

Chapter Fourteen

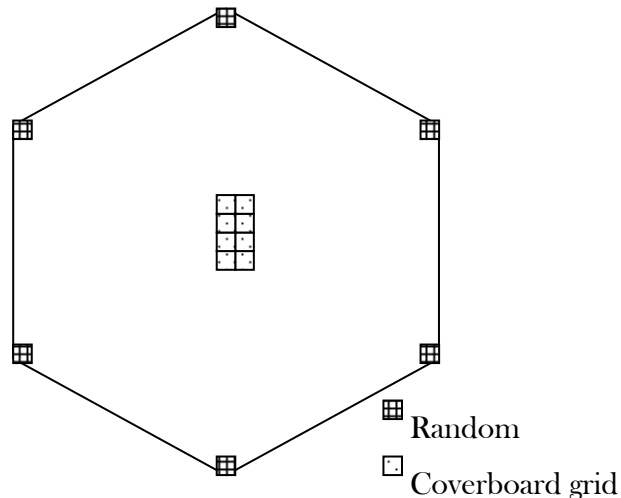
Terrestrial Snail Monitoring Protocol

There are no protocols for these species in the USFS MSIM. However, the US Fish and Wildlife Service has developed a protocol for monitoring the Iowa Pleistocene snail (Henry et al. 2003) which has been adapted below to find terrestrial snails of other species in additional habitats. The Iowa WAP (Zohrer et al. 2005) has designated 8 terrestrial snails as species of greatest conservation concern. The Plan also states that there is no comprehensive list of terrestrial snail species occurrence in Iowa.

IOWA SNAIL MONITORING:

While the 9 species of greatest conservation need are all associated with Algific slopes, Iowa needs additional information as to the other terrestrial snails that may occur within the state in other habitats. Therefore this protocol can be implemented at every permanent sampling location.

Coverboards are the primary method that will be used to monitor terrestrial snails. These boards are smaller than those used in the Amphibian & Reptile protocol, although all snails and herpetofauna encountered under either size of board should be recorded. For snails, two different coverboard arrangements will be used at each 26 acre (10.5 hectare) site. A grid of 8 boards will be used near the center point of the hexagon. Remember that the hexagonal sampling plot is centered on the primary habitat classification for that site. This grid of coverboards should ensure that the given habitat type is adequately sampled. In addition 6 coverboards will be placed within the hexagon such that 1 board occurs at each hexagon point.



SURVEY METHODS:

All coverboards should be 8 x 24 inches (20.3 x 70 cm) and made of either cardboard or wood (basswood or oak species of wood). It is important that the wood not be treated with chemicals. Alternatively, corrugated cardboard may be better in some habitats. The coverboards need to

be able to remain moist (Anderson 2004, Henry et al. 2003). Materials that dry quickly should not be used. Each of the 6 boards placed at the bird point count locations (so 1 board per location) should be marked in a grid pattern as that in Figure 2. Each block is 2 x 2 inches (5 x 5 cm) in size. These individual coverboards are important in two respects. The first is in monitoring additional habitats associated with a sampling area, provided that the hexagonal points fall in habitats other than that used for the site classification. The second reason for using the additional coverboards is for the assessment of spatial aggregation (Henry et al. 2003). Should snail populations be declining, it is conceivable that this could manifest in an increased aggregation of the remaining individuals in suitable habitat (Henry et al. 2003).

Grid pattern on each of the coverboards placed at each hexagonal point.

1,4	2,4	3,4	4,4	5,4	6,4	7,4	8,4	9,4	10,4	11,4	12,4
1,3	2,3	3,3	4,3	5,3	6,3	7,3	8,3	9,3	10,3	11,3	12,3
1,2	2,2	3,2	4,2	5,2	6,2	7,2	8,2	9,2	10,2	11,2	12,2
1,1	2,1	3,1	4,1	5,1	6,1	7,1	8,1	9,1	10,1	11,1	12,1

By recording the location of the snails on the grid, additional data analysis can be conducted with regard to distance traveled. This is very little additional work (recording location on a grid) for potentially large information gain.

