

Species Status Assessment

Class: Gastropoda
Family: Hydrobiidae
Scientific Name: *Gillia altilis*
Common Name: Buffalo pebblesnail

Species synopsis:

The buffalo pebblesnail is native to the Atlantic coastal drainage of North America, occurring from New York and Vermont southward to South Carolina. Hydrobiidae is one of the most common and diverse gastropod families, with 185 species in 14 genera typically found in springs, creeks and small to medium rivers in temperate, subtropical and tropical regions of the world. The first record of the buffalo pebblesnail in the Great Lakes drainage was from Oneida Lake, New York around 1915-1918, however, in subsequent years it was likely extirpated from this water body and later recorded from Niagara-on-the-Lake, Lake Ontario, Lake Erie, and multiple locations in the Erie Canal. The buffalo pebblesnail was able to colonize Lake Ontario through the Erie Canal, extending its range westward, and is now considered established in the Lake Ontario drainage (Thompson 1984). It is usually found in freshwater stream environments and has adapted to inhabiting both stagnant waters in lakes and streams as well as rapidly moving waters.

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: CS - Currently Stable

Status Discussion:

In some regions where this species is native, populations are declining or not very abundant (Kipp et al. 2013). In Vermont, this species is considered to be in greatest conservation need, and it is listed as a species of special concern in New York (unprotected but of special concern due to increasing evidence of vulnerability). Its state NatureServe rank is S1 (critically imperiled) because it is very vulnerable due to low abundance of species or required habitat (Kipp et al. 2013). It has a wide distribution, presumed large population, occurrence in a number of protected areas, tolerance of a broad range of habitats, tolerance to habitat modification, lack of substantial immediate threats, and because it is not in decline or is unlikely to be declining fast enough to qualify for global listing in a more threatened category (NatureServe 2013).

II. Abundance and Distribution Trends

a. North America

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Time frame considered: _____

b. Regional

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Regional Unit Considered: Region 5 - Northeast

Time Frame Considered: _____

c. Adjacent States and Provinces

CONNECTICUT	Not Present <u> X </u>	No data _____
MASSACHUSETTS	Not Present <u> X </u>	No data _____
QUEBEC	Not Present <u> X </u>	No data _____
NEW JERSEY	Not Present _____	No data <u> X </u>

i. Abundance

____ declining ____ increasing ____ stable X unknown

ii. Distribution:

____ declining ____ increasing ____ stable X unknown

Time frame considered: Not Specified

Listing Status: _____ Not Listed SGCN? No

ONTARIO	Not Present _____	No data _____
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i. Abundance

____ declining ____ increasing _____ stable X unknown

ii. Distribution:

____ declining ____ increasing _____ stable X unknown

Time frame considered: _____

Listing Status: _____ Not Listed, considered exotic

PENNSYLVANIA	Not Present _____	No data <u> X </u>
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i. Abundance

____ declining ____ increasing ____ stable X unknown

ii. Distribution:

____ declining ____ increasing ____ stable X unknown

Time frame considered: Not Specified

Listing Status: _____ Not Listed SGCN? No

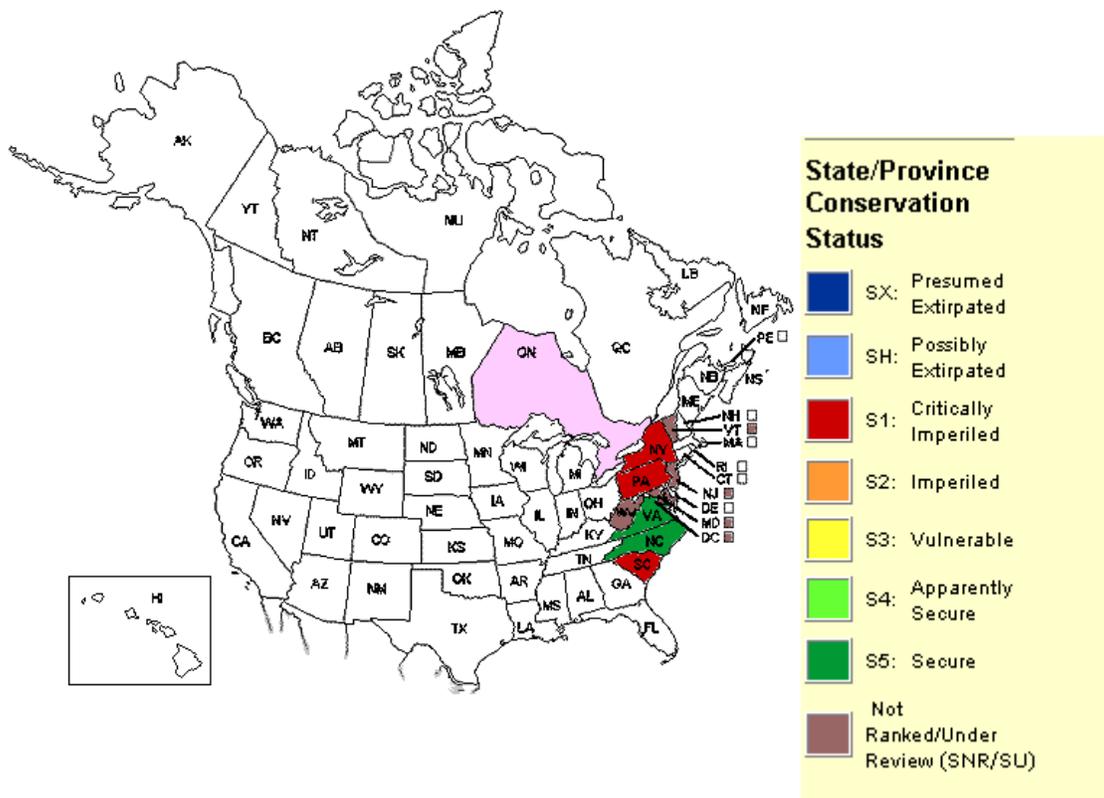


Figure 1. Conservation status of the buffalo pebblesnail in North America (NatureServe 2013).

