

Chapter 3: Affected Environment



Algific slope on a preserve of The Nature Conservancy.

3.1 Physical Environment

The namesake of the Refuge, the Driftless Area (Figure 1 on page 7), is a region characterized by a near absence of glacial deposits, or glacial drift, causing it to be named the 'Driftless Area' by early geologists. Its rugged, dissected terrain resulted from weathering and stream erosion of Paleozoic age limestone bedrock (Prior 1991). The karst topography with caves, coldwater springs and streams, hardwood forests, and the Upper Mississippi River valley set northeast Iowa apart from the rest of the state. Karst is a type of topography that is formed on limestone and other soluble rocks, primarily by dissolution

from water. The Driftless Area also includes southeast Minnesota, southwest Wisconsin, and extreme northwest Illinois. Some portions of the Wisconsin Driftless Area are truly unglaciated. This area is one of the ecotypes identified in the U.S. Fish and Wildlife Service's Upper Mississippi River/Tallgrass Prairie ecosystem. Streams cutting into bedrock have created many cliffs and algific talus slopes which constitute habitat for a large number of plant species that are either unique to this area or well out of their normal ranges.

Northeast Iowa receives 32-34 inches of rainfall annually with a growing season ranging from 135 to 155 days. The Driftless Area is within the eastern broadleaf forest (continental) province identified by Bailey (1995). The Refuge lies within the Mississippi flyway.

3.2 Biological Environment

3.2.1 Habitat/Vegetation

The Refuge contains upland hardwood forests, grassland, stream and riparian habitat (Figures 6-14). The Refuge provides wildlife habitat similar to that in the remainder of the region where lands are not farmed. The driftless region is a transition zone between eastern hardwood forests and midwestern tall grass prairies. Vegetation classifications for northeast Iowa vary (Cahayla-Wynn and Glenn-Lewin 1978). Glenn-Lewin et al. (1984) describe it as a dynamic area where vegetation probably never has been in a climax state. Historic habitats range from tallgrass prairie and savanna to maple/basswood and oak/hickory forest and riparian areas (Kemperman 1983, Glenn-Lewin et al. 1984). The presettlement forest was primarily oak (Glenn-Lewin et al. 1984). Fire was a natural part of the Driftless Area ecosystem, maintaining prairie and savanna. Because of the karst geology, wetland habitats are not predominant except along streams and rivers.

Currently, despite the terrain, row crop and livestock agriculture is common. Prairie and savanna areas were converted to row crop or pasture and few unaltered native vegetation remnants exist. Patches of forest were cleared for agriculture, but the more rugged areas still support hardwood forest. Logging, grazing, development, and fire suppression have impacted the remaining fragmented forests (Hemesath and Norris 1998). All forests on Refuge units were selectively logged at some time in the past; most within the last 30 years. Most Refuge forests were also subject to grazing. Invasive species occurring on the Refuge include garlic mustard, multiflora rose, leafy spurge, wild parsnip, Canada thistle, European buckthorn, and honeysuckle.

3.2.2 Algific Talus Slopes

The habitat of the Iowa Pleistocene snail and Northern monkshood and other rare species is the algific talus slope. This habitat, usually north facing, occurs where air circulation over underground ice produces a constant stream of moist cool air through vents onto the adjacent hillsides (Figure 19). These cold air vents are typically covered with a loose talus layer and a thin plant and litter cover. Some of these species, like Leedy's roseroot, occur on maderate cliffs. This is a similar habitat, where the overlying talus layer does not exist, generally because of removal by past erosive forces. Only the (now exposed) rock formation remains. Cool subsurface air flows out from the cliff face.

Algific talus slopes and maderate cliffs vary in size from a few yards to one-half-mile in length. Sinkholes above the slope are important to the function of the habitat as a source of air and water flow and are included in Refuge protection when possible. Several sinkholes are usually associated with algific talus slopes and can be up to one-half mile away. Air flowing from surface vents ranges from 30 degrees F to 55 degrees F spring to fall (U.S. Fish and Wildlife Service 1984).



