

II. BACKGROUND

Land use issues for Felton Prairie are bound up in the geology and history of the region. When large numbers of settlers arrived on the prairies of Clay County in the late nineteenth century, they settled on the dry uplands of the beach ridges. At the turn of the century, construction equipment advanced to the point where the wet soils covering the Red River Valley floor could be drained for crop cultivation. These soils were formed by sediment transported into a large glacial lake that occupied the western two thirds of Clay County. Lake Agassiz formed 11,000 years ago as glacial ice retreated north. Bounding the lake east and west were beach ridges of sand and gravel. The native prairie plants adapted to the ridges were cut for hay or used for pasture. Because they were less desirable for cultivation compared to the ancient lakebed, the beach ridges support some of the finest native prairie left in the state of Minnesota, especially dry prairie, a community rarely found east of the great plains region. Of the estimated 614,500 acres of wet and tallgrass prairie that covered Clay County, only 18,500 remain (3%) as shown in Figure 3, (MN DNR, CD-ROM, 1997).

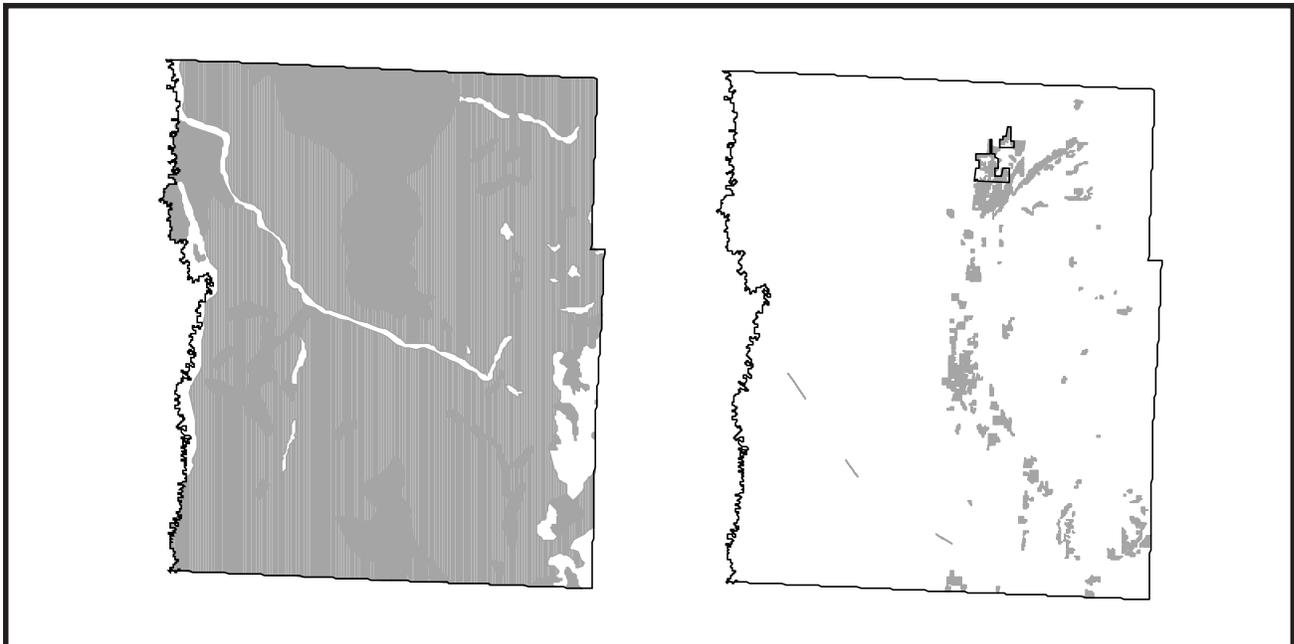


Figure 3: Estimated pre-settlement prairie found in Clay County shaded in gray, left, and what remains, right; the study area is outlined in black (MN DNR, CD-ROM, 1997).