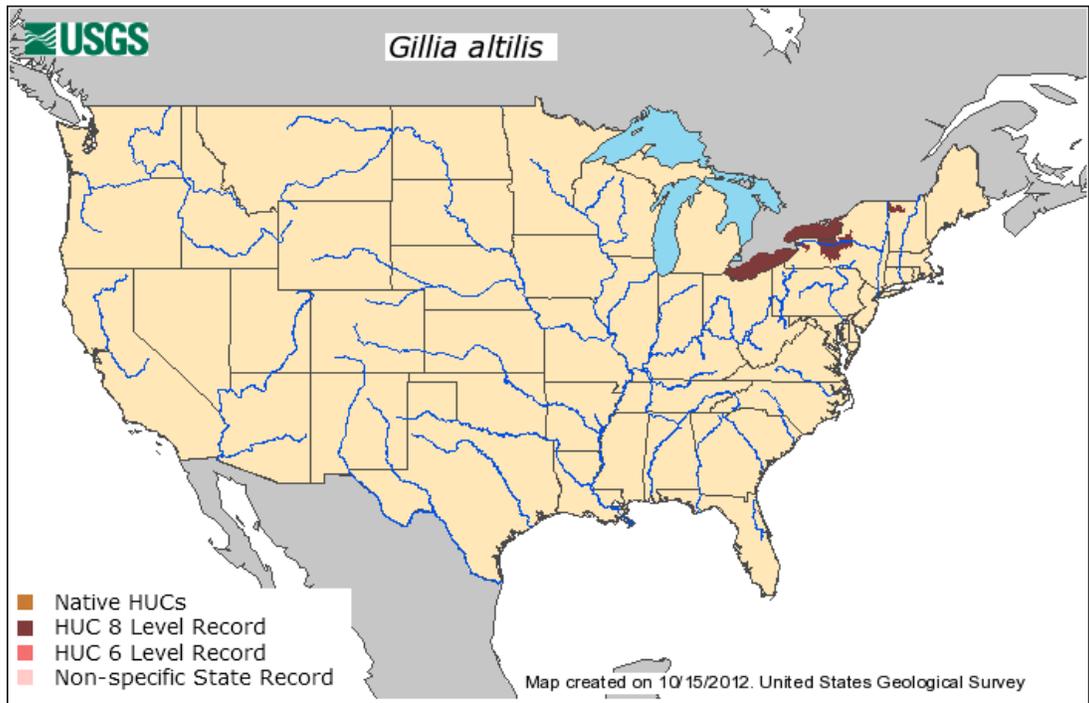


Figure 2. Distribution of buffalo pebblesnail by watershed in North America (Kipp et al. 2013).

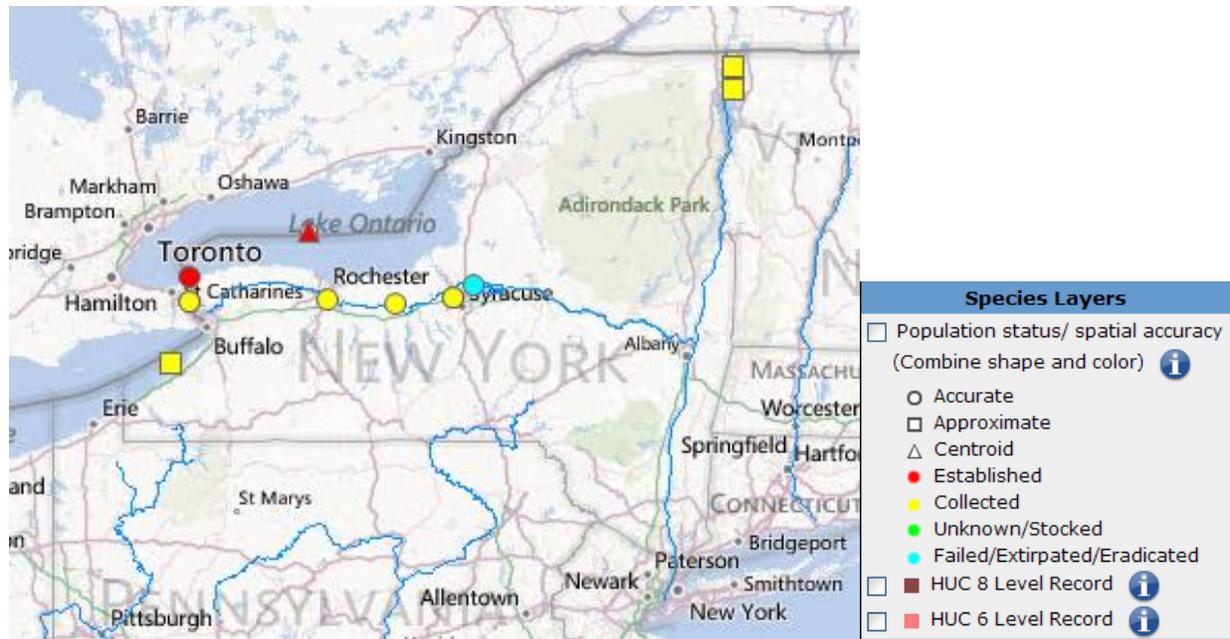


Figure 3. Distribution of buffalo pebblesnail depicting population status of collections (Kipp et al. 2013).

