

# Development of monitoring protocol for the Iowa Pleistocene snail

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## Goals and Objectives:

This study is an effort to develop and apply methods for the monitoring of the Iowa Pleistocene snail (*Discus macclintockii*), a federally endangered species, that occurs in isolated algific slope habitats in northeastern Iowa. This information will be used by the Refuge and cooperating partners to insure the long-term conservation of this species. Specific objectives include:

1. We will develop a sampling protocol using a combination of cover boards and plots to survey snail populations. An effort will be made to sample multiple sites that include NWR lands, Iowa DNR and Nature Conservancy preserves and privately owned sites.
  2. We will estimate population size on individual sites given these basic recapture data. Assessment of the statistical reliability of these estimates will be provided.
  3. We will suggest field sampling that will include measurements of habitat characteristics such as soil temperature, moisture, and disturbance that might be related to long-term population trends.
  4. We will construct survey designs for long-term monitoring that would determine if the populations are increasing, decreasing, or remaining stable. Monitoring surveys will consider specific methods to be used, the amount of sampling needed, periodic sampling, potential damage to the habitat, statistical reliability, and necessary effort.
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## Progress:

A first draft of the population monitoring protocol report was completed June 2002 and submitted to Cathy Henry of the Driftless Area NWR. Between June and September 2002 we combined information and revised the draft report. A final draft of the population monitoring protocol (Henry et al. 2002) was completed and sent out for comment in October 2002.

This study was designed to explore options for monitoring trends in Pleistocene snails within and among slopes in Iowa. Monitoring of the population is required under the current recovery plan, but resources for intensive sampling are limited. A basic premise of the approach was that monitoring would require a combination of intensive and extensive methods. Presently about 60% of the 37 slopes are protected. We considered how to sample individual slopes, how to assess spatial variation within slopes, and how to allocate effort among slopes. We considered demographic monitoring only, although population viability might depend on genetic variability in small populations.

Capture models that account for both time and heterogeneity in capture probabilities fit the data well. Estimates for sampled area (32" x 48" = 10.67 ft<sup>2</sup>, 0.991 m<sup>2</sup>) are given below. Density estimated from the recapture surveys ranged from about 28 snails/m<sup>2</sup> on slope 83-207 to about 400 snails/m<sup>2</sup> at slope 86-281. Sampling by counting all snails observed during 3 minutes on 0.5 m<sup>2</sup> quadrats was a much less effective method of estimating snail density because the probability of observing snails is much lower than it is with the boards. Although this method may have the advantage of disturbing the site somewhat less than with boards, it is not suitable for consistently estimating snail abundance.

Air temperature and soil temperature had some minor influence on snail activity but no variable was useful as a consistent predictor of habitat quality. Spatial variability among locations within slopes was important in the estimation procedure and was significantly greater when snail density was lower. The limitations on sampling effort required that we estimate an average correction ratio from samples at 4 slopes. The relationship among slopes was nonlinear and the variance was great. Estimates of total snails captured was consistent with random sampling and mark-recapture estimates but the variance on the estimated totals were very poorly estimated.

## Conclusions and Recommendations:

We conclude that the effort required to sample the *Discus* population and the potential disturbance to the habitat should be considered in executing the recovery plan. On the one hand, it is not possible to detect population trends without 10 years of sampling, preferably by the means outlined in the report. On the other hand, based on our study it is reasonable to question whether the existing recovery plan should be revisited to set more realistic goals.