Species Status Assessment

Class: Gastropoda
Family: Valvatidae
Scientific Name: *Valvata sincera*
Common Name: Mossy valvata (boreal turret snail)

Species synopsis:

The mossy valvata, also known as the boreal turret snail, is a northern species. It is found from the Arctic Circle southward to Connecticut and westward to Minnesota (see Jokinen 1992); New York is at the southern extent of its range. The mossy valvata lives in cold water and is limited to lakes and large streams, in which it can live at considerable depths; it is associated with submerged aquatic vegetation (Clarke 1981). Mossy valvata occurs at four known locations in the St. Lawrence River watershed (Jokinen 1992); new locations were documented in 2012 and 2013 in Oneida Lake and Cayuga Lake.

I. Status

a. Current and Legal Protected Status

i. Federal Not Listed **Candidate?** No

ii. New York Special Concern; SGCN

b. Natural Heritage Program Rank

i. Global G5

ii. New York S1 **Tracked by NYNHP?** Yes

Other Rank:
American Fisheries Society (AFS): Currently stable
IUCN – Least Concern

Status Discussion:
Cordeiro and Perez (2011) call the North American distribution of mossy valvata "widespread and abundant." This snail's current presence in southern New England and New York is likely a relict of a broader Holocene distribution (Smith 1987, Strayer 1987). Mossy valvata is common within its distribution in Oneida, Erie and Cayuga Lakes (Expert meeting). It is listed as a SGCN in Vermont. Kart et al. (2005) note that the freshwater snails group in the Vermont State Wildlife Action Plan, which includes mossy valvata, range from extirpated to declining to rare. There are three records in Vermont, all in the Lake Champlain Valley (Kart et al. 2005).

Mossy valvata is listed as endangered in Massachusetts where it is considered to be locally rare and possible extirpated. Recent surveys did not detect mossy valvata at historical sites (McLain 2003 *in* Massachusetts Division of Fisheries and Wildlife 2005).

II. Abundance and Distribution Trends

a. North America

i. Abundance

____ declining ____increasing __X__ stable ____unknown

ii. Distribution:

____ declining ____increasing __X__ stable ____unknown

Time frame considered: _____

b. Regional

i. Abundance

__X__ declining ____increasing ____stable _____unknown

ii. Distribution:

__X__ declining ____increasing ____stable _____unknown

Regional Unit Considered: ____Northeast_____
Time Frame Considered: _____

c. Adjacent States and Provinces

CONNECTICUT **Not Present _____** **No data _____**

i. Abundance

__X__ declining ____ increasing ____ stable ____unknown

ii. Distribution:

__X__ declining ____ increasing ____ stable ____unknown

Time frame considered: ___Not Specified_____
Listing Status: _____Special Concern_____ SGCN? __Yes___

MASSACHUSETTS **Not Present _____** **No data _____**

i. Abundance

__X__ declining ____ increasing ____ stable ____unknown

ii. Distribution:

__X__ declining ____ increasing ____ stable ____unknown

Time frame considered: __Since 1980_____
Listing Status: _____Endangered_____ SGCN? __Yes__

NEW JERSEY **Not Present __X___** **No data _____**

ONTARIO **Not Present _____** **No data _____**

i. Abundance

____ declining ____increasing __X__ stable ____unknown

ii. Distribution:

____ declining ____increasing __X___ stable ____unknown

Time frame considered: _____
Listing Status: _____Not Listed (S4)_____

PENNSYLVANIA **Not Present _____** **No data _____**

i. **Abundance**

____ declining ____increasing ____stable __X__ unknown

ii. **Distribution:**

____ declining ____increasing ____stable __X__ unknown

Time frame considered: _____
Listing Status: _____Not Listed_____ SGCN? __No____

QUEBEC **Not Present _____** **No data _____**

i. **Abundance**

____ declining ____increasing _____stable __X__ unknown

ii. **Distribution:**

____ declining ____increasing _____stable __X__ unknown

Time frame considered: _____
Listing Status: _____Not Listed_____

VERMONT **Not Present _____** **No data _____**

i. **Abundance**

__X__ declining ____increasing ____stable ____ unknown

ii. **Distribution:**

__X__ declining ____increasing ____stable ____ unknown

Time frame considered: ___Not Specified_____
Listing Status: _____Not Listed_____ SGCN? __Yes____

d. NEW YORK **No data _____**

i. Abundance

____ declining ____ increasing ____ stable __X__ unknown

ii. Distribution:

____ declining ____ increasing ____ stable __X__ unknown

Time frame considered: _____

Monitoring in New York.

None currently.

Trends Discussion:

Strayer (1987) notes that although only a few records of mossy valvata exist for the Hudson basin, the presence of the species in postglacial deposits suggest that it may have been more widespread in the basin historically.