The beach ridges are vital to economic development in the Fargo-Moorhead area because they hold the highest quality and most accessible quantity of aggregate in the region. The aggregate operations near Felton are within 20 miles of the Fargo-Moorhead metropolitan area. Although good for agriculture, the lakebed soils are not good foundation material for buildings and infrastructure like roads. They have a high shrink-swell range and are poorly drained. The gravel and sand from the beach ridges is used for construction materials like concrete and asphalt, and to provide drainage under roads and building foundations. The Red River Valley is rated by the United States Geological Survey (USGS) as an aggregate poor region (USGS, 2001). The beach ridges offer the best source of sand and gravel in the Red River valley. The aggregate industry has also provided an important source of economic diversification and income for the region.

Background & History

With the introduction of the automobile around 1903 and passage of the Federal-Aid Highway Act in 1916, road construction and the use of concrete gradually increased. In the 1930's highway engineers recognized the need for a gravel sub-base, especially in high shrink-swell soils like those in the Red River Valley. When the 1956 Federal-Aid Highway Act was passed, creating the interstate system, the demand for concrete soared nationally (American Concrete Paving Association, 2001). The post-war boom led to a similar demand in the construction industry for materials including gravel and concrete. A study of aerial photographs of the Felton area will reveal that there was little to no aggregate mining at the turn of the century. The number of mine sites increased slowly after the depression and boomed during the post-war period along with improvements to and paving of roads in the region. The use of concrete for bridges and architectural structures also increased during the same period. These trends are likely to continue as the region grows and maintains its infrastructure. Ironically, it was the success and visibility of gravel mining that led to some of the earliest efforts to conserve Felton Prairie.

A. History of Felton Prairie Conservation Activities

Concern about the future of Felton Prairie dates back nearly fifty years in documented form. In 1953 a DNR Wildlife Supervisor proposed acquisition of 893 acres in Sections 36, Felton Township, 31 and 32, Hagen Township (Figure 4). In supporting documentation for prairie preservation, D.B. Lawrence wrote:

“Felton Prairie has been examined...and all have been thrilled with its magnificence. It is a spectacular prairie with well exposed remnants of the shorelines of Glacial Lake Agassiz and portions of the pioneer wagon trail still plainly visible. From the high ridges there is a fine view westward out across the floor of the Red River Valley,” (Lawrence, 1962).

Of the 893 acres, Clay County approved 320 acres for the Felton Wildlife Management Area (WMA). Part of Lawrence's proposed acreage (Sections 31 in Hagen Township and 6 in Keene) was deeded from the state to the county through tax forfeiture in 1945. According to the deed the property was to be used “exclusively for gravel pit – to obtain gravel for use on county highways,” (Clay County, 1945). The county began mining in the current site shortly after acquisition of the property.

In 1975 The Nature Conservancy acquired the northeast quarter of Section 5 in Keene Township with financial support from Al Bloomquist and the Red River Valley Sugarbeet Growers Association. Blazing Star Prairie was dedicated as a State Scientific and Natural Area (SNA) in 1976 along with Bicentennial Prairie, a parcel leased to DNR by Clay County after vigorous debate. Boy Scout Troop #627 of Moorhead petitioned the board of commissioners to preserve 160 acres of native prairie owned by the county in Keene Township (SW ¼, Section 5). The land harbored prairie chicken booming grounds, Native American artifacts, and a large erratic boulder used as a rubbing stone by bison. After lengthy debate and petitions “for” preservation (500), and “against” (200), the county commissioners granted a ten-year, self-renewing lease to DNR as a State Scientific and Natural Area with the stipulation that the county could end the agreement in 90 days if they needed to mine aggregate on the site. A broad constituency formed to support the easement including the American Crystal Sugar Company, the Roamers 4-Wheel Drive Club, the Minnesota Prairie Chicken Society, Clay County 4-H, and the Center for Environmental Studies, a Tri-College consortium (Forum, 1975). Since that time both sites have been studied extensively and support several rare species such as the western prairie fringed orchid and the greater prairie chicken.



Figure 4: Summary of conservation activities and land agreements in the study area.

Background & History

Immediately south of the Felton WMA, the U.S. Fish and Wildlife Service acquired an easement protecting Section 1 of Flowing Township in 1990 through foreclosure procedures by the Farmer's Home Administration. In 1991 DNR acquired the land. Shrike and Assiniboia Units, north of Highway 34, were added to the system of Scientific and Natural Areas in the 1990's. The most recent acquisition has been the Shaw property east of Bicentennial Prairie SNA secured in 1998. DNR held a prairie bank easement on 80 acres of the quarter section dating back to 1989. All of these efforts attest to the importance, and occasional controversy, of the prairie lands near Felton.

