Threatened   | Unlikely*          | In the Great Plains, piping plovers inhabit barren sand and gravel shores of rivers and lakes. Plovers avoid dense vegetation. Nearly all natural lakes used by plovers in North Dakota are alkaline in nature and have salt-encrusted, white beaches. Such alkali lakes probably are selected due to their sparse vegetation. Beaches used by piping plovers generally are 10-40 yards wide. Piping plovers also use barren river sandbars. In North Dakota, this habitat type is found on the Missouri and Yellowstone Rivers. *Note: Williams County is designated as critical habitat for the Piping Plover. |
| <i>Anthus spragueii</i>   | Sprague's Pipit | Candidate    | Low                | Sensitive to fragmentation and conversion of grassland habitat. Sprague's pipits prefer relatively large prairie patches of at least approximately 72 acres, with larger patches of at least 360 acres preferred.  |

| Species Name                | Common Name     | USFWS Status | Potential | Comments   |
|-----------------------------|-----------------|--------------|-----------|--|
| <i>Grus americana</i>       | Whooping crane  | Endangered   | Low       | Whooping cranes inhabit shallow wetlands that are characterized by cattails, bulrushes, and sedges. They can also be found in upland areas, especially during migration.   |
| <b>Fish</b>                 |                 |              |           |  |
| <i>Scaphirhynchus albus</i> | Pallid sturgeon | Endangered   | Unlikely  | Large rivers with high turbidity and a natural flow. Preferred habitat has a diversity of depths and velocities formed by braided channels, sandbars, islands, sand flats and gravel bars  |
| <b>Mammals</b>              |                 |              |           |  |
| <i>Canis lupus</i>          | Gray wolf       | Endangered   | Unlikely  | Historically, the gray wolf occupied almost all habitats in North America, including the Great Plains. In modern times, the gray wolf has been restricted to habitats with low densities of roads and people. Likely habitat for the gray wolf in North Dakota is the forested areas in north central and northeast North Dakota; however, they may appear anywhere. |

*Notes:*

USFWS - United States Fish and Wildlife Service

\* Williams County, ND is designated as critical habitat for the Piping Plover.

(1) All "Listings" are USFWS status listing by species as the State of North Dakota nor Williams County, ND maintain a state or local list.

(2) Potential for occurrence onsite:

**Unlikely** - no recent observation of the species, or no species range overlap and/or unsuitable habitat in the project vicinity.

**Low** - species range overlaps project area and marginally suitable habitat is present in the project area.

**Moderate** - species range overlaps project area and suitable habitat is present or species known to occur in habitat similar to the project area.

**High** - species observed during field survey, highly suitable habitat present within the project area, or known population exist within the project area.

## Exclusion Area and Avoidance Area Summary

The following **Table 2**, Exclusion Areas and **Table 3**, Avoidance Areas summarizes the desktop finding based upon NDPSC Administrative Code Rules, Article 69-06.

**TABLE 2  
EXCLUSION AREAS  
TIOGA STATION PROJECT AND STUDY AREAS, WILLIAMS COUNTY, ND**

| Exclusion Areas   | Yes | No  |
|---|-----|-----|
| National Parks or Memorials Parks (Land & Water Conservation Sites)                                     | No  | Yes |
| National Historic Site, Historical District, Historic Landmarks   | No  | No  |
| National Natural Landmarks or Monuments   | No  | No  |
| National Wilderness Areas or Wildlife Areas   | No  | No  |
| National Wild, Scenic or Recreational Rivers  | No  | No  |
| National Wildlife Refuges or Grasslands   | No  | No  |
| State Parks   | No  | No  |
| State Forests or Forest Management Lands  | No  | No  |
| State Historic Sites, Monuments, or Historical Markers  | No  | No  |
| State Archaeological Sites  | No  | No  |
| State Grasslands  | No  | No  |
| State Wild, Scenic or Recreational Rivers   | No  | No  |
| State Game Refuges, or Game Management Areas  | No  | No  |
| Sate Management Areas   | No  | No  |
| State Nature Preserves  | No  | No  |
| County Parks (Town of Tioga Parks)  | No  | Yes |
| County Recreational Areas   | No  | Yes |
| Municipal Parks   | No  | No  |
| Parks Owned or Administered by Other Governmental Subdivisions  | No  | No  |
| Prime Farmland  | No  | Yes |
| Irrigated Land  | No  | No  |
| Areas Critical to the Life stages of Threatened or Endangered Animal or Plant Species                   | No  | No  |
| Areas Where Animals or Plant Species that Are Unique or Rare to this State will be Irreversibly Damaged | No  | No  |

