

## APPENDIX D

### Supplemental Environmental Information

## Supplemental Environmental Information

The Project is located in east central to northwest Minnesota. Counties within the Project area include Clay, Douglas, Grant, Otter Tail, Pope, Stearns, Stevens, Todd, Traverse and Wilkin Counties. A complete list of cities and townships affected by the Proposed Routes is included in Figure 2-1 of this Application.

### LAND COVER

The State of Minnesota follows the National Hierarchical Framework of Ecological Units for developing an Ecological Classification System (ECS) for ecological mapping and landscape classification. The state is divided into four ecological provinces, ten sections, and 26 subsections.

#### Provinces

Provinces are units of land defined using major climate zones, native vegetation, and biomes such as prairies, deciduous forests, or boreal forests. Two ecological provinces occur along the Proposed Routes. The eastern portions of the Proposed Routes are within the province classified as the Eastern Broadleaf Forest. The western portions of the Proposed Routes are within the Prairie Parkland Province.

#### Sections

Sections are units within provinces that are defined by origin of glacial deposits, regional elevation, distribution of plants, and regional climate. The Proposed Routes traverse three sections. The eastern portions of the Proposed Routes traverse the Minnesota and northeastern Iowa Morainal Section. The western portions of the Proposed Routes traverse the North Central Glacial Plains Section and the Red River Valley Section.

#### Subsections

Subsections are units within sections that are defined using glacial deposition processes, surface bedrock formations, local climate, topographic relief, and the distribution of plants, especially trees. The Proposed Routes traverse four subsections. The eastern and northern segments of the Proposed Routes traverse mainly the Big Woods subsection and a portion of the eastern most section traverse the Hardwood Hills subsection. The southern and western segments of the Proposed Routes traverse the Minnesota River Prairie and Red River Prairie subsections.

Specific land cover classifications include:

- Cropland,
- Grassland,
- Wooded and forested,
- Open water,
- Open land and natural areas,
- Urban and vacant land, and
- Wetlands.

The land cover categories listed are further divided into subcategories. The broader categories may represent several vegetative community types that are generally defined by species composition and abundance.

Since European settlement of the region in the 1800s, forested areas, native grass prairies, and wetlands have been disturbed, altered, or destroyed. The original vegetation as identified by Marschner defined the regional area as hardwood forest in the eastern section, brush land in the central section, and prairie in the western section. Much of the area has been converted to cropland and has resulted in the loss of much of the original vegetation. Wetland loss has also occurred within the area due to drainage and filling of wetlands for agricultural and other land uses. The majority of the area has less than 50% of its pre-settlement wetlands remaining.

### **Cover Type Descriptions**

Wetland areas are described as those areas meeting three wetland criteria (soils, hydrology, and vegetation). Non-wetland areas are those that neither meet wetland criteria or are not open water areas (lakes, streams, and rivers). Vegetation within non wetland and upland areas consists of plants adapted to soils under aerobic conditions, whereas wetland vegetation is typically adapted to anaerobic soil conditions.

#### Cropland

Cropland may be defined as land used for the production of cultivated crops or used for pasturing animals. Subclassification for this cover type includes wheat, corn, sugar beets, hay, soybeans, small grains, and pasture. It may also include land that is fallow and enrolled in some form of conservation program, such as the Conservation Reserve Program (CRP).

## Grassland/Prairie

The Prairie Parkland province encompasses the western and eastern third of the state of Minnesota and the eastern third of North Dakota. This original prairieland was the eastern edge of the Great Plains and was part of the northern tallgrass prairie. Deciduous forests occurred along the north and eastern edges of the prairie. A few small tracts of remnant prairie still occur in western and southern Minnesota and North Dakota. Remaining prairie areas in the Red River Prairie subsection are protected in preserves along the Lake Agassiz beach ridges. Prairie remnants may be dry, mesic, or wet.

## Wooded and Forested Areas

Several wooded and forested areas may occur in the Project area including dry, mesic, and wet forests. These forest community types vary depending on soil moisture.

Dry forests are dominated by white, black, and pin oaks; bitternut hickory; and red maple. Mesic stands will be comprised of red, white and/or bur oaks; sugar maple; basswood; green ash; bitternut hickory; big tooth aspen; and butternut. Wet forested areas within the regional area are typically associated with larger river systems and occur on floodplains. Dominant species consist of green ash, slippery red rock elms, silver maples, cottonwood, black willow, American elm, and bur oak. Black ash, American hornbeam, ironwood, boxelder, hackberry, and basswood are subdominant species.

## Urban and Vacant Land

Urban and vacant land consists of areas of concentrated populations and developed land uses. Developed land uses include residential, industrial, commercial, and other land uses, in addition to developed infrastructure.

## Open Lands and Natural Areas

Open lands and natural areas occur throughout the Project area. Open lands and natural areas include USFWS Waterfowl Production Areas, USFWS easements, state wildlife management areas, scientific and natural areas, state parks, state trails, and county biological survey sites of significance. In addition, county land and parks, local parks, and other open space along with privately owned open land such as golf courses are included here.

## Native Vegetation

The remaining native vegetation occurring within the Project area is typical for the subsection they are located in, as described above. The Big Woods and Hardwood Hills subsections contain fragmented and limited contiguous segments of wooded and forested tracks. Undisturbed woodlots and forested areas are rare. The western and southern sections of the Project area are prairie regions and contain some small remnants of natural/native prairie. Wetland areas remaining within the area, if undisturbed, contain mostly native vegetation. Disturbed wetlands may contain non-native vegetation such as reed canary grass, hybrid cattail, and others.

## TOPOGRAPHY

The Project area lies in the northern rim of the Central Plains region, with more than 15,000 lakes and extensive wetlands, rivers, and streams. This portion of Minnesota was covered by glacial ice over 15,000 years ago. The landscape resulting from glaciation is characterized by young plains, moraines, lakes, and lacustrine beds. The topography in the Project area is relatively level to sloping land with elevations ranging from 880 feet to 1,600 feet. The lowest elevations are found along the Red River. The highest elevations are found in the central area of the Project southwest of the City of Alexandria.