The grid of coverboards, placed near the center point of the hexagonal sampling plot, should be numbered as above except that these numbers will range from 1,1 to 24,16 as seen in Figure 3. All coverboards should be soaked in water before being deployed – preferably in water on the sampling site (creek, pond, etc.). Periodically the soil underneath the coverboard should be soaked with water to maintain the moisture level.

The design of this protocol calls for these coverboards to be checked every time the site is visited by any given technician. This should result in at least 19 checks between April and October.

Snails may live for 3 or more years. Since they are also not believed to travel long distances (although no data has been published on this, a FWS study indicates that if the Iowa Pleistocene snail moved constantly in a straight line it would disperse 14.7 m in a year (Henry et al. 2003)), it may be prudent to permanently mark snails.

To mark snails, colored, numbered bee tags can be glued onto the shell with superglue. Henry et al. (2003) recommend that the numbers 6 and 9 be avoided and that juvenile snails less than 5 mm in length be marked with paint. Shell diameter and height should be measured to the nearest 0.5 mm and the height and width of the shell opening should be measured as well. The number of whorls of the shell should also be recorded.

Figure 2: Grid pattern on the coverboards placed near the center of the hexagon. Dark lines indicate coverboard edges.

1,16	2,16	3,16	4,16	5,16	6,16	7,16	8,16	9,16	10,16	11,16	12,16	13,16	14,16	15,16	16,16	17,16	18,16	19,16	20,16	21,16	22,16	23,16	24,16
1,15	2,15	3,15	4,15	5,15	6,15	7,15	8,15	9,15	10,15	11,15	12,15	13,15	14,15	15,15	16,15	17,15	18,15	19,15	20,15	21,15	22,15	23,15	24,15
1,14	2,14	3,14	4,14	5,14	6,14	7,14	8,14	9,14	10,14	11,14	12,14	13,14	14,14	15,14	16,14	17,14	18,14	19,14	20,14	21,14	22,14	23,14	24,14
1,13	2,13	3,13	4,13	5,13	6,13	7,13	8,13	9,13	10,13	11,13	12,13	13,13	14,13	15,13	16,13	17,13	18,13	19,13	20,13	21,13	22,13	23,13	24,13
1,12	2,12	3,12	4,12	5,12	6,12	7,12	8,12	9,12	10,12	11,12	12,12	13,12	14,12	15,12	16,12	17,12	18,12	19,12	20,12	21,12	22,12	23,12	24,12
1,11	2,11	3,11	4,11	5,11	6,11	7,11	8,11	9,11	10,11	11,11	12,11	13,11	14,11	15,11	16,11	17,11	18,11	19,11	20,11	21,11	22,11	23,11	24,11
1,10	2,10	3,10	4,10	5,10	6,10	7,10	8,10	9,10	10,10	11,10	12,10	13,10	14,10	15,10	16,10	17,10	18,10	19,10	20,10	21,10	22,10	23,10	24,10
1,9	2,9	3,9	4,9	5,9	6,9	7,9	8,9	9,9	10,9	11,9	12,9	13,9	14,9	15,9	16,9	17,9	18,9	19,9	20,9	21,9	22,9	23,9	24,9
1,8	2,8	3,8	4,8	5,8	6,8	7,8	8,8	9,8	10,8	11,8	12,8	13,8	14,8	15,8	16,8	17,8	18,8	19,8	20,8	21,8	22,8	23,8	24,8
1,7	2,7	3,7	4,7	5,7	6,7	7,7	8,7	9,7	10,7	11,7	12,7	13,7	14,7	15,7	16,7	17,7	18,7	19,7	20,7	21,7	22,7	23,7	24,7
1,6	2,6	3,6	4,6	5,6	6,6	7,6	8,6	9,6	10,6	11,6	12,6	13,6	14,6	15,6	16,6	17,6	18,6	19,6	20,6	21,6	22,6	23,6	24,6
1,5	2,5	3,5	4,5	5,5	6,5	7,5	8,5	9,5	10,5	11,5	12,5	13,5	14,5	15,5	16,5	17,5	18,5	19,5	20,5	21,5	22,5	23,5	24,5
1,4	2,4	3,4	4,4	5,4	6,4	7,4	8,4	9,4	10,4	11,4	12,4	13,4	14,4	15,4	16,4	17,4	18,4	19,4	20,4	21,4	22,4	23,4	24,4
1,3	2,3	3,3	4,3	5,3	6,3	7,3	8,3	9,3	10,3	11,3	12,3	13,3	14,3	15,3	16,3	17,3	18,3	19,3	20,3	21,3	22,3	23,3	24,3
1,2	2,2	3,2	4,2	5,2	6,2	7,2	8,2	9,2	10,2	11,2	12,2	13,2	14,2	15,2	16,2	17,2	18,2	19,2	20,2	21,2	22,2	23,2	24,2
1,1	2,1	3,1	4,1	5,1	6,1	7,1	8,1	9,1	10,1	11,1	12,1	13,1	14,1	15,1	16,1	17,1	18,1	19,1	20,1	21,1	22,1	23,1	24,1