**TABLE 3  
AVOIDANCE AREAS  
TIOGA STATION PROJECT AND STUDY AREAS, WILLIAMS COUNTY, ND**

| Exclusion Areas  |    |     |
|--|----|-----|
| Historical Resources Which Are Not Specifically Designated as Exclusion Areas  | No | No  |
| Areas within City Limits, or Military Installation Boundaries                  | No | Yes |
| Area within Known 100-Year Floodplains   | No | Yes |
| Areas Which Are Geologically Unstable  | No | No  |
| Woodlands and Wetlands   | No | Yes |
| Areas of Recreational Significance Which Are Not Designated as Exclusion Areas | No | No  |
| Within 500 Feet of an Inhabited Rural Residence                                | No | No  |

## Conclusions

GES conducted a desktop study of public databases and readily available documentation based upon NDPSC Administrative Code Rules, Article 69-06. This evaluation consisted of the project's possible effects on resources list in NDPSC Administrative Code Rules, Article 69-06

NWI mapped wetlands are located within the Study Areas but outside of the Project Area. The proposed project will not affect any previously identified wetland or wood areas.

Water resource related studies determined the project footprint overlies the Ray Aquifer. However, as the proposed project is an unmanned facility with no potable water or sanitary waste requirements; there will be no impact on Ray Aquifer or public water supplies.

FEMA has designated that an area within the southwest portion of the Study Area is within a floodplain. This area is along the alignment of an unnamed tributary of Paulson Creek.

A small area in the southwest portion of the Study Area is classified by the USDA as prime farmland. This location of prime farmland is about 0.25 mile south from the project area, on the opposite side of the existing Burlington Northern Railroad track, and as such will not be affected by the Project.

A desktop assessment of federally listed threatened, endangered and candidate species as well was conducted by evaluating historic and present occurrences, and by determining if potential habitats exist within the study area. Currently, five federally listed species and one candidate species have been listed by the USFWS for Williams County, ND. The following determinations were made concerning direct and cumulative effects of the proposed project on each species and their habitat:

1. Gray Wolf (*Canis lupus*) – Unlikely
2. Interior Least Tern (*Sterna antillarum*) – Unlikely
3. Pallid Sturgeon (*Scaphirhynchus albus*) – Unlikely
4. Whooping Crane (*Grus americana*) – Low
5. Piping Plover (*Charadrius melodus*) – Unlikely
6. Sprague's Pipit (*Anthus spragueii*) – Low

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- SWCA Environmental Consultants, Wetland Delineation Report and Endangered Species Review for the Hess Gas Plant Expansion Footprint, Williams County, North Dakota, April 14, 2010
- U.S. Army Corps of Engineers (USACE), 2008, Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region. Edited by J.S. Wakeley, R.W. Lichvar, and C.V. Noble, ERDC/EL TR-08-12, Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.
- United States Department of Agriculture, North Dakota Farm Services Agency (Conservation Reserve Program (CRP) or Grassland Reserve Program (GRP)
- United States Fish and Wildlife Service (USFWS), Endangered Species Act (16 U.S.C. 1531 et seq.)
- USFWS, Migratory Bird Treaty Act (16 U.S.C. 703 et seq.)
- USFWS, Bald and Golden Eagle Protection Act (16 U.S.C. 668 – 668d, 54 Stat.250)

USFWS National Wildlife Refuge System, National Wildlife Refuge Systems in North Dakota,  
<http://www.fws.gov/refuges/>

North Dakota Department of Health (NDDH); Wellhead Protection Summer Newsletter 2000

NDDH Geographic Targeting System for Groundwater Monitoring, Scott Radig, Feb. 1997

North Dakota Source Water Assessment Program, Strategic Plan; NDDH; Oct. 1999

Western Area Water Supply Project, Project Progress Report; Oct. 10, 2011

## FIGURES



P:\Tesoro\Tioga\RambergStations\GIS\Tesoro\_Tioga\_SLM.mxd - Scale 1:36,000 - 11/20/2012 10:32:38 AM - NAD 1983 StatePlane North Dakota North FIPS 3301 Feet