The Project area crosses six distinct physiographic areas. From the eastern end of the Project to the western end these include: Anoka Sand Plain Area, Alexandria Moraine Area, Western St. Croix Moraine, Wadena Drumlin Area, Olivia Till Plain, and the Glacial Lake Agassiz (Wright, 1972). The physiography encompassed by these areas generally includes flat or undulating glacial or sandy lake plains, although some areas include steep slopes and high hills, moraines and outwash plains, and some areas of silty, sandy, and clay lacustrine deposits.

Pre-settlement vegetation was primarily brush land, oak and jack pine trees. Much of this vegetation has been replaced with land development, sod, agricultural use, and dispersed native areas. Drained peat and muck areas have been drained to grow crops on these rich soils.

The majority of the Project area encompasses pasture and cropland that includes corn, mineral sod, soybeans, oats, and spring wheat. Residential land use within the Project area is primarily limited to incorporated population centers with dispersed rural residential use. Concentrations of trees surround most remaining farmsteads and intermittent wooded areas are also present. The primary tree cover within the Project area occurs along major waterways and includes species such as oak, ash, maple, and elm trees.

## GEOLOGY

The surficial geology within the Project area is primarily ground moraines and out wash plains deposited by glaciers. The moraines are primarily sand, silt and clay mixtures with rock. Glacial outwash and alluvium are present along the Mississippi River. Alluvium is also associated with other area streams and rivers. The glacial outwash is primarily shallow sand and gravel deposits in glacial melt water channels. The alluvium is composed of shallow surficial sand and gravel deposits and located along main drainages.

The depth to bedrock generally ranges from 0 to 50 feet within the area. The uppermost bedrock is Mesozoic and Ordovician of age. The Mesozoic bedrock is primarily siltstone, sandstone, and shale. The Ordovician bedrock is primarily porphyritic granodiorite, and is gray to pinkish gray in color.

Mineral resources in the Project area consist of shallow sand and gravel deposits in moraines, outwash, and alluviums. The bedrock at surface is commonly mined. The locations of former sand and gravel pits shown on topographic maps and in county soil surveys indicate that most exploitable aggregate resources in the area are encountered along rivers and streams.

## WILDLIFE

Common wildlife species found within the Project area include large and small mammals, songbirds, waterfowl, raptors, reptiles, and amphibians. Figure D-1 presents a list of common mammal species that may occur within the area. Figure D-2 lists the common bird species that may occur in the area.

Figure D-1 Common Mammal Species that May Occur in Minnesota			
Common Name	Scientific Name	Common Name	Scientific Name
Arctic Shrew	<i>Sorex arcticus</i>	Northern Grasshopper Mouse	<i>Onychomys leucogaster</i>
Badger	<i>Taxidea taxus</i>	Northern short-tailed shrew	<i>Blarina brevicauda</i>
Beaver	<i>Castor canadensis</i>	Northern Water Shrew	<i>Sorex palustris</i>
Big brown bat	<i>Eptesicus fuscus</i>	Norway rat	<i>Rattus norvegicus</i>
Black Bear	<i>Ursus americanus</i>	Opossum	<i>Didelphis marsupialis</i>
Bobcat	<i>Lynx rufus</i>	Plains Pocket Gopher	<i>Geomys bursarius</i>
Boreal Redback Vole	<i>Clethrionomys gapperi</i>	Prairie vole	<i>Microtus ochrogaster</i>
Coyote	<i>Canis latrans</i>	Pygmy shrew	<i>Sorex boyi</i>
Deer mouse	<i>Peromyscus maniculatus</i>	Raccoon	<i>Procyon lotor</i>
Eastern chipmunk	<i>Tamias striatus</i>	Red bat	<i>Lasiurus borealis</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>	Red fox	<i>Vulpes vulpes</i>
Eastern mole	<i>Scalopus aquaticus</i>	Red Squirrel	<i>Tamiasciurus hudsonicus</i>

Figure D-1 Common Mammal Species that May Occur in Minnesota			
Eastern pipistrelle	<i>Pipistrellus subflavus</i>	Richardson's Ground Squirrel	<i>Citellus richardsoni</i>
Fox squirrel	<i>Sciurus niger</i>	River Otter	<i>Lutra canadensis</i>
Gray fox	<i>Urocyon cinereoargenteus</i>	Shorttail Weasel	<i>Mustela erminea</i>
Gray squirrel	<i>Sciurus carolinensis</i>	Silver-haired bat	<i>Lasionycteris noctivagans</i>
Hoary bat	<i>Lasiurus cinereus</i>	Southern bog lemming	<i>Synaptomys cooperi</i>
House mouse	<i>Mus musculus</i>	Southern flying squirrel	<i>Glaucomys volans</i>
Keen's myotis	<i>Myotis keenii</i>	Spotted Skunk	<i>Spilogale putorius</i>
Least weasel	<i>Mustela nivalis</i>	Starnose Mole	<i>Condylura cristata</i>
Little brown myotis	<i>Myotis lucifugus</i>	Striped skunk	<i>Mephitis mephitis</i>
Long-tailed weasel	<i>Mustela frenata</i>	Thirteen-lined ground squirrel	<i>Spermophilus tridecemlineatus</i>
Masked shrew	<i>Sorex cinereus cinereus</i>	Western harvest mouse	<i>Reithrodontomys megalotis</i>
Meadow jumping mouse	<i>Zapus hudsonius</i>	White-footed mouse	<i>Peromyscus leucopus</i>
Meadow vole	<i>Microtus pennsylvanicus</i>	Whitetail Jackrabbit	<i>Lepus townsendi</i>
Mink	<i>Mustela vison</i>	White-tailed deer	<i>Odocoileus virginianus</i>
Mule Deer	<i>Odocoileus hemionus</i>	Woodchuck	<i>Marmota monax</i>
Muskrat	<i>Ondatra zibethicus</i>	Woodland Jumping Mouse	<i>Napaeozapus insignis</i>
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>		

Source: Burt, W.H. and R. P. Grossenheider. 1976. *Field guide to the mammals: North America north of Mexico*. Houghton Mifflin Company, Boston, Massachusetts.