Two sites in the Hudson basin that were visited during three survey periods from the late 1800s through 1985, had mossy valvata during the more recent surveys (1973 to 1985) and not during the earlier surveys (Strayer 1987).

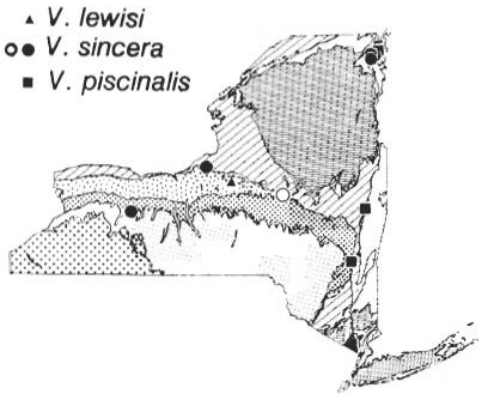

Figure 1: Records of *V. sincera* (mossy valvata) in New York. Closed circles indicate records from Jokinen (1992) surveys, open circles indicate records from museum specimens (Jokinen 1992).

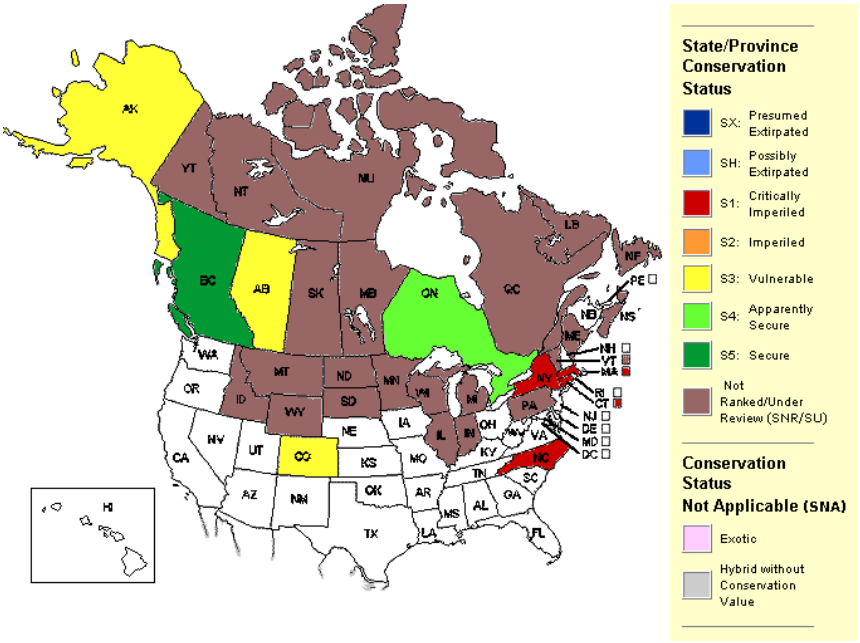

Figure 2: Conservation status of mossy valvata in North America (NatureServe 2013).

III. New York Rarity, if known:

Historic	# of Animals	# of Locations	% of State
prior to 1970	_____	_____	_____
prior to 1980	_____	_____	_____
prior to 1990	_____	_____	_____

Details of historic occurrence:

Jokinen (1992) provides details on historic records occurring in the following counties: Cayuga, Chautauqua, Clinton, Dutchess, Greene, Herkimer, Monroe, Onondaga, Otsego, Wayne.

During four survey periods ranging from 1978 to 1991, Jokinen (1992) recorded living mossy valvata at four locations, all within the St. Lawrence River watershed: two locations in Dead Creek, a tributary of Lake Champlain; Lake Champlain; and the Oswego River. Shells were found at one additional site—Conesus Lake in Livingston County—but no living individuals were located.

Current	# of Animals	# of Locations	% of State
	_____	_____	_____

Details of current occurrence:

In June of 2012 Alexander Karatayev, Vadim Karatayev, and Lyubov Burlakova found 105 individuals in 11 locations in Oneida Lake. In September of 2013 Alexander Karatayev and Lyubov Burlakova found 2 individuals in 2 locations in Cayuga Lake (A. Karatayev, personal communication).

New York's Contribution to Species North American Range:

% of NA Range in New York	Classification of New York Range
____ 100 (endemic)	**____ Core**
____ 76-99	**__X__ Peripheral**
____ 51-75	**____ Disjunct**
____ 26-50	**Distance to core population:**
__X__ 1-25	**_____**

IV. Primary Habitat or Community Type:

1. Summer-stratified Monomictic Lake

2. Winter-stratified Monomictic Lake

3. Headwater/Creek

4. Large/Great River

Habitat or Community Type Trend in New York:

____ Declining __X__ Stable ____ Increasing ____Unknown

Time frame of decline/increase: _____

Habitat Specialist? _____ Yes __X__ No

Indicator Species? __X__ Yes _____ No

Habitat Discussion:

This is a northern, cold water species that is typically associated with submerged aquatic vegetation (Clarke 1981). In southern New England and New York, mossy valvata is limited primarily to large lakes and rivers, though in Canada it is also found in muskeg pools (Clarke 1981). Of the five known sites in New York, one is a river, three are lakes, and the last is a marshy creek that feeds into Lake Champlain (Jokinen 1992). Habitats are typically high calcium, and pH ranges from 6.9 to 7.4 in the five sites sampled by Jokinen (1992). Habitats in Connecticut and New York are eutrophic (Jokinen 1992) but this snail is generally limited to oligotrophic and mesotrophic situations (Kart et al. 2005).