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Sources:  
USGS 7.5 Minute Series Topographic Quadrangles  
Tioga, White Earth, Tioga SW, and Tioga SE



|              |   |                  |             |
|--------------|---|------------------|-------------|
| DRAFTED BY:  | <b>SITE LOCATION MAP</b>  |                  |             |
| RAB          |   |                  |             |
| CHECKED BY:  | <b>TESORO HIGH PLAINS PIPELINE<br/>TIOGA STATION SITE<br/>TIOGA, NORTH DAKOTA</b>             |                  |             |
| REVIEWED BY: |   |                  |             |
| NORTH<br>    | Groundwater & Environmental Services, Inc.<br>1630 WELTON STREET, SUITE 300, DENVER, CO 80202 |                  |             |
|              | SCALE IN FEET<br>   | DATE<br>11-20-12 | FIGURE<br>1 |



## **ATTACHMENTS**

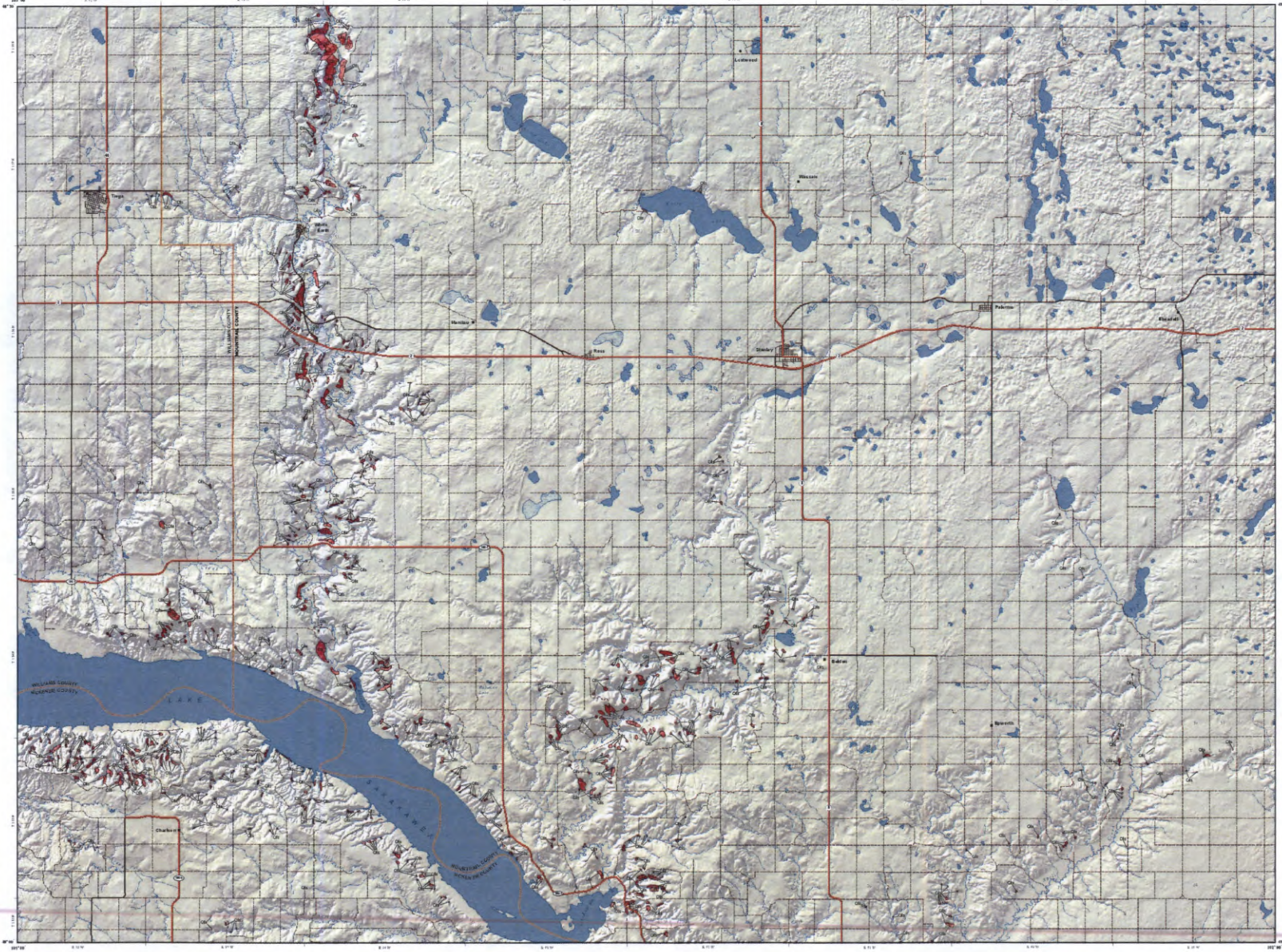


# Areas of Landslides Stanley 100K Sheet, North Dakota

|                    |          |      |
|--------------------|----------|------|
| County             | McIntosh | Ward |
| City               | None     | None |
| Neighb. 100K Sheet | None     | None |