Figure D-2 Common Bird Species that May Occur in Central Minnesota			
Common Name	Scientific Name	Common Name	Scientific Name
Acadian flycatcher	<i>Empidonax virescens</i>	Lark sparrow	<i>Chondestes grammacus</i>
American Avocet	<i>Recurvirostra americana</i>	Least bittern	<i>Ixobrychus exilis</i>
American bittern	<i>Botaurus lentiginosus</i>	Least flycatcher	<i>Empidonax minimus</i>
American black duck	<i>Anas rubripes</i>	LeConte's Sparrow	<i>Ammodramus leconteii</i>
American Coot	<i>Fulica americana</i>	Lesser Scaup	<i>Aythya affinis</i>
American crow <sup>2</sup>	<i>Corvus brachyrhynchos</i>	Loggerhead shrike	<i>Lanius ludovicianus</i>
American kestrel	<i>Falco sparverius</i>	Long-eared owl	<i>Asio otus</i>
American redstart	<i>Setophaga ruticilla</i>	Louisiana waterthrush	<i>Seiurus motacilla</i>
American robin <sup>2</sup>	<i>Turdus migratorius</i>	Mallard	<i>Anas platyrhynchos</i>
American tree sparrow <sup>2</sup>	<i>Spizella arborea</i>	Marbled Godwit	<i>Limosa fedoa</i>
American Wigeon	<i>Anas americana</i>	Marsh wren	<i>Cistothorus palustris</i>
American woodcock	<i>Scolopax minor</i>	Mourning dove	<i>Zenaidura macroura</i>
Baltimore oriole	<i>Icterus galbula</i>	Northern cardinal <sup>2</sup>	<i>Cardinalis cardinalis</i>
Bank swallow	<i>Riparia riparia</i>	Northern goshawk	<i>Accipiter gentilis</i>
Barn swallow	<i>Hirundo rustica</i>	Northern harrier	<i>Circus cyaneus</i>
Barred owl	<i>Strix varia</i>	Northern junco	<i>Junco hyemalis</i>

**Figure D-2  
Common Bird Species that May Occur in Central Minnesota**

Belted kingfisher	<i>Ceryle alcyon</i>	Northern mockingbird	<i>Mimus polyglottos</i>
Black and white warbler	<i>Mniotilta varia</i>	Northern Shoveler	<i>Anas clypeata</i>
Black Tern	<i>Chlidonias niger</i>	Orchard oriole <sup>2</sup>	<i>Icterus spurius</i>
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	Ovenbird	<i>Seiurus aurocapillus</i>
Black-capped chickadee <sup>2</sup>	<i>Poecile atricapilla</i>	Pied-billed grebe	<i>Podilymbus podiceps</i>
Black-crowned night heron	<i>Nycticorax nycticorax</i>	Pileated woodpecker	<i>Dryocopus pileatus</i>
Blue jay	<i>Cyanocitta cristata</i>	Pine siskin	<i>Carduelis pinus</i>
Blue-gray gnatcatcher <sup>2</sup>	<i>Polioptila caerulea</i>	Pintail	<i>Anas acuta</i>
Blue-winged teal	<i>Anas discors</i>	Prairie warbler	<i>Dendroica discolor</i>
Blue-winged warbler	<i>Vermivora pinus</i>	Prothonotary warbler	<i>Protonotaria citrea</i>
Bobolink	<i>Dolichonyx oryzivorus</i>	Purple finch	<i>Carpodacus purpureus</i>
Brewer's blackbird <sup>2</sup>	<i>Euphagus cyanocephalus</i>	Purple martin	<i>Progne subis</i>
Broad-winged hawk	<i>Buteo platypterus</i>	Red-necked Grebe	<i>Podiceps grisegena</i>
Brown creeper	<i>Certhia americana</i>	Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Brown thrasher <sup>2</sup>	<i>Toxostoma rufum</i>	Red-breasted nuthatch	<i>Sitta canadensis</i>
Brown-headed cowbird <sup>2</sup>	<i>Molothrus ater</i>	Red-eyed vireo	<i>Vireo olivaceus</i>
Bufflehead	<i>Bucephala albeola</i>	Redhead	<i>Aythya americana</i>
Burrowing Owl	<i>Athene cunicularia</i>	Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Canada goose <sup>2</sup>	<i>Branta canadensis</i>	Red-shouldered hawk	<i>Buteo lineatus</i>
Canvasback	<i>Aythya valisineria</i>	Red-tailed hawk	<i>Buteo jamaicensis</i>
Carolina wren	<i>Thryothorus ludovicianus</i>	Red-winged blackbird <sup>2</sup>	<i>Agelaius phoeniceus</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>	Ring Necked Pheasant	<i>Phasianus colchicus</i>
Cerulean warbler	<i>Dendroica cerulea</i>	Ring-billed gull	<i>Larus delawarensis</i>
Chestnut-Sided Warbler	<i>Dendroica tigrina</i>	Ring-Necked Duck	<i>Aythya collaris</i>
Chimney swift	<i>Chaetura pelagica</i>	Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
Chipping sparrow	<i>Spizella passerina</i>	Rough Legged Hawk	<i>Buteo lagopus</i>
Clay Colored Sparrow	<i>Spizella pallida</i>	Rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	Ruby-throated hummingbird	<i>Archilochus colubris</i>
Common flicker	<i>Colaptes auratus</i>	Ruddy Duck	<i>Oxyura jamaicensis</i>
Common gallinule	<i>Gallinula chloropus</i>	Ruffed Grouse	<i>Bonasa umbellus</i>
Common grackle <sup>2</sup>	<i>Quiscalus quiscula</i>	Rusty blackbird	<i>Euphagus carolinus</i>
Common nighthawk	<i>Chordeiles minor</i>	Savannah sparrow	<i>Passerculus sandwichensis</i>
Common snipe	<i>Gallinago gallinago</i>	Saw-whet owl	<i>Aegolius acadicus</i>
Common yellowthroat <sup>2</sup>	<i>Geothlypis trichas</i>	Scarlet tanager	<i>Piranga olinacea</i>
Cooper's hawk	<i>Accipiter cooperii</i>	Sedge wren	<i>Cistothorus platensis</i>
Dickcissel	<i>Spiza americana</i>	Sharp-shinned hawk	<i>Accipiter striatus</i>
Double crested Cormorant	<i>Phalacrocorax auritus</i>	Short-eared owl	<i>Asio flammens</i>
Downy woodpecker	<i>Picoides pubescens</i>	Snow Bunting	<i>Plectrophenax nivalis</i>
Eared Grebe	<i>Podiceps nigricollis</i>	Snowy Owl	<i>Nyctea scandiaca</i>