HABITAT & PLANT COMPOSITION DATA COLLECTION:

Environmental variables such as air and soil temperature and other weather conditions should be recorded at the time of the survey on the snail monitoring data sheet. See chapter 19 for information on terrestrial habitat and plant composition measurements and chapter 20 for habitat data collection in aquatic areas. As the same areas will be searched for birds and mammals, no additional habitat data is expected to be collected under the terrestrial snail protocol. However, terrestrial snail technicians should coordinate with other crews to ensure that all needed habitat data is collected.

EQUIPMENT NEEDED:

14 Coverboards - 8 x 24 inches (20.3 x 70 cm) and of oak, basswood wood, or corrugated cardboard. These should already have the grid drawn on them.

Water to maintain moisture under boards

Bee tags and superglue, paint for juvenile shells

Calipers or ruler

Hand lens

Plastic baggies

Paper towels

Air and soil thermometers

Field guides

Dissecting scope at lab or office

Standard field kit: Clip board, pencils, ruler, small scissors, Sharpie markers, compass, hand sanitizer, & data sheets.

STAFF & TRAINING:

Two weeks of training is recommended and should include 1) field guide use and id, 2) trips to University museums to discuss defining species characteristics, 3) field practice with an experienced observer, and 4) proficiency testing. Crews will also need training on habitat data collection.

DATA QUALITY & MANAGEMENT:

Snail species may be difficult to identify and this will be difficult to rate for quality unless snails are collected and sent for identification. All snail shells that are found should be collected for species confirmation. Other than species identification this protocol should be straightforward to implement. Many species will need to be collected alive and transported to the lab to be identified with the aid of a dissecting scope.

At the end of each trapping day, each observer should review data sheets to ensure all information present. At the end of the week, the field crew leader should review the collected data sheets as well.

DATA ANALYSIS:

The species occurrence data can be analyzed using Program PRESENCE (MacKenzie et al. 2002) or the 'occupancy estimation' or 'robust design occupancy' data type choices in Program MARK (White and Burnham 1999) which will calculate probability of detection estimates and proportion of points occupied. Given the distance between the coverboards (about 200 m), the

6 outer boards and the center group of boards could be analyzed as 7 different areas because snails are thought to be capable of moving less than 15 meters in a year (Henry et al. 2003).

If the boards are visited each day for 4 - 5 days, population size estimates and survival probabilities can be computed for each of the 7 areas in the hexagon as well, depending upon the number of recaptures found on the boards. This can be done with Program MARK as well. See Chapter 5 (Data Analysis) for additional information on these techniques.

SAFETY ISSUES & CONSIDERATIONS:

Proper hygiene should be followed after handling snails.

