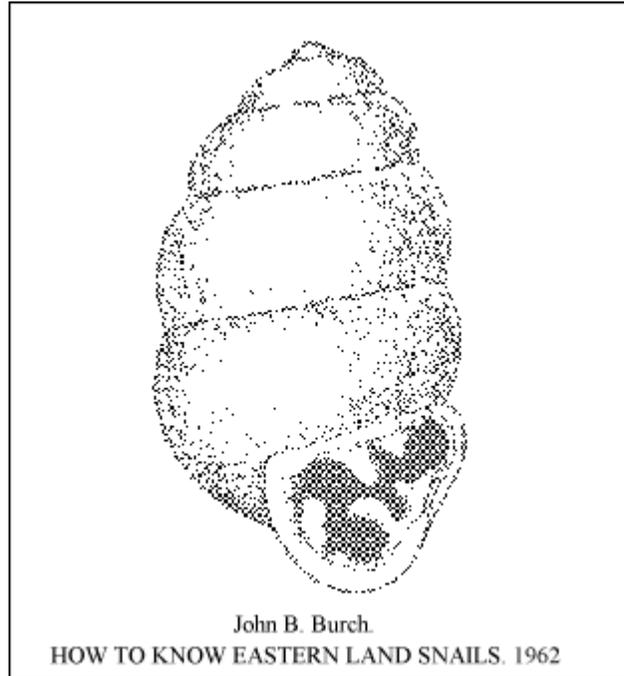


*Conservation Assessment
for
Delicate Vertigo (Vertigo bollesiana) (E. S. Morse, 1865)*



USDA Forest Service, Eastern Region

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This document is undergoing peer review, comments welcome

This Conservation Assessment was prepared to compile the published and unpublished information on the subject taxon or community; or this document was prepared by another organization and provides information to serve as a Conservation Assessment for the Eastern Region of the Forest Service. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject taxon, please contact the Eastern Region of the Forest Service - Threatened and Endangered Species Program at 310 Wisconsin Avenue, Suite 580 Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

This is a draft Conservation Assessment providing a summary of readily available

information on the distribution, ecology, habitat and population biology of *Vertigo bollesiana*, a terrestrial snail, in the Great Lake States. This document was compiled to assist in writing the Conservation Assessment for the Niagara Escarpment Community.

Vertigo bollesiana is known to occur in the eastern United States. Populations have been found in Maine, New Hampshire, Vermont, Massachusetts, New York, Virginia, West Virginia, North Carolina, Tennessee, Kentucky, Ohio, Wisconsin, Iowa and Michigan (Nekola 1998b).

This species tolerance of environmental change is unknown (NatureServe 2000). Nekola (1998b) reported this species does not respond well to disturbance and seems to be limited to sites which have not been disturbed for at least 100 years.

There is very little information published on this species. *Vertigo bollesiana* is not listed on the state of Michigan Threatened and Endangered List or for any other state in the Great Lakes.

Generally, threats to this and other gastropod species are loss of habitat to development, agriculture and some types of forestry management (Frest 1991, Nekola and Frest, 1996 and Nekola 1998b). Where land snail populations are present, forest clearing has negative impacts as well as any activities that may alter groundwater flow (Nekola 1998a). Threats to *Vertigo bollesiana* probably involve chiefly habitat loss and exploitation (NatureServe 2000). Specific threats to populations found by Nekola are quarrying and timber harvest in adjacent uplands to a population (Nekola 1998b). Acid rain likely impacts this species (D. Cuthrell, personal communication 2001).

Research is needed into the habitat needs and tolerances of this species. The relationships of different populations should be examined across the range (NatureServe 2000).

ACKNOWLEDGEMENTS

Information was provided by the following individuals: Dr. Michael Hoggarth, Associate Professor and Chair, Department of Life and Earth Sciences, Otterbein College, Westerville, Ohio; Dave Cuthrell, Michigan Natural Features Inventory; Daryl Howell, State of Iowa, Department of Natural Resources. Laura Hutchinson, Library Services Leader, North Central Research Station in St. Paul Minnesota conducted a literature search on this species. Julie Williams compiled the State Endangered, Threatened and Sensitive Species lists for the majority of the states within the continental U.S. and Canadian provinces.