Figure D-2 Common Bird Species that May Occur in Central Minnesota			
Eastern bluebird	<i>Sialia sialis</i>	Song sparrow <sup>2</sup>	<i>Melospiza melodia</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>	Sora	<i>Porzana carolina</i>
Eastern meadowlark <sup>2</sup>	<i>Sturnella magna</i>	Spotted sandpiper	<i>Actitis macularia</i>
Eastern pewee	<i>Contopus virens</i>	Swainson's Hawk	<i>Buteo swainsoni</i>
Eastern phoebe	<i>Sayornis phoebe</i>	Swamp sparrow	<i>Melospiza georgiana</i>
Eastern screech owl	<i>Megascops asio</i>	Tree swallow <sup>2</sup>	<i>Tachycineta bicolor</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>	Tufted titmouse	<i>Baeolophus bicolor</i>
European starling	<i>Sturnus vulgaris</i>	Turkey vulture	<i>Cathartes aura</i>
Field sparrow <sup>2</sup>	<i>Spizella pusilla</i>	Upland sandpiper	<i>Bartramia longicauda</i>
Forster's Tern	<i>Sterna forsteri</i>	Vesper sparrow	<i>Poocetes gramineus</i>
Franklin's Gull	<i>Larus pipixcan</i>	Virginia rail	<i>Rallus limicola</i>
Gadwell	<i>Anas strepera</i>	Warbling vireo	<i>Vireo gilvus</i>
Golden Winged Warbler	<i>Vermivora chrysoptera</i>	Western Grebe	<i>Aechmophorus occidentalis</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>	Western Kingbird	<i>Tyrannus verticalis</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>	Western meadowlark	<i>Sturnella neglecta</i>
Gray catbird <sup>2</sup>	<i>Dumetella carolinensis</i>	Whip-poor-will	<i>Caprimulgus vociferus</i>
Gray Partridge	<i>Perdix perdix</i>	White Pelican	<i>Pelecanus erythrorhynchos</i>
Great blue heron <sup>2</sup>	<i>Ardea herodias</i>	White-breasted nuthatch	<i>Sitta carolinensis</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>	White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Great horned owl	<i>Bubo virginianus</i>	White-throated sparrow	<i>Zonotrichia albicollis</i>
Green heron	<i>Butorides virescens</i>	Wild Turkey	<i>Meleagris gallapavo</i>
Green Winged Teal	<i>Anas crecca</i>	Willow flycatcher <sup>2</sup>	<i>Empidonax traillii</i>
Hairy woodpecker	<i>Picoides villosus</i>	Wilson's phalarope	<i>Phalaropus tricolor</i>
Henslow's sparrow	<i>Ammodramus henslowii</i>	Wood Duck	<i>Aix sponsa</i>
Herring gull	<i>Larus argentatus</i>	Wood thrush	<i>Hylocichla mustelina</i>
Hooded warbler	<i>Wilsonia citrina</i>	Yellow Bellied Sapsucker	<i>Sphyrapicus varius</i>
Horned lark	<i>Eremophila alpestris</i>	Yellow Headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
House sparrow	<i>Passer domesticus</i>	Yellow Throated Vireo	<i>Vireo flavifrons</i>
House wren <sup>2</sup>	<i>Troglodytes aedon</i>	Yellow warbler	<i>Dendroica petechia</i>
Indigo bunting	<i>Passerina cyanea</i>	Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Killdeer	<i>Charadrius vociferus</i>	Yellow-breasted chat	<i>Icteria virens</i>
King rail	<i>Rallus elegans</i>	Yellow-throated warbler	<i>Dendroica dominica</i>

Source: Peterson, Roger Tory. 1980. *A Field Guide to the Birds – Eastern or Western*. Houghton-Mifflin, New York, New York.

Several species of reptiles and amphibians may occur within the Project area. Reptiles may occur in most habitat types with the amphibians occupying the moist to wet environments such as wetlands, ponds, ditches, and riparian areas. Figure D-3 is a listing of reptiles and amphibians that may occur in the area.