Edward C. Murphy  
2004



### General Information on Landslides

Landslides are masses of rocks that have tumbled on and down a slope under their own weight. These geologic hazards can damage buildings, roads, railroad tracks, pipelines, transmission lines, and other types of infrastructure. Landslides are generally characterized in the field by steep, non-vertical slopes (the scarp) that are underlain by a mass of displaced rock (the body). The body of the slide may be relatively intact or it may be severely fragmented. Recent or relatively new landslides are generally characterized by a fresh (well-sloped) rock scarp and a sparsely vegetated body. Older slides are typically more difficult to identify in the field because the scarp may be covered with vegetation and the landslide bodies are often well-vegetated, covered by mature trees.

Slips fail for various reasons including the steepness or angle of the slope, rock type, bedding, and moisture content of the rocks. Most landslides in western North Dakota are rotational slides that have a well-defined head and toe. Typically, the displaced mass of rock and sediment slides down slopes as a single unit and the toes tilt (rotate) back in the direction of the slope. The failed mass of rock is, however, almost never a cohesive unit. Numerous cracks generally cause the failed material to splinter into smaller portions. Successive landslides may occur at the same location. Over time, the accumulated material from multiple adjacent landslides can cover an area that is several thousand feet wide and several miles long.

Landslides are most readily identifiable from the air. The landslide map on the Stanley Sheet was identified from a set of aerial photographs (120,000 acres) that were flown between June and September of 1958. It is unfortunate that these photographs were taken when leaves were on the trees because groves of leaf-bearing trees tend to obscure landslides, especially small ones. On the other hand, bare soil on mountainous terrain is easier to identify these features. Trees and bushes are often absent within very distinct parallel, transverse, and/or semi-circular-depressions that generally occur within the body of the landslide.

### The Stanley Sheet

The topography throughout most of this area is typical of glacial terrain: gentle to moderately rolling hills and the presence of numerous paleochannels. Glacial sediments are thin to absent in the badlands topography associated with the McIntosh River Valley and the valleys of the major channels, but may be several hundred feet thick in the uplands. Glacial cover is underlain by the Santred Bed or Bullhorn Creek Formation (Pliocene), which consist of alternating beds of claystone, siltstone, sandstone, mudstone, and lignite that were deposited in nonmarine environments.

Landslides are virtually nonexistent in the rolling glacial topography that dominates the area shown on this map. Instead, landslides are concentrated in low-mountain areas: the badlands topography adjacent to Lake Sakawewa, the White Earth River Valley, the valley of the Little Earth River and, to a lesser degree, the valley of Shell Creek. The 808 landslides identified on this map sheet represent approximately one-half of one percent of the total map area. Most of these landslides are 20 to 40 acres in size, but a handful of landslide complexes in the northern segment of the White Earth River Valley exceed 200 acres. Presumably, the poorly lithified strata tend to fail in the areas of highest topographic relief. Landslides are concentrated along the lower reaches of the White Earth and Little Earth rivers where relief is highest at 300 to 400 feet. Landslides are also prevalent throughout the middle and upper reaches of the White Earth River Valley where relief averages about 200 feet. Landslides are rare throughout the Shell Creek River Valley and in the middle to upper reaches of the Little Earth River Valley where relief is typically 100 feet. The highly sinuous nature of the White Earth River Valley contrasts sharply with the smooth, slightly sinuous Shell Creek River Valley and, to a lesser degree, with the Little Earth River Valley. This may account for the propensity for landslides in the White Earth River Valley.

### UNIT DESCRIPTIONS

- Surface geology undifferentiated
- QUATERNARY**
- RECENT/PLEISTOCENE**
- Landslide  
A mass of relict surface rock that has slid or tumbled down slope. A pink area on the map represents centers of individual landslides.
- Geologic Symbols**
- Known contact between geologic units
- Other Features**
- Water
- Water - Intermittent
- Marsh
- Bar or Weir
- Stream - Intermittent
- Section Corner
- County Boundary
- U.S. Federal Highway
- State Highway
- Paved Road
- Unpaved Road

Landslides identified on this sheet were mapped from stereo pairs black and white 1:20,000 scale aerial photographs flown between 6-6-58 and 9-7-58. At a 1:100,000 scale map can be used to identify most, but not all, landslides, but not all are up to date, representative of all landslides for the area.