Cold air vent on an algific talus slope with the rare plant golden saxifrage growing near it. USFWS

The vegetative community on algific talus slopes is different than the surrounding forest and typically contains ferns, mosses, liverworts, evergreen species such as Canada yew and balsam fir, birch, basswood, and sugar maple, and boreal disjunct herbs and ferns (Glenn-Lewin et al. 1984). The algific talus slopes also harbor state threatened and endangered plants and animals (Appendix C) and in general support an entire community of rare or disjunct species. Algific talus slopes are ranked by NatureServe as a G2 community meaning that they are imperiled globally because of rarity. Service species of concern that occur on algific slopes include eight species of glacial relict snails: *Vertigo meramecensis*, *V. brierensis*, *V. iowensis*, *V. hubrichti*, *V. occulta*, *Catinella gelida*, *Novisuccinea Sp A* and *Sp B*. Some or all of these species are also listed by state law as threatened or endangered in Iowa, Illinois, Wisconsin, and Minnesota (Appendix C). Golden saxifrage (*Chrysosplenium iowense*) is a plant associated with algific slopes that is listed as threatened by Iowa and Minnesota and is included in the Service's draft species of concern list.

Most of the original inventories of algific talus slopes were done by Frest (1982, 1983, 1985, 1986, 1987). There are nearly 400 known algific slopes/maderate cliffs in the Driftless Area (Figure 20). Not every site contains the above species. Some sites have never been thoroughly surveyed for these species, particularly for snails. Although original surveys to locate this habitat type were systematic and comprehensive, some sites likely remain undiscovered.