Figure D-3 Common Reptile and Amphibian Species that May Occur in Central Minnesota			
Common Name	Scientific Name	Common Name	Scientific Name
American Toad	<i>Bufo americanus</i>	Northern Leopard Frog	<i>Rana pipiens</i>
Blanding's Turtle	<i>Emydoidea blandingii</i>	Northern Prairie Skink	<i>Eumeces septentrionalis</i>
Blue-Spotted Salamander	<i>Ambystoma laterale</i>	Northern Water Snake	<i>Nerodia sipedon</i>
Brown Snake	<i>Storeria dekayi</i>	Painted Turtle	<i>Chrysemys picta</i>
Bullfrog	<i>Rana catesbeiana</i>	Pickerel Frog	<i>Rana palustris</i>
Bullsnake	<i>Pituophis catenifer</i>	Plains Garter Snake	<i>Thamnophis radix</i>
Canadian Toad	<i>Bufo hemiophrys</i>	Queen Snake	<i>Regina septemvittata</i>
Common Garter Snake	<i>Thamnophis sirtalis</i>	Redbelly Snake	<i>Storeria occipitomaculata</i>
Common Map Turtle	<i>Graptemys geographica</i>	Smooth Green Snake	<i>Opheodrys vernalis</i>
Eastern Hognose Snake	<i>Heterodon platirhinos</i>	Snapping Turtle	<i>Chelydra serpentina</i>
Eastern Newt	<i>Notophthalmus viridescens</i>	Spiny Shoftshell	<i>Apalone spinifera</i>
Great Plains Toad	<i>Bufo cognatus</i>	Spring Peeper	<i>Pseudacris crucifer</i>
Green Frog	<i>Rana clamitans</i>	Tiger Salamander	<i>Ambystoma tigrinum</i>
Grey Treefrog Complex	<i>Hyla versicolor-chrysosecelis</i>	Western Chrous Frog	<i>Pseudacris triseriata</i>
Mink Frog	<i>Rana septentrionalis</i>	Western Hognose Snake	<i>Heterodon nasicus</i>
Mudpuppy	<i>Necturus maculosus</i>	Wood Frog	<i>Rana sylvatica</i>

Source: Tekiela, Stan. 2003. *Reptiles & Amphibians of Minnesota Field Guide*. Adventure Publications, Cambridge, Minnesota.

## WETLANDS

Wetlands within the central part of Minnesota possess a wide variety of characteristics and landscape position. The wide variety of characteristics is due to the specific vegetation, hydrology, and soils within the Project area wetlands. Unique environmental and biotic characteristics add to the overall regional diversity and production of the aquatic invertebrates and the vertebrate wildlife. Wetlands are critical to the region for flood control, water quality management, and aesthetics. Wetlands within the region also support countless recreational opportunities such as hunting, fishing, trapping, bird watching, and photography.

Hydrology for wetlands is as diverse as the types of wetlands present with the Project area. The hydrology follows many different sources including surface flow, groundwater supported and a combination of the two. The amount of hydrology is dependant on the size of the wetland, watershed acreage, amount of rainfall an area receives, and flood occurrences. Several areas within the overall regional area contain rare wetlands that have hydrology of upwelling groundwater that is mineralized and are identified as calcareous fens. These wetland types are typically found at the base of steep slope areas such as river bluffs and sand ridges.

Plant communities within the extensive number of wetlands are dynamic and continually changing as a result of short- and long-term fluctuations in water levels, wet-dry cycles, and human

disturbance. Some wetlands such as floodplains have extensive inundation for long periods during the early growing season and then receive little inputs. Other wetlands are inundated seasonally, have hydrology at or above the surface for most of the growing season, or are permanently inundated. The hydrologic conditions determine the composition and extent of the plant communities present.

### **Jurisdictional Wetlands**

For jurisdictional purposes, the U.S. Army Corps of Engineers (USACE) and the state of Minnesota jointly define wetlands 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. Wetlands generally include swamps, marshes, bogs, and similar areas.

All wetlands meeting specific criteria outlined in the USACE 1987 Wetland Delineation Manual are jurisdictional either federally or through state regulations in Minnesota. Wetlands within North Dakota are regulated by the Corps of Engineers. The St. Paul District of the USACE has issued a Regional General Permit (RGP) for activities with minimal individual or cumulative impacts on the aquatic environment in the State of Minnesota. This RGP replaces the Nationwide Permit Program in the state of Minnesota.

Regional permits are a type of general permit, as defined in 33 CFR 322.2(f), 323.2(h), and 325.2(e)(2). The RGP authorizes activities that involve structures or work in or affecting navigable waters of the U.S. under Section 10 of the Rivers and Harbors Act of 1899 and for discharges of dredged or fill material into waters of the U.S. under Section 404 of the Clean Water Act. Consequently, any such action proposed in wetlands or other waters of the U.S. are subject to review by the USACE and other federal and state agencies, and require authorization by the USACE.

Above ground utility line projects require authorization under Regional Permit RGP-03-MN and must meet the conditions outlined under the RGP. Authorization may include special conditions to ensure compliance with the RGP.

The USACE and the state of Minnesota use three characteristics of wetlands when making wetland determinations: vegetation, soil, and hydrology. Unless an area has been altered or is a rare natural situation, wetland indicators of all three characteristics must be present during a specific portion of the growing season for an area to be a wetland. Hydrophytic vegetation includes plants that are adapted to life in soil that is at least periodically saturated. Soils that may occur in wetlands, called hydric soils, have characteristics that indicate they were developed in conditions where soil oxygen is limited by the presence of saturated soil for long periods during the growing season. Wetland hydrology refers to the presence of water at or near the soil surface for a sufficient period of the year

to significantly influence the plant types and soils that occur in the area. One or more indicators each of wetland vegetation, hydric soil, and wetland hydrology must be present for an area to meet the definition of a jurisdictional wetland.

Wetlands perform many important hydrologic functions, such as floodwater storage, maintaining stream flows, slowing and storing floodwaters, stabilizing stream banks, nutrient removal and uptake, and groundwater recharge. A number of wetland classification systems have been developed, but the Cowardin et al. (1979) and the Circular 39 classification methods are the most widely recognized system and will be used for wetland classification within the Project area.

### ***Cowardin Classification***

#### *Palustrine*

Non-tidal and tidal-freshwater wetlands in which vegetation is predominantly trees (forested wetlands); shrubs (scrub-shrub wetlands); persistent or non-persistent emergent, erect, rooted herbaceous plants (persistent- and non-persistent-emergent wetlands); or submersed and (or) floating plants (aquatic beds). Also, includes intermittently to permanently flooded open-water bodies of less than 20 acres in which water is less than 6.6 feet deep.

