

Refuge for an Ice Age Survivor

by Cathy Henry



Shell markings are used in mark/recapture studies to monitor the snail's population.

USFWS photo

A tiny snail, a relict from the last great ice age, finds its home on a cool, rocky slope near the coldwater streams, cliffs, valleys, and sinkholes that make up the Driftless Area National Wildlife Refuge in Iowa. The endangered Iowa Pleistocene snail (*Discus macclintocki*) has known the meaning of refuge in more ways than one. Known from fossil records to have existed 400,000 years ago, it is one of many glacial relict species that are found in the region of northeast Iowa, northwest Illinois, southeast Minnesota, and southwest Wisconsin called the driftless area.

The rugged driftless area got its name because of early geologists' inability to find evidence of glacial drift. Though much of the area was indeed covered by glaciers about 500,000 years ago, it was bypassed by subsequent glaciers. The Iowa Pleistocene snail found its current home with desirable temperature, moisture, and food resources about 10,000 years ago as ice age conditions moderated. Certain slopes, usually north facing, are covered with a talus layer that allows ice-cooled air to exit from underground cracks and fissures. Upland sinkholes contribute to the air flow regime and are an important component of a unique system called an algific talus slope, meaning a cold producing rocky slope. Even when the outside air temperature is 90 degrees F (32 degrees C), ground temperatures on these slopes range from close to freezing (32 degrees F, or 0 degrees C) to about 55 degrees F (13 degrees C). Although the slopes will freeze in winter, the temperatures are moderated.

The Iowa Pleistocene snail now occurs nowhere else in the world but at 37 algific talus slopes in Iowa and Illinois. It was thought to be extinct until discovered in 1955 in northeast Iowa, and it was listed in 1977 as endangered. The snail is no bigger than a shirt button in diameter. It lives in the leaf litter, preferring a diet of birch and maple leaves. The snail shares its habitat with a



Right: The Northern wild monkshood is just one of the rare plants protected on the Driftless Area NWR.

Photo by Bob Clearwater



Diagram courtesy of The Nature Conservancy

host of rare and disjunct plants associated with cool habitats. The Northern wild monkshood (*Aconitum noveboracense*), a threatened plant, also grows on these sites. It is a member of the buttercup family (Ranunculaceae) and derives its name from the hood shape of its flowers, which are adapted for bumblebee pollination. Occurring on approximately 114 sites in Iowa, Wisconsin, Ohio, and New York, monkshood also grows on similar cool moist habitats such as sandstone cliffs.

The 775-acre (315-hectare) Driftless Area National Wildlife Refuge was established in 1989 to protect habitats of the Iowa Pleistocene snail and Northern monkshood. The primary objective of their respective recovery plans is providing protection for remaining colonies. Once lost, the specialized habitat cannot be restored. Concern over threats to the habitat stem from logging, grazing, filling of sinkholes, agricultural runoff, roads, and quarries. The invasion of garlic mustard (*Alliaria petiolata*) has emerged as another threat in recent

years, and the potential effects of modern global warming are yet another concern.

The refuge consists of scattered tracts of land in northeast Iowa ranging from 6 to 208 acres (2.4 to 85 ha) in size. Algific talus slopes range in size from a few square meters to 0.5 mile (0.8 km) in length. Adjacent sinkholes are also targeted for acquisition since they feed the underground system with water and airflow. Buffer areas around the slope are included when possible. Refuge partners are also protecting algific talus slopes. The Nature Conservancy, Iowa Natural Heritage Foundation, Mississippi Valley Conservancy, the Iowa Department of Natural Resources, County Conservation Boards in Iowa, and public agencies in Ohio and New York own and protect habitat for these species. Further acquisition by the refuge is planned to help meet recovery goals. A 1993 expansion proposal is being considered under recently initiated comprehensive conservation planning for the refuge to include counties in



Golden saxifrage
Photo by Bob Clearwater

Minnesota where the threatened Leedy's roseroot (*Sedum integrifolium* spp. *leedyi*) occurs. Listed in 1992, this plant occurs on only four sites in southeast Minnesota and three in New York. Refuge expansion would provide more protection for the Northern monkshood and other glacial relict snails as well. In a cooperative effort with the refuge, Iowa

**Right: Nature Conservancy intern
Connie Dettman and refuge biologist
Cathy Henry monitoring Iowa
Pleistocene snails.**
USFWS photo



and Wisconsin recently received Endangered Species Act-section 6 recovery funding to purchase two Northern monkshood sites.

At least eight other glacial relict snail species are also protected on these sites. Species like the midwest Pleistocene vertigo (*Vertigo hubrichti hubrichti*) may be more rare than the Iowa Pleistocene snail. Protection of algific talus slopes may help prevent the need for threatened or endangered status for these other snails and plants like the golden saxifrage (*Chrysosplenium iowense*).

There are over 300 algific talus slopes in the driftless area, with varying species components. Private landowners are stewards of many algific talus slopes. Landowners with endangered species on their property have been contacted by the refuge and The Nature Conservancy. Funding under the Service's Endangered Species Landowner Incentives Program allowed voluntary fencing to be completed to exclude cattle from five algific talus slopes.

Of course, the goal is recovery. To gauge progress over the years, we are monitoring the Northern monkshood and experimenting with monitoring methods for the Iowa Pleistocene snail. A mark-recapture study was initiated in 2000 with the assistance of Iowa State University. The Nature Conservancy of Iowa placed an intern at the refuge office recently to conduct monitoring and work on TNC preserves. The Iowa DNR has assisted with monitoring and identification of acquisition sites. With all of these efforts, barring effects of global warming, these species can someday be recovered as secure representatives of ice age history.

Cathy Henry is a Refuge Operations Specialist at the Driftless Area NWR in McGregor, Iowa (563/873-3423, ext. 5; cathy_henry@fws.gov).