B. Issues

The stewardship plan must address the following issues in order to be credible and acceptable to the parties that must implement it.

1. Aggregate Supply for Local and Regional Needs

The end product of this planning process should provide guidance in resolving land use conflicts between prairie preservation and gravel mining for the immediate future. Both are scarce and valuable resources. The problem is that gravel cannot be mined without destroying the prairie and the conditions that supported it. Topography, hydrology, and soil structure will be altered to the point where certain species cannot be restored. On the other hand, prairie offers less economic return in the short run than aggregate mining. Aggregate has been mined primarily for concrete on the state school trust fund land since 1963. To date, approximately four million cubic yards have been mined yielding the fund \$2.2 million in royalties. Clay County owns a gravel pit that supplies Class 5 road gravel for 600 miles of road maintenance on an annual basis. If mining were to cease, where would this material come from and how much would it cost to procure elsewhere?

2. Impact of Aggregate Mining on Biological Communities:

a) Loss and Fragmentation of Prairie Habitat

As seen in Figure 3 less than 3% of the presettlement prairie remains in Clay County. Of this, 14,290 acres occur in sites that have been ranked by the DNR as having high or medium biodiversity significance (MN DNR, CD-ROM, 1997). Figure 3 also illustrates the lack of connection among extant prairie remnants. Prairie species accustomed to vast, unbroken landscapes have become isolated populations on islands of prairie remnants. This fragmentation makes those populations more vulnerable to extirpation by disease, predators, and other forms of disturbance. Gravel mining is one such form of disturbance. Not only is the plant community removed, the act of mining may destroy eggs or individual species unable to escape. In addition, the soil or overburden that may lie above a gravel deposit is stored in a spoil pile. Without proper management such as weed control or a cover crop, invasive species like Canada thistle and spotted knapweed can colonize spoil piles and spread to the surrounding landscape.

b) Impacts of Mining below the Water Table on Calcareous Fens

Another issue emerged during the planning process that was not included in the original LCMR funding proposal. The north calcareous fen downslope of the State School Trust Fund mine exhibits signs of degradation. Woody vegetation has encroached on the fen indicating reduced ground water delivery to the site or a lack of prescribed burning. Another, larger fen referred to as the south fen does not exhibit the same degree of degradation. This led DNR to monitor local ground water levels in the 1990's. Calcareous seepage fens are unique, groundwater-fed wetlands. DNR has been collecting data from monitoring wells in order to understand the hydro-geologic conditions supporting the fens. Preliminary analysis of these data led to concerns that mining gravel below the water table could

impact the fens by altering ground water flows to them. Thus an initial solution to minimize prairie disturbance by deep mining could negatively impact the fens.

3. Regulatory Environment

The unique qualities of Felton Prairie may be viewed as assets for eco-tourism and promotion of the area, but for the mining industry they present additional challenges from federal and state protection of species such as the western prairie fringed orchid and Dakota skipper. The former is on the federal threatened species list which restricts actions that would harm or destroy the plant. A number of other species are state listed as endangered¹, threatened² or special concern³ and any action that would cause the mortality of individuals of a listed species requires a state permit and mitigation. The calcareous fens, described above, are protected under the 1991 Minnesota Wetlands Conservation Act (MWCA):

“Calcareous fens may not be drained or filled or otherwise altered or degraded except as provided for in a management plan approved by the commissioner. The commissioner will provide technical assistance to landowners or project sponsors in the development of management plans.” (M.R. 8420.1040)

Because of their rarity and fragility, these fens are the only wetland type regulated by DNR, all others are overseen by the Minnesota Board of Water and Soil Resources.

¹ Under Minnesota Statute 84.0895, Protection of threatened and endangered species, endangered is defined as a species “threatened with extinction throughout all or a significant portion of its range.”

² Under Minnesota Statute 84.0895, threatened is defined as a species “likely to become endangered within the foreseeable future throughout all or a significant portion of its range.”

³ Under Minnesota Statute 84.0895, “species of special concern” is defined as “extremely uncommon in this state, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.”