Palustrine wetlands can be further divided based on the dominant plant life form or the physiography and composition of the substrate (e.g., aquatic bed, emergent, forested, scrub-shrub, unconsolidated bottom, or unconsolidated shore) and the seasonal water regime (e.g., intermittently exposed, semi-permanently flooded, seasonally flooded, saturated, or temporarily flooded).

Palustrine wetlands within the Project area occur in a variety of forms, size, depth, and type/classification. The wetlands can range from a few feet across and only inches deep, to basins 500 acres in size with depths of up to six feet. Most of the plants within the small to medium sized seasonal wetlands support facultative wetland species (FACW) interspersed with a few obligate (OBL) species in the deeper portions of the basin.

#### *Riverine*

Non-tidal and tidal-freshwater wetlands within a channel. Vegetation, when present, is predominantly non-persistent emergent plants (non-persistent-emergent wetlands), or submersed and (or) floating plants (aquatic beds), or both.

Riverine wetlands, defined by their close associations with perennial streams, occur along stream channels and are often associated with riparian areas. These areas are also supported by groundwater drainage associated with floodplains and by periodic flooding events. Riverine wetlands are divided

into categories based on the nature of the adjacent stream (e.g., upper perennial or intermittent). Riverine wetlands can be further divided based on the dominant plant life form of the physiography and composition of the substrate (e.g., unconsolidated bottom unconsolidated shore, or streambed) and the seasonal water regime (e.g., permanently flooded, semi-permanently flooded, seasonally flooded, or temporarily flooded).

There are three types of stream systems in the region: perennial, intermittent, and ephemeral. Perennial streams have visible water flowing above the streambed year-round; intermittent streams have water that appears both above and below the streambed; and ephemeral streams or watercourses flow only in response to precipitation. Vegetation growing along intermittent streams often has access to the water table or at least a greater quantity of soil moisture due to the proximity of the water table. Therefore, this creates distinct hydrologic characteristics and vegetation composition differences that distinguish intermittent streams from ephemeral streams. Generally, only perennial and intermittent streams can support riparian areas, while ephemeral streams generally do not possess the hydrologic conditions that allow riparian vegetation to grow. Although water flows down ephemeral streams periodically, the water table does not occur sufficiently close to the soil surface to allow hydrophytic vegetation to become established. Vegetation growing along ephemeral watercourses may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but generally there are no dramatic compositional differences between the two.

### ***Circular 39 Classification***

#### *Type 1: Seasonally Flooded Basin, Floodplain Forest*

Soil is covered with water or is waterlogged during variable seasonal periods but usually is well-drained during much of the growing season. This type is found both in upland depressions and in overflow bottomlands. In uplands, basins or flats may be filled with water during periods of heavy rain or melting snow. Vegetation varies greatly according to season and duration of flooding: from bottomland hardwoods to herbaceous plants. Where the water has receded early in the growing season, smartweeds, wild millet, fall panicum, redroot cyperus, and weeds (i.e. marsh elder, ragweed, and cocklebur) are likely to occur. Shallow basins that are submerged only very temporarily usually develop little or no wetland vegetation.

#### *Type 2: Wet Meadow, Fresh Wet Meadow, Wet to Wet-Mesic Prairie, Sedge Meadow, and Calcareous Fen*

Soil is usually without standing water during most of the growing season but is waterlogged within at least a few inches of the surface. Meadows may fill shallow basins, sloughs, or farmland sags, or these meadows may border shallow marshes on the landward side. Vegetation includes grasses, sedges, rushes and various broad-leaved plants. In the North, representative plants are sedges,

rushes, redtop, reedgrasses, manna grasses, prairie cordgrass, and mints. Other wetland plant community types include low prairies, sedge meadows, and calcareous fens.

*Type 3: Shallow Marsh*

Soil is usually waterlogged early during the growing season and may often be covered with as much as 6 inches or more of water. Shallow marshes may nearly fill shallow lake basins or sloughs, or may border deep marshes on the landward side. Seep areas on irrigated lands often develop as shallow marshes. Vegetation includes grasses, bulrushes, spikerushes, and various other marsh plants such as cattails, arrowhead, pickerelweed, and smartweeds. Common representatives in the North include reed, whitetop, rice cutgrass, sedges, and giant burreed.

*Type 4: Deep Marsh*

Soil is usually covered with 6 inches to 3 feet or more of water during the growing season. Deep marshes may completely fill shallow lake basins, potholes, limestone sinks and sloughs, or they may border open water in such depressions. Vegetation includes cattails, reeds, bulrushes, spikerushes and wild rice. In open areas, pondweeds, naiads, coontail, watermilfoils, waterweeds, duckweed, water lilies, or spatterdocks may occur.

*Type 5: Shallow Open Water*

Shallow ponds and reservoirs are included in this wetland type. Water is usually less than 10 feet deep and is fringed by a border of emergent vegetation similar to open areas of Type 4. Vegetation (mainly at water depths less than 6 feet), includes pondweeds, naiads, wild celery, coontail, watermilfoils, muskgrass, waterlilies, and spatterdocks.

*Type 6: Shrub Swamp; Shrub Carr, Alder Thicket*

The soil is usually waterlogged during the growing season and is often covered with as much as six inches of water. Shrub swamps occur mostly along sluggish streams and occasionally on floodplains. Vegetation includes alders, willows, buttonbush, dogwoods and swamp-privet.

*Type 7: Wooded Swamps; Hardwood Swamp, Coniferous Swamp*

The soil is waterlogged at least to within a few inches of the surface during the growing season and is often covered with as much as 1 foot of water. Wooded swamps occur mostly along sluggish streams, on old riverine oxbows, on floodplains, on flat uplands, and in very shallow lake basins. Forest vegetation includes tamarack, arborvitae (cedar), black spruce, balsam fir, red maple, and

black ash. Northern evergreen swamps usually have a thick ground covering of mosses. Deciduous swamps frequently support beds of duckweeds, smartweeds, and other herbs.