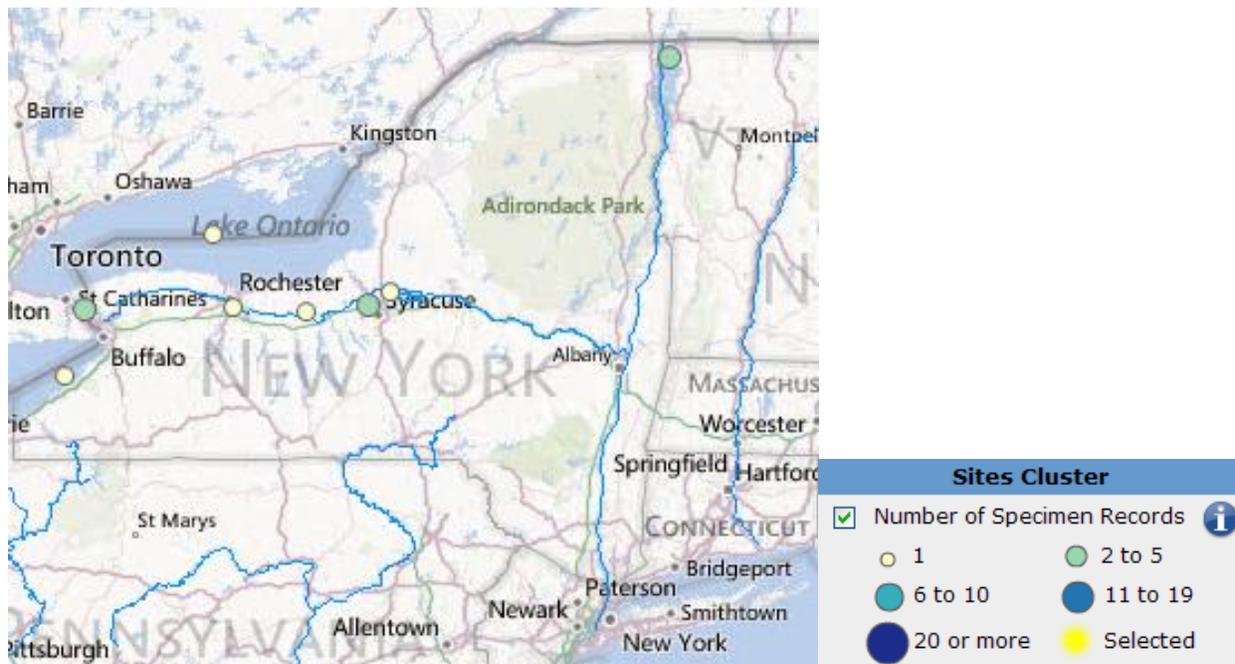


Figure 4. Distribution of buffalo pebblesnail depicting number of specimen records at each location (Kipp et al. 2013).

III. New York Rarity, if known:

Historic	<u># of Animals</u>	<u># of Locations</u>	<u>% of State</u>
prior to 1970	_____	<u>9 counties</u>	_____
prior to 1980	_____	_____	_____
prior to 1990	_____	_____	_____

Details of historic occurrence:

The first record of this species was from Oneida Lake, Oswego County in 1915, but this population is now thought to be extirpated. This species has been recorded from the Erie Canal, Onondaga, and Herkimer counties; the Albany/Troy area and the Hudson River, Albany and Rensselaer counties, and the Hudson River from Barrytown south to Straatsburg, Dutchess County. Shells have been found in beach wash from Lake Ontario, Monroe County; Oneida Lake, Oswego and Onondaga Counties; and the Salmon River, Oswego County (Jokinen 1992).

Current	<u># of Animals</u>	<u># of Locations</u>	<u>% of State</u>
	_____	_____ >7 _____	_____

Details of current occurrence:

No populations were located during Jokinen’s survey from 1978-1991 or Strayer’s 1987 survey, but the USGS reports records from multiple locations in the past 20 years: Erie Canal at Clyde, Syracuse, and Brighton in 1993, Niagara River in Niagara Falls 1993, Erie Canal at Syracuse in 1994, and Lake Erie and Lake Ontario in 2005 (Kipp et al. 2013). Thompson (1984) sites the following localities from museum lots: Hudson River, Albany, Dutchess, and Ulster counties; Erie Canal, Herkimer and Onondaga counties; Champlain Canal, Rensselaer County; Niagara Falls, Niagara County; Monroe County; and Wayne County. The New York State Museum has numerous specimens from the Hudson River, Albany County.