Figure 19: Algific Talus Slope Diagram¹



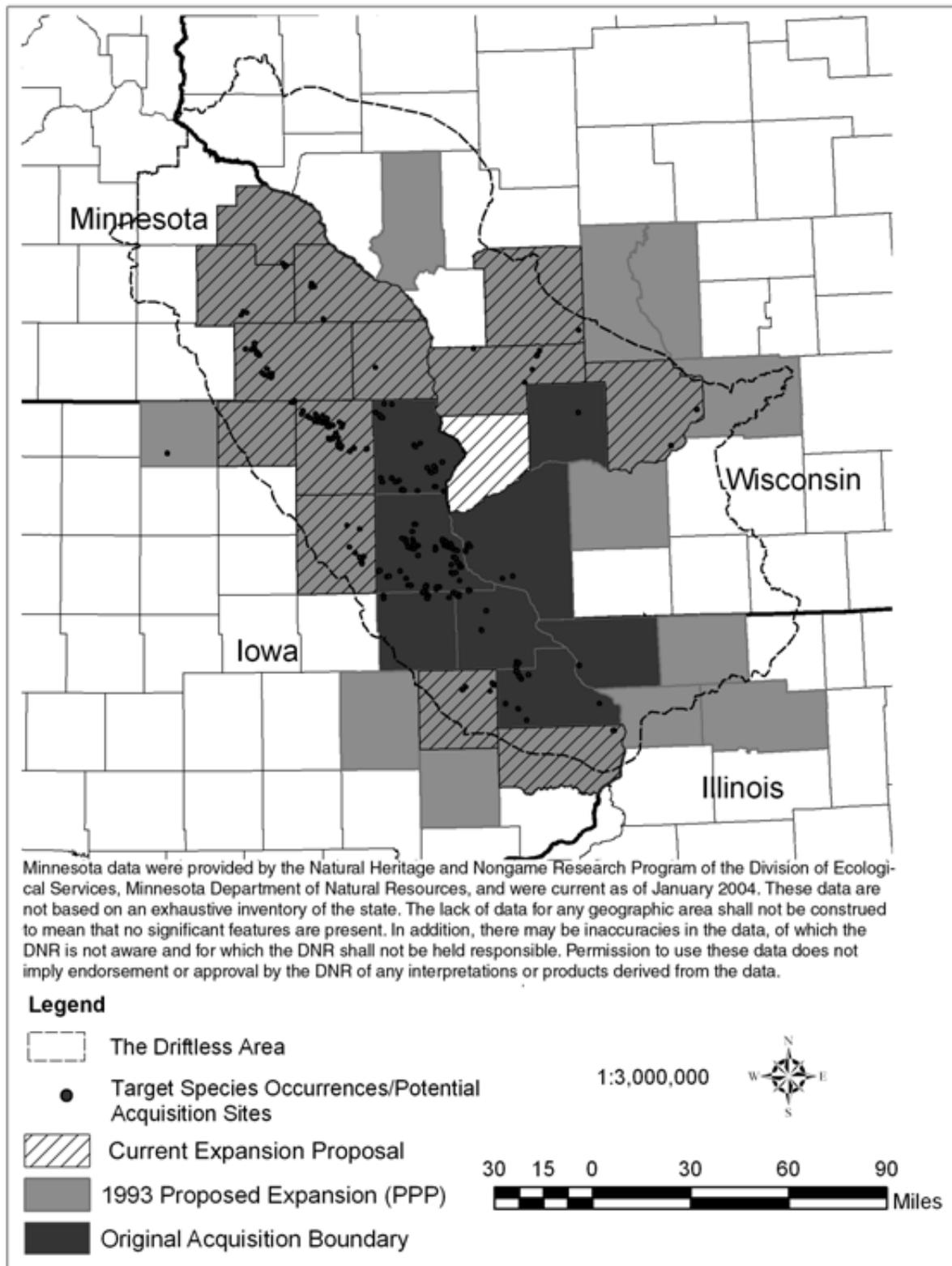
1. Courtesy of The Nature Conservancy

3.2.3 Wildlife

U.S. Fish and Wildlife Service Region 3 migratory non-game birds of management concern that may occur on the Refuge are Northern harrier, red-shouldered hawk, yellow-billed cuckoo, red-headed woodpecker, Northern flicker, sedge wren, veery, wood thrush, loggerhead shrike, blue-winged warbler, golden-winged warbler, chestnut-sided warbler, cerulean warbler, dickcissel, field sparrow, grasshopper sparrow, bobolink, eastern meadowlark. In addition to most of the above, Region 3 resource conservation priority bird species that occur in northeast Iowa, and likely on the Refuge, are Wood Duck, Mallard, Blue-winged Teal, American Woodcock, Black-billed Cuckoo, Whip-poor-will, Louisiana Waterthrush, and Kentucky Warbler (U.S. Fish and Wildlife Service 2002). Many other migratory birds such as Mourning Dove, American Robin, Eastern Bluebird, Red-bellied Woodpecker, Pileated Woodpecker, Song Sparrow, Common Yellowthroat, Red-eyed Vireo, Brown Thrasher, Yellow Warbler, Common Grackle, Red-tailed Hawk occur on the Refuge. The Partners in Flight Bird Conservation Plan for the Upper Great Lakes Plain (Knutson et al. 2001) identifies priority bird populations and habitats. Some of the following priority species do occur, or likely occur, on the Refuge: Dickcissel, Bobolink, Red-headed Woodpecker, Blue-winged Warbler, Field Sparrow, Black-billed Cuckoo, Cerulean Warbler, Acadian Flycatcher, Kentucky Warbler, Prothonotary Warbler (Hemesath and Norris 1998).

Notable resident wildlife include white-tailed deer, Wild Turkeys, Ruffed Grouse, Ring-necked Pheasant, coyotes, numerous small mammals, and timber rattlesnakes. Predators may be important in the context of impacting breeding birds on the Refuge. Trout species occurrence on the Refuge is currently limited. Declines in timber rattlesnakes are of concern to some state agencies and they are

Figure 20: Algific Talus Slopes Target Species Occurrences in the Driftless Area



listed as threatened by the State of Minnesota and are a Resource Conservation Priority species for the Service. Although they have not been seen on the Refuge, they likely occur and may occur on lands acquired in the future.



Iowa Pleistocene snail. Bob Clearwater

3.2.4 Threatened and Endangered Species

Fossil records show that the Iowa Pleistocene snail existed 400,000 years ago and was widespread in the Midwestern United States. It was thought to be extinct until discovered in Iowa in 1928. It was listed as federally endangered in 1977. It is also listed by state law as endangered in Iowa and Illinois. The Iowa Pleistocene snail is a relict species that has survived on these small areas of suitable habitat and is currently known to exist at 36 locations in Iowa and one in Illinois. The snail has narrow temperature, moisture and food requirements found only on algific talus slopes (Frest 1984). Adult shell diameter is 5-7 mm. Populations on each of the known sites vary from 500 to 10,000 individuals. Each snail colony is a separate population as migration between algific slopes is unlikely, though could occur

with flood events or transport by other animals (Ross 1999). Other glacial relict snails also appear to be restricted to algific talus slope or moderate cliff habitat and presumably cannot withstand even moderate changes in their environment (Frest 1991).