*Type 8: Bogs; Coniferous Bogs, Open Bogs*

The soil is usually waterlogged and supports a spongy covering of mosses. Bogs occur mostly in shallow lake basins, on flat uplands and along sluggish streams. Vegetation is woody or herbaceous or both. Typical plants are heath shrubs, sphagnum moss, and sedges. In the North, leatherleaf, Labrador-tea, cranberries, sedges, and cottongrass are often present. Scattered, often stunted, black spruce and tamarack may occur in northern bogs.

*Type 9: Riverine*

Riverine systems (rivers, creeks and streams) are contained in natural or artificial channels periodically or continuously containing flowing water. Upland islands or palustrine wetlands may occur in the channel, but they are not part of the riverine system.

## **PREHISTORIC AND HISTORIC SETTLEMENT**

The Proposed Routes traverse the upper Mississippi Valley of east central Minnesota. This broad till plain region, south and west of the Mississippi River, is dotted with pothole lakes. Prehistoric and historic settlement would tend to occur most often near reliable sources of water and routes of transportation, which would include navigable rivers and lakes.

### **Prehistoric Context**

Prehistoric archaeological sites in east central Minnesota span from the Paleoindian period beginning shortly after the retreat of the Pleistocene ice sheets into the early periods of historic accounts of the region in the 17<sup>th</sup> and 18<sup>th</sup> centuries. Prehistoric cultures are grouped into four broad cultural traditions: Paleoindian (10,000 to 6000 BC), Archaic (6000 to 800 BC), Woodland (800 BC to Historic), and Oneota/Plains Village (AD 900 to Historic). There are varying interpretations of when the Historic period began. The earliest widely acknowledged written accounts referring to the region and the tribes that inhabited the region date to the 1630s. However, first-hand written accounts reflecting sustained, although still rather limited, European incursions into the region emerge later in the century. The first extensive written account of the region was produced in France in 1683. In general, the period from the early 1600s to sustained American settlement in the mid-1800s is referred to as the Contact period. Some scholars refer to the earlier decades of indirect and poorly documented contact as the Protohistoric period.

The Paleoindian tradition (ca. 13,000 through 8000 B.P.) is characterized by relatively mobile groups of hunter-gatherers that migrated into the region as glaciers retreated from the Upper Midwest. The better known sites of this period are recognized by the presence of distinctive lanceolate projectile points, bifacially flaked stone knives, large scrapers and simple choppers. This period is sparsely represented in the region. An in situ site of this period would be considered extremely significant.

The transition to Archaic adaptations (ca. 8000 through 2500 B.P.) was incremental. It is somewhat misleading to end the Paleoindian and begin the Archaic at 8000 B.P., because the adaptations overlapped or graded into one another. The characteristic lanceolate projectile points of the Paleoindian are replaced by stemmed and notched forms, and pecked and ground stone implements become increasingly common. Late in this period copper implements also appear. In general there is a continued reliance on large game hunting, but there is also evidence of increasingly diversified technologies for hunting, fishing, foraging, woodworking and plant processing. Characteristic tool forms and use of raw materials become more regional in this period and there is evidence of larger or regularly reused habitation areas along the margins of lakes and rivers.

The emergence of the Woodland tradition (ca. 2500 through 300 B.P.) is marked by evidence of selective manipulation and domestication of plants. There is an increased occupation of stream and lake junctions and the development of ceramics. Another pattern that becomes frequent, although not ubiquitous in this period, is the use of earthworks in association with mortuary activity. Away from the major river valleys this adaptive pattern continued into the historic period, coexisting with the Oneota and Plains Village cultures. Identified prehistoric cultural components in the study area are dominated by the Woodland period.

Oneota and Plains Village tradition (ca. 1000 through 300 B.P.) occupations begin to appear along the major river valleys and other bodies of water. These areas include the Minnesota and Mississippi Rivers and their larger tributaries, and larger lakes. The Oneota tradition is related to the Mississippian tradition along the middle Mississippi River. This period is characterized by large village settlements based on a mix of agriculture, gathering and large game hunting. This pattern continued into the historic period, and many of the named groups of the early contact periods conformed to this pattern. In the Contact period, settlements of the Woodland, Oneota, and Plains Village traditions coexisted with the emerging Plains Equestrian tradition. The areas around the rivers, larger streams and many lakes of central Minnesota are rich in prehistoric archaeology.

## **Historic Context**

As early historic accounts of the region that would be Minnesota become fairly clear, the general area of the Project was occupied by the Santee Dakota (Sisseton, Wahpeton, Mdewakanton, and Wahpekute). However, the Chippewa (or Ojibwa) were moving into Minnesota during this period, and by the mid-1700s they occupied the northeast portions of the state. By the late 1600s French fur

traders were in the region, followed by English and American traders. By the early 1800s, sustained Euroamerican settlement, rather than frontier trading posts, accelerated in the region marked by, or encouraged by the establishment of Fort Snelling at the confluence of the Minnesota and Mississippi Rivers.

Minnesota history begins with the fur trade. French explorers entered the region in the interests of the fur trade, first exploring the extent of the Great Lakes, and then discovering the upper Mississippi River. The first detailed account of the area was written in 1683 by a French missionary who had been held captive by the Dakota. Emboldened by the fur trade, the Chippewa advanced into Minnesota, and the Dakota moved to the south and west. In the late 1700s, Spain claimed the Louisiana Territory (including portions of Minnesota) in a settlement with France, and the British Empire expanded its fur trade holdings into northern Minnesota. In 1783, after the American Revolution, the newly formed United States nominally gained control of Minnesota east of the Mississippi (the Northwest Territories), and in 1803 the Louisiana Purchase included Minnesota west of the Mississippi. However, the United States did not effectively manifest its presence in Minnesota until the Dakota piece treaty of 1815.