NOMENCLATURE AND TAXONOMY

Scientific name: *Vertigo bollesiana* (E. S. Morse, 1865)

Subspecies:	None
Common name:	Delicate Vertigo
Order:	Stylommatophora
Family:	Pupillidae
Synonym (s):	No synonyms

DESCRIPTION OF SPECIES

The shell length of *Vertigo bollesiana* is <1.75 mm. It is very similar to a more common *Vertigo* species, *V. gouldii*. It can be distinguished from *V. gouldii* by its smaller size, more conical shape, indistinct striae, and deeper depression over the palatal lamellae (Nekola 1998b).

LIFE HISTORY

No data published.

HABITAT

Vertigo bollesiana is found in leaf litter on wooded hillsides and in marshes (M. Hoggarth, personal communication 2001). In the Upper Peninsula of Michigan all sites discovered in the past three years have been associated with carbonate cliffs, igneous outcrops and lakeshore ledge habitat (Sjogren 2000). Site specific habitat most frequently was north-northwest exposed limestone outcrops with dense growth of *Thuja occidentalis*, *Tsuga canadensis* and *Acer saccharum* and occasionally *Betula lutea* (Nekola 1998b). This species has also been found on basalt cliff. In Minnesota, it occupies algific slopes and moderate cliffs (NatureServe 2000). In eastern and northwestern Wisconsin and northeastern Iowa, *Vertigo bollesiana* is restricted to wooded carbonate or igneous outcrops and algific talus slopes (Nekola and Frest. 1996, Nekola 1998b).

DISTRIBUTION AND ABUNDANCE

Rangewide/Regionwide

The range of this species includes southern Ontario, north to Lake Temagami. In the United States this species is known in Maine, Massachusetts, New Hampshire, New York, Indiana (M. Hoggarth, personal communication 2001), Michigan, Virginia, eastern Tennessee (M. Hoggarth personal communication 2001, NatureServe 2000), Iowa, Kentucky, Minnesota and Wisconsin (NatureServe 2000). NatureServe 2001 also lists records occurring in North Carolina, West Virginia and Ohio (NatureServe 2000) but

these three states are not included in the U.S. and Canada State/Province distribution chart in the NatureServe comprehensive report. This species is known from 20 sites in the eastern United States, two in southeastern lower Michigan (Sjogren 2000). In 4 Upper Peninsula counties, most of the sites containing *Vertigo bollesiana* had fewer than 10 individuals (Nekola 1998b).

Status in the Great Lakes Region

Table 1. State Ranks for *Vertigo bollesiana*

State	State Threatened/Endangered or Special Concern Listing	State/Province Heritage Status Ranks
Illinois	Not listed as T/E or SC	No rank
Indiana	Not listed as T/E or SC	No Rank
Michigan	Not listed as T/E or SC	S2
Minnesota	Not listed as T/E or SC	S2 (NatureServe 2000)
New York	Not listed as T/E or SC	No Rank
Ohio	Not listed as T/E or SC	Recommended Endangered (M. Hoggarth personal communication 2001)
Ontario	Not listed as T/E or SC	S3
Pennsylvania	Not listed as T/E or SC	No Rank
Wisconsin	Not listed as T/E or SC	S3S4

This species was ranked in Iowa (SU), Kentucky (S1), Tennessee (S2) and Virginia (S1) (NatureServe 2000). State threatened, endangered and sensitive species lists were not located for Alaska, Florida, Georgia, Idaho, Kansas, Maine, Maryland, New Hampshire, New Jersey, North Carolina, Rhode Island, Texas and West Virginia.

State Rank: S1= Critically Imperiled; extreme rarity or because of some factor of its biology making it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1,000). S2= Imperiled; rarity or because of other factors making it very vulnerable to extirpation from the state. Typically 6 to 220 occurrences or few remaining individuals (1,000 to 3,000). S3= Vulnerable; rare and uncommon, or found only in restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 to 10,000 individuals. S4=Apparently Secure; uncommon but not rare, and usually widespread in the state. Possible cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals. SU= Unrankable; currently unable to rank due to lack of information or due to substantially conflicting information about status or trends.

Global Rank: The global rank G3 was assigned May 24, 1994 and re-evaluated October 8, 2002. G3=Rare to uncommon; usually between 20 and 100 occurrences may have fewer occurrences, but with a larger number of individuals in some populations; may be susceptible to large-scale disturbances. The reasons that rank G3 was assigned was it's

widely scattered distribution and little is known about it's life history and habitat (NatureServe 2001). It's Global trend is declining (NatureServe 2000).