Northern monkshood was listed as federally threatened in 1973. It is also state listed as threatened in Iowa, Wisconsin, and New York, and endangered in Ohio. It does not occur in any other states, and the majority of the known populations occur in Iowa. There are 83 known sites in Iowa, 18 in Wisconsin, two in New York, and one in Ohio. Population sizes range from a few individuals to 10,000 plants. Most sites have a few hundred to 1,000 plants. Northern monkshood is a member of the buttercup family (*Ranunculaceae*) and grows on cool moist habitat including algific talus slopes and sandstone cliffs. Currently all monkshood sites on the Refuge are algific talus slopes. The plant requires specific temperature and moisture regimes (U.S. Fish and Wildlife Service 1983). Its hood shaped flower is adapted for bumblebee pollination and is typically purple in color, but can vary from white to blue and purple.

Leedy's roseroot does not currently occur on the Refuge, but future additions to the Refuge may be for the purpose of protecting this species. Leedy's roseroot was listed as threatened in 1992 and is a member of the stonecrop family (*Crassulaceae*). It grows on cool cliff habitats only in southeast Minnesota and New York. The four Minnesota populations each contain a few hundred plants. It has waxy, succulent leaves with small dark red to yellow flowers arranged in dense heads at the end of the stem. Male and female flowers occur on separate plants.

The only federally threatened or endangered bird occurring on the Refuge is the Bald Eagle, recently proposed for delisting. There are no known eagle nests on the Refuge.

3.3 Soil and Water

Soils vary because Refuge units are scattered over a large area. Most of the soils are forest derived. Some savanna and prairie soils occur, mainly on the Howard Creek unit. All of the units contain some rock outcroppings or cliffs, and rocky soils. Soils are generally erodible. Water sources are from springs and streams on, or adjacent to, the Refuge units. The primary contaminant sources are from nonpoint source runoff from adjacent agricultural fields that could contain excess nutrients and pesticides. Runoff may contaminate sinkholes and groundwater in addition to surface water. Water

quality on the Refuge has not been tested. A contaminant assessment of the Refuge has been completed by the Service's Division of Ecological Services.

3.4 Public Use

Public use is currently minimal since most units are closed to protect endangered species or because access is limited. On two Refuge units that are open, most visitation is during the hunting season. Most users are bow hunting for deer. There were 2,741 visitors in FY 2003. This figure includes visitors to the McGregor District Visitor Contact Station.

3.5 Cultural Resources

The uplands, floodplains, and tributaries of the driftless area offered a variety of resources to prehistoric populations. The area has a cultural history of 11,500 years with the Paleo-Indian peoples. Archeologists hypothesize that small family-groups of hunters-gatherers roamed widely in search of mega-fauna and other resources. The presence of these people is usually recognized through surface finds of their fluted spear points; none of these points have been identified within the Refuge.

People of the 6,000-year long Archaic tradition adapted their subsistence practices to changing environmental, habitat, and resources based changes including the 2,000-year very warm and dry altithermal that ended about 5,000 years ago. Extensive trade routes brought in exotic materials. People buried their dead in natural knolls. Archaic tradition cultural practices gradually evolved into the subsequent Woodland tradition.

Commencing around 3,000 years ago was the Woodland tradition. Archeological sites usually include pottery, arrowheads, and artificial mounds used for human burials and for other purposes. People exploited a wide range of habitats in an environment similar to that found in the early historic period. The people lived in larger, semi-permanent villages, practiced horticulture, and at some period participated in long distance trade. In some respects, Europeans coming into the Upper Mississippi River valley encountered people of the Woodland culture, some of whom may have been the ancestors of the Eastern Dakota Indians.

The Mississippian period started in the Saint Louis area about 1,000 years ago and moved up the Mississippi River. A related cultural group known as the Oneota, which may have developed from the Late Woodland culture, is more evident in the archeological record. Late Oneota people probably were the ancestors of the Ioway, Oto, Missouri, and Winnebago Indian tribes.