Wisconsin Territory, including Minnesota was formed in 1836. Minnesota remained a fur trading frontier until the emergence of the lumber industry after the Dakota and Chippewa land cessions of 1837. Early agricultural settlement also began in this period. Over the next decade Saint Paul, Saint Anthony (Minneapolis), and Stillwater became Minnesota's first towns. Wisconsin became a state in 1848 leaving eastern Minnesota without a government until Minnesota Territory was formed the following year. Settlement of Minnesota Territory increased, more land was ceded by the Dakota and Chippewa, and by 1850, wheat had become a major commercial crop in the territory. Over the next decade there was a virtual explosion in settlement in Minnesota spurred on in the later half of the decade by newspaper promotions. In 1858 Minnesota became the 32<sup>nd</sup> state.

Minnesota economy remained heavily focused on lumber and wheat. The state did not honor federal land treaties with the Indians, and an escalating conflict that would be called the Dakota Conflict broke out. There were a series of bloody confrontations in 1862. That same year, the first operational line of the Minneapolis and Saint Paul Railway was completed. From this small beginning, railroads, agriculture and the lumber industry would grow together.

What had first connected the resources of Minnesota to world markets in the fur trade was its location at the west end of Lake Superior and along navigable portions of the Mississippi and Minnesota Rivers. In the early years of immigration, these were also the main routes of bulk transportation that made the lumber industry and agriculture profitable. Early market agriculture depended on these routes for comparatively rapid transportation of agricultural products and for bringing in homesteaders and farm labor. River settlements such as Minneapolis and Saint Paul continued to prosper, and new settlements emerged along the rivers. Goods and materials also had

to be transported overland between the waterways, and wagon roads like the Red River Trails were established across Minnesota. By 1856, a way station along the Red River Trails from Saint Paul to Pembina at the Canadian border had grown large enough to be incorporated as the City of St Cloud.

Beginning in the 1830s, a new technology of bulk transportation had emerged in the eastern states. The new railroads were not as strongly affected by weather and water levels as barges and steamboats, could travel at night, and could haul comparatively large loads at unheard of speeds as high as 20 miles per hour. Railroads first connected established markets, and then began to spread away from waterways in response to the demands of industries such as lumber and mining. Beginning with the completion of the Minneapolis and Saint Paul Railway in 1862, local and regional railroads grew in Minnesota. Many of the early railroads connected established cities and towns along the waterways and wagon roads. The principal rail lines radiated from Minneapolis-Saint Paul along the Mississippi River and Duluth on Lake Superior. At the same time, entrepreneurs were developing plans to connect major centers across the continent and to profit from lumber and mining resources in areas remote from major markets. Industry and commerce attracted railroad development, and in turn the railroads promptly promoted tourism in Minnesota. The role of railroads in Minnesota history is summarized in the historic context section of the Railroads in Minnesota, 1862-1956, Multiple Property Documentation Form (Schmidt, et al. 2007). The railroads have gone through numerous mergers, acquisitions, bankruptcies, and name changes over the years. The major remaining operators west of Minneapolis-Saint Paul are the Burlington Northern Santa Fe, and the Canadian Pacific SOO Line. St Cloud is an important hub of the Burlington Northern Santa Fe. Several historic branches of the Great Northern Railway, now owned by the Burlington Northern Santa Fe, cross through the general project area.

The lumber industry and agriculture depended heavily on the railroad to connect to major markets and to expand into new areas for production. The railroads actively encouraged settlement and cultivation. Before the railroad, wholesale middlemen bought grain from the farmers by the sack and transported it by horse and wagon to the river towns where it was loaded on boats. With the arrival of the railroad, grain was loaded by the carload at railheads and shipped to major markets. Production areas and towns competed to bring the railroads, and the railroads promoted expansion and settlement. Many of the railroad routes were developed by small companies that were financed by or later acquired by larger companies. In 1889 many of the small early railroads and merged companies in east-central Minnesota were consolidated and reorganized as the Great Northern Railway. The Great Northern Railway remained the major operator in this part of Minnesota until it merged with the Chicago, Burlington and Quincy, the Northern Pacific, and the Spokane, Portland and Seattle in 1970 to form the Burlington Northern Railroad. In 1878 the Great Grasshopper Plague devastated the wheat industry, and Minnesota farms were forced to diversify, but they still depended heavily on the railroads. In 1884 iron mining emerged as a major industry that depended on the bulk transportation of the railroads and that would play a major role in the Minnesota economy for nearly a century. Like the lumbering industry, the major centers of the iron ore industry

were in northern Minnesota. Each of these economic contexts is addressed in the Railroads Multiple Property Documentation Form (Schmidt, et al. 2007). Interrelated multiple property historic contexts have also been prepared for agriculture, lumbering, the iron ore industry, tourism and recreation, and urban centers.

In the 1890s innovations in the internal combustion engine and the automobile foreshadowed a new era in transportation. The automobile began as a novelty and plaything of the rich, but innovations in assembly line production and the introduction of the Model T Ford in 1908 made automobiles affordable to a much larger proportion of the population. Demands of automobile enthusiasts and bicyclists resulted in maintained public highways. Additional innovations in internal combustion engines and the semi-trailer resulted in the development of the diesel tractor-trailer (or semi). By 1920 tractor trailers competed with the railroads for most freight traffic and buses and automobiles were dominating passenger traffic. Roads and highways now competed with the railroads as key transportation routes, and new roads could be developed more cheaply and more easily than rail lines. This competition in combination with the Great Depression resulted in serious financial difficulties for the railroads.

Minnesota, its railroads, and its roads and highways grew together. Much of the historical archaeology of Minnesota can be found along the interconnecting branches of these networks. Engineering and architectural designs are manifested in the structures and associated buildings of these transportation corridors and the corridors were integral to many economic and historical developments. Rural historical cultural resources in central Minnesota are dominated by agriculture, tourism, and associated transportation networks.