Due to the low number of sites with occurrence of this species and it's rarity at these sites combined with it's apparent sensitivity to disturbance, Nekola (1998b) suggested that this species should be listed by the Michigan DNR in the State of Michigan.

Table 2. *Vertigo bollesiana* Occurrence in the Great Lake States by County, State and Year*

State	County of Occurrence	Number of Occurrences and Year
Illinois	Not tracked by Natural Heritage in this state.	
Indiana	Not tracked by Natural Heritage in this state.	
Michigan	Chippewa County Delta County Gogebic County Ontonagon County	3 occurrences 5 occurrences 1 occurrence 4 occurrences Occurrence info. from Nekola (1998b), this species is not tracked by the Michigan Natural Features Inventory.
Minnesota	Two southern counties (M. Hoggarth personal communication 2001), three Known populations within SE Minnesota (NatureServe 2000).	This species is not tracked by Natural Heritage in this state.
New York	Not tracked by Natural Heritage in this state.	
Ohio	Only one county in the entire State has an occurrence of this species (M. Hoggarth personal communication 2001)	Not tracked by Natural Heritage in this state.
Ontario	Not tracked by Natural Heritage in this province.	
Pennsylvania	Not tracked by Natural Heritage in this state.	
Wisconsin	Door County Brown County	Not tracked by Natural Heritage in this state.

County occurrence information from Michigan Natural Features Inventory, Michigan County Element List-September 1999, Wisconsin Natural Heritage Program, Rare Species and Natural Communities, NHI Working List by County, Indiana Natural Heritage Data Center, List of Endangered, Threatened, and Rare Species by County,

November 16, 1999, Ontario Natural Heritage Information Centre, Rare Species Query by County query ran 1/9/01.

Occurrences are also known in 3 counties in Iowa, 4 counties in West Virginia, 1 county in Tennessee, 2 counties in New York and counties in Georgia, Massachusetts, Vermont, New Hampshire and Maine (Nekola and Frest 1996).

POPULATION BIOLOGY AND VIABILITY

Not known.

POTENTIAL THREATS AND MONITORING

Present or Threatened Risks to Habitat or Range

This species does not respond well to disturbance and seems to be limited to sites which have not been disturbed for at least 100 years (Nekola 1998b). *Vertigo bollesiana* has been found to inhabit algific and manderate sites (NatureServe 2000). Frest (1991) reported on threats to these habitats. Manderate cliffs and algific sites share the same physical features and origins and threats to both habitat types are similar. Threats include physical filling of upland sinks with trash or soil, discharge of agricultural pollutants such as pesticides, herbicides and fertilizers, grazing, human traffic, removal or clearing of vegetation, road building, quarrying; spelunking and rock climbing are minor but a real problem on some sites and have caused extirpation of at least one snail colony known by Frest (1991).

Table 3. *Threats or Risks to Vertigo bollesiana and Habitat by Forest*

Forest	Risk or Threat
Chequamegon-Nicolet	Not on RF Sensitive Species list for the Cheq-Nicolet.
Chippewa	Not on RF Sensitive Species list for the Chippewa.
Hiawatha	At the one location this species is known on the Hiawatha NF, habitat is not directly impacted by management actions due to rocky cliffs.
Huron-Manistee	Not on RF Sensitive Species list for the Huron-Manistee.
Ottawa	Not on RF Sensitive Species list for the Ottawa.
Superior	Not on RF Sensitive Species list for the Superior.

Commercial, Recreational, Scientific or Educational Overutilization

Exploitation is a probable threat to this species (NatureServe 2000). Collecting and research pressures are substantial problem on the more fragile sites (Frest 1991).

Disease or Predation

None known. Their small size precludes them from being preyed upon by most mammals (D. Cuthrell, personal communication 2001).

Inadequacy of Existing Regulatory Mechanisms

None documented.

Other Natural or Human Factors Affecting Continued Existence of Species

None documented.

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION

The three populations of *Vertigo bollesiana* in Minnesota are largely on State Wildlife Management Area property (NatureServe 2000). The use of buffer zones sufficient to protect the hydrology at and above cliff faces should be used. The one occurrence in Michigan is on the National Forest. Ownership was not recorded for all sites.