Aquatic gastropods are frequently used as bioindicators because they are sensitive to water quality and habitat alteration (Callil and Junk 2001, Salanki et al. 2003).

V. New York Species Demographics and Life History

__X__ Breeder in New York

__X__ Summer Resident

__X__ Winter Resident

_____ Anadromous

_____ Non-breeder in New York

_____ Summer Resident

_____ Winter Resident

_____ Catadromous

_____ Migratory only

_____Unknown

Species Demographics and Life History Discussion:

Mossy valvata has an annual life cycle and individuals are hermaphroditic. Adults are present only in the summer. Egg capsules containing 2 to 6 eggs are attached to aquatic plants (Lang and Dronen 1970). Newly hatched individuals lay eggs during the following season and then die.

Both perch (*Perca flavescens*) and whitefish (*Coregonus clupeaformis*) feed on mossy valvata (Goodrich 1932, Clarke 1981).

Most Gastropods belong to the clade Caenogastropoda, in which individuals mature slowly (requiring at least a year), are long-lived dioecious species with internal fertilization, and females generally attach eggs to firm substrates in late spring and early summer. Many species are narrow endemics associated with lotic habitats, often isolated in a single spring, river reach, or geographically restricted river basin (Johnson et al. 2013). In contrast, members of the clade Heterobranchia are hermaphroditic, mature quickly, and generally have shorter generation times (Johnson et al. 2013).

VI. Threats:

Expert meeting concluded there is insufficient information to assess threats to this species, but recognize that any threats that cause water quality decline in large waterbodies could threaten this species in NY.

Jokinen (1992) notes that Conesus Lake (Livingston County), which was used as a reservoir for the Genesee Valley Canal, was subject to repeated drawdowns, and this could have destroyed the valvatids there. In Massachusetts, shoreline development, water level drawdowns, lake draining, increased nutrient input, and herbicides have been cited as threats to mossy valvata. The resulting loss in water clarity can prevent the growth of rooted aquatic vegetation in deeper waters, which may be essential for the survival of mossy valvata (Massachusetts Division of Fisheries and Wildlife 2005).

High imperilment rates among freshwater gastropods have been linked to alteration, fragmentation and destruction of habitat and introduction of non-indigenous species. Causes of habitat degradation and gastropod species loss include dams, impounded reaches, development of riparian areas, channelization, erosion, excess sedimentation, groundwater withdrawal and associated impacts on surface streams (flows, temperature, dissolved oxygen), multiple forms of pollution (salt, metals such as Cu, Hg, Zn, untreated sewage, agricultural runoff, pesticides/fertilizers), changes in aquatic vegetation, and invasion of exotic species (Johnson et al. 2013).

The New Zealand mud snail (*Potamopyrgus antipodarum*) is a highly invasive species that was introduced in Idaho in the 1980s. It can have devastating consequences to aquatic ecosystems, reducing or eliminating native snail species (Benson et al. 2013). This snail was found established in Lake Ontario in 1991 (Zaranko et al. 1997) and in Lake Erie in 2005 (Levri et al. 2007).

Are there regulatory mechanisms that protect the species or its habitat in New York?

_____ No ____ Unknown

__X__ Yes

The Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Conservation Law.

The Freshwater Wetlands Act provides protection for regulated wetlands greater than 12.4 acres in size under Article 24 of the NYS Conservation Law. The Adirondack Park Agency has the authority to regulate smaller wetlands within the Adirondack Park. The Army Corps of Engineers has the authority to regulate smaller wetlands in New York State, and the DEC has the authority to regulate smaller wetlands that are of unusual local importance. The Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Conservation Law.

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

Basic biological information is lacking for most taxa of freshwater gastropods and there is a strong need for surveys and biological studies given the strong evidence of decline and extinction.

The following goals and recommended actions are provided in the NY Comprehensive Wildlife Conservation Strategy (NYSDEC 2005):

- Conduct surveys to determine distribution and population trends
- Identify habitat requirements for all life stages
- Develop specific plans for each listed species (or appropriate suite of species) that details status, threats, and actions necessary to reverse declines or maintain stable populations
- Develop fact sheets for each listed species for paper and online distribution

VII. References

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