Twenty-seven previously identified archaeological sites are located within one mile of the 17 units studied by Commonwealth Cultural Resources Group in 2002. These study units included current Refuge lands and areas of potential Refuge acquisitions. Twenty-two of these sites are prehistoric and one is a multi-component prehistoric and protohistoric site, one includes both prehistoric and historic components, and three are historic sites. The majority of prehistoric sites cannot be assigned to a specific period.

The following listed Indian tribes have been recognized by the federal government or self-identified by the tribe as having a potential concern for traditional cultural resources, sacred sites, and cultural hunting and gathering areas in the counties in which the Refuge is located.

- # Delaware Nation of Oklahoma
- # Flandreau Santee Sioux

- # Forest County Potawatomi Community
- # Hannahville Indian Community of Michigan (Potawatomi)
- # Ho-Chunk Nation of Wisconsin
- # Iowa Tribe of Kansas and Nebraska
- # Iowa Tribe of Oklahoma
- # Osage Nation of Oklahoma
- # Otoe-Missouria Tribe
- # Peoria Indian Tribe of Oklahoma
- # Sac & Fox Tribe of the Mississippi in Iowa
- # Sisseton-Wahpeton (Sioux) Oyate
- # Devils Lake Sioux Tribal Council
- # Upper Sioux Community of Minnesota
- # Winnebago Tribe of Nebraska
- # Wyandotte Tribe of Oklahoma

Although Indian tribes are generally understood to have concerns about traditional cultural properties, other organizations such as church congregations, civic groups, and county historical societies could have similar concerns.

A cultural resources overview and management study was prepared in 2002 as part of the Comprehensive Conservation Plan for the Refuge (Commonwealth Cultural Resources Group 2003). The document is available at the Refuge office, McGregor, Iowa. The report presents a cultural history beginning 11,500 years ago through prehistoric and historic periods, ending in the 20th century. Current Refuge lands as well as potential acquisition areas were evaluated for the presence of archeological sites. Two historic sites were located on the Refuge units. The location of reported prehistorical and historic archeological sites within one mile of the Refuge units, and analysis of geomorphological data indicates high potential for unrecorded sites on most Refuge units. The document has a chapter about consultation processes identified in the National Historic Preservation Act of 1966 as amended, and a chapter that summarizes the responses to a letter sent to over 100 tribal communities, historical societies, and research groups who have potential interest in resources on the Refuge. The report concludes that a variety of cultural resources must be considered during any field projects associated with the Refuge. A comprehensive bibliography of cultural resources reports produced for studies performed within the vicinity of the Refuge is also included. Finally, a chapter on management of cultural resources under Section 106 of the National Historic Preservation Act is provided for use in Refuge management.

Cultural resources are an important part of the nation's heritage. The U.S. Fish and Wildlife Service is committed to protecting valuable evidence of human interactions with each other and the landscape. Protection is accomplished in conjunction with the U.S. Fish and Wildlife Service's mandate to protect fish, wildlife, and plant resources.

3.6 Fire

Wildfires in northeast Iowa are primarily from human caused road ditch fires that escape. Prescribed fire is used regularly on the Refuge as a habitat management tool. Periodic burning of grasslands reduces encroaching woody vegetation such as box elder. Fire also encourages the growth of desirable species such as native, warm-season grasses and forbs. Prescribed fires on the Refuge have only occurred on the Howard Creek unit and range from 10 to 60 acres depending on the goal of the burn. Burning does not occur every year. Prescribed fire may be used on other units in the future.

3.7 Socioeconomic Environment

The economy of communities near the Refuge lands are primarily based on farming with some industry and tourism jobs. Crops are mainly corn and soybean with beef and dairy cattle operations occurring in the area. Some timber harvest also occurs. Most communities in the area are under 10,000 people. The largest community is Dubuque, Iowa with a population of about 70,000.

3.8 Refuge Staff and Budget

The annual Refuge operations budget for fiscal year 2004 was \$92,285 which includes salary for one Refuge Operations Specialist (GS 9). The Refuge receives administrative, law enforcement, and maintenance support from the McGregor District of Upper Mississippi River National Wildlife and Fish Refuge. Volunteers also assist with Refuge activities.