SUMMARY OF EXISTING MANAGEMENT ACTIVITIES

None known.

PAST AND CURRENT CONSERVATION ACTIVITIES

None known.

RESEARCH AND MONITORING

Existing Surveys, Monitoring and Research

Dr. Jeffery Nekola surveyed this species along with other snail species and reported findings in Land Snails of Door Peninsula Natural Habitats, Final Report Wisconsin Chapter, The Nature Conservancy and a study for the Michigan Department of Natural Resources Nongame Wildlife Fund, Terrestrial Gastropods Inventory of the Niagaran Escarpment and Keweenaw Volcanic Belt in Michigan's Upper Peninsula. Wayne Grimm, Ontario, studied snails on Drummond Island, no publication was found, unable to contact him. The National Biological Information Infrastructure (NBII) was searched for this species at <http://search.usgs.gov/nbii/query>, no matches were found. A query on *Vertigo bollesiana* conducted at North Central Research Station found no research articles on this land snail.

Survey Protocol

Samples are collected from various habitats, larger land snails are collected by hand and placed in plastic snap vials. Four liter litter samples are used to collect smaller taxa. At woodland sites, concentrate collections at places of abundance of larger snails, along the

base of cliffs, rocks, trees, soil covering ledges or at microclimates such as cold air vents on a cliff face. In open sites collect small blocks of turf (ca 125 cm³) or loose soil and leaf litter accumulations under or adjacent to cobbles, boulders or shrubs (Nekola 1998b) or from hummock sides, undisturbed places or swales (Nekola and Frest 1996). Samples could also be taken under shrubs (Nekola and Frest 1996). At the lab, use a low-temperature soil oven to slowly and completely dry the samples. Once dry, soak the samples in water for 3-24 hours and sieve. Use a neutral-brown background, binocular microscope and sable brush to separate shells for identification (Nekola 1998b).

RESEARCH PRIORITIES

This species tolerance of environmental change is unknown (NatureServe 2001).

REFERENCES

Cuthrell, D. 2001. Personal communication. Threats and predation of snails.

Frest, T. J. 1991. Summary Status Reports on Eight Species of Candidate Land Snails from Driftless Area (Paleozoic Plateau), Upper Midwest. Final Report USFWS R3, pp. 14-15.

Hoggarth, M. 2001. Personal communication , Snail species.

Indiana Natural Heritage Data Center, List of Endangered, Threatened and Rare Species by County.

<http://www.ai.org/dnr/naturpr/species/index.htm>.

Michigan Natural Features Inventory. Michigan County Element List, September 1999. http://www.dnr.state.mi.us/wildlife/heritage/mnfi/lists/1999_county_lists.pdf. 98 pp.

NatureServe: An online encyclopedia of life [web application]. 2000. Version 1.2. Arlington, Virginia USA: Association for Biodiversity Information. Available: <http://www.natureserve.org/> (Accessed: February 3, 2001). 4 pp.

NatureServe Explorer: An online encyclopedia of life [web application]. 2002. Version 1.6. Arlington, Virginia USA: Association for Biodiversity Information. Available: <http://www.natureserve.org/> (Accessed: January 2, 2003). 4 pp.

Nekola, Jeffery, C. and T. Frest. 1996. Land Snails of Door Peninsula Natural Habitats. Final Report, Wisconsin Chapter of The Nature Conservancy. 97 pp.

Nekola, Jeffery, C. 1998a. Personal communication with Kirstin Seleen, message subject: Snails of the Niagara Escarpment. 1 pp.

Nekola, Jeffery, C. 1998b. Terrestrial Gastropod Inventory of the Niagarian Escarpment

and Keweenaw Volcanic Belt in Michigan's Upper Peninsula. 133 pp.

Ontario Natural Heritage Information Centre Rare Species Query by County, information gathered 1/9/01.

<http://www.mnr.gov.on.ca/MNR/nhic/queries/countysel.cfm>.

Sjogren, Steve. 2000. Regional Forester's Sensitive Species Risk Evaluation for *Vertigo bollesiana* (land snail), 2 pp.

Wisconsin Natural Heritage Program. Rare Species and Natural Communities, NHI Working List by County. <http://www.dnr.state.wi.us/org/land/er/workinglist/countylist/>.

LIST OF CONTACTS

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