TARGET SPECIES:

Target snail species:

Common Name	Scientific Name	Habitat
Iowa Pleistocene snail	<i>Discus macclintocki</i>	Algific slopes
Frigid ambersnail	<i>Catinella gelida</i>	Algific slopes
Minnesota Pleistocene snail	<i>Novasuccinea n. Sp. minnesota a</i>	Moderate slopes
Iowa Pleistocene succinea	<i>Novasuccinea n. Sp. minnesota b</i>	Moderate slopes
Briarton Pleistocene snail	<i>Vertigo brierensis</i>	Algific slopes
Hubricht's vertigo	<i>Vertigo hubrichti</i>	Algific slopes
Iowa Pleistocene vertigo	<i>Vertigo iowaensis</i>	Algific slopes
Bluff vertigo	<i>Vertigo occulta</i>	Limestone or dolomite cliffs & outcrops

ADDITIONAL METHODS FOR SPECIAL LOCATIONS:

Time Constrained Searching

The time constrained search method has not been as successful in detecting terrestrial snails as the coverboard method (Henry et al. 2003 and unpublished references therein). However, this represents a more traditional method. To do this, the observer searches through litter and under rocks and logs to find terrestrial snails. An additional spin on this method is to collect the litter layer and bring it into the lab for sorting and species identification (Kappes 2005). This method is more destructive to both the habitat and the snail population and is not recommended.

SUGGESTED FIELD GUIDES:

Leonard, AB. 1959. Handbook of Gastropods in Kansas. The State Printing Plant. Topeka, Kansas.

LITERATURE CITED:

- Anderson, T. (2004, September 16). Callused Vertigo (*Vertigo authur*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/callusedvertigo.pdf> [Last accessed December 6, 2006].
- Henry, C, WR Clark, MJ Burns, C Dettman. 2003. *Population Monitoring for the Iowa Pleistocene Snail (Discus macckintocki)*. USFWS. Driftless Area National Wildlife Refuge. MacGregor, IA. 32 pp.
- Kane, KL, EE Klaas, KL Anderson, PD Brown, and RL McNeely. 2003. The Iowa Gap Analysis Project Final Report. Iowa Cooperative Fish and Wildlife Research Unit, Iowa State University, Ames, Iowa.
- Kappes, H. 2005. *Influence of Coarse Woody Debris on the Gastropod Community of a Managed Calcareous Beech Forest in Western Europe*. Journal of Molluscan Studies. 71: 85-91.
- MacKenzie, DI, JD Nichols, GB Lachman, S Droege, JA Royle, and CA Langtimm. 2002. *Estimating Site Occupancy Rates when Detection Probabilities are Less than One*. Ecology. 83: 2248-2255.
- Manley, PN, B Van Horne, JK Roth, WJ Zielinski, MM McKenzie, TJ Weller, FW Wackerly, and C Hargis. 2004. Multiple Species Inventory and Monitoring Technical Guide. Review Draft. USDA Forest Service, Washington Office, Ecosystem Management Coordination Staff, Wildlife Fish Watershed Air Research Staff.
- White, GC, and KP Burnham. 1999. *Program MARK: Survival Estimation from Populations of Marked Animals*. Bird Study. 47: 120-138.
- Zohrer et al. 2005. The Iowa Comprehensive Wildlife Conservation Plan.

Terrestrial snail data: DATE: _____ OBS: _____ pg ____ of ____

LOCATION: _____ VISIT #: _____ Start time: _____ End time: _____

Air Temp (°C): _____ Soil Temp (°C): _____ %clouds: _____ Rain: _____ Wind spd: _____

Comments: _____

Lo=Location=center point (C) or outer edge (O) of hexagon. Bo #=Board #. Rc=Recapture=Y or N. Aperture = shell opening (where snail body goes). All measurements are in mm.

Lo	Bo #	Species	Mark color and number	Rc	Shell height	Shell width	Aperture height	Aperture width	Comments

Data entered: date: _____ by: _____ Record #s: _____ date checked: _____ by: _____