New York’s Contribution to Species North American Range:

% of NA Range in New York	Classification of New York Range
___ 100 (endemic)	<u>X</u> Core
___ 76-99	___ Peripheral
___ 51-75	___ Disjunct
___ 26-50	Distance to core population:
<u>X</u> 1-25	_____

IV. Primary Habitat or Community Type:

1. Large/Great River
2. Summer-stratified Monomictic Lake
3. Freshwater
4. Canal
5. Headwater/Creek

Habitat or Community Type Trend in New York:

Declining Stable Increasing Unknown

Time frame of decline/increase: _____

Habitat Specialist? Yes No

Indicator Species? Yes No

Habitat Discussion:

Presence of the buffalo pebblesnail in the great lakes indicates it can be found in cold, clear lakes; however, it is usually found in freshwater streams, canals and rivers. Its globose shell is adapted for inhabiting high-velocity lotic environments and it has a large muscular foot used to suction to rocks (Kipp et al. 2013). It is well also well adapted to living on silty substrates as the foot prevents it from sinking, and it has been found to inhabit both stagnant waters in lakes and streams as well as rapidly moving waters (Thompson 1984). In the Hudson River, this species occurred on mud and aquatic plants in shallow water (Townes 1936).

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

- Breeder in New York**
 - Summer Resident**
 - Winter Resident**
 - Anadromous**
- Non-breeder in New York**
 - Summer Resident**
 - Winter Resident**
 - Catadromous**
- Migratory only**
- Unknown**

Species Demographics and Life History Discussion:

As a prosobranch snail, the sexes of this species are dioecious, or separate, with internal fertilization (Dillon et al. 2006). Females lays single or clumps of eggs (up to six at a time) in hemispherical-shaped capsules on solid substrates, including leaves, stems of macrophytes, shells of other gastropods, stones or leave litter in late spring or early summer (Dillon et al, 2006, Kipp et al. 2013). Few detailed life history studies have been completed, but the maximum age of species is thought to be 2 years (AFS 2013).

It is speculated that this species is a generalized grazer, like most Hydrobiidae. It has a specialized radula, adapted for grazing on coarser food particles than those of other related snails (Kipp et al. 2013).

VI. Threats:

Taxonomic experts determine there is insufficient information to fully assess threats.

High imperilment rates among freshwater gastropod groups have been linked to alteration, fragmentation and destruction of habitat from the creation of dams and impounded reaches, development of riparian areas, channelization, erosion, groundwater withdrawal and associated impacts on surface streams (flows, temperature, dissolved oxygen), multiple forms of pollution (salt, metals, untreated sewage, agricultural runoff, pesticides/fertilizers), changes in aquatic vegetation, and invasion of exotic species (AFS 2013).

Most gastropod species live in the shallows (depths less than 3 meters), where food abundance is greatest. As a result, drastic water fluctuations, such as draw-downs, may cause declines in snail populations (Hunt and Jones 1972). Strayer (1987) concluded that human activities had destroyed much of the original mollusk fauna in some parts of the Hudson basin, but not in others.

Channelization of farmed mucklands and industrial pollution from Beacon were noted as causes for the notably reduced biodiversity of mollusks in the Wallkill River of Orange County and the Fishkill River of Dutchess County, respectively.

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

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.

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

American Fisheries Society (AFS). 2013. Conservation status of freshwater gastropods of Canada and the United States by the Gastropod Subcommittee (Endangered Species Committee). *Fisheries* 38(6): 247-282.

Callil, T. C. and W. J. Junk. 2001. Aquatic gastropods as mercury indicators in the Pantanal of Pocone region (Mato Grosso, Brasil). *Water, Air and Soil Pollution*. 319:319-330.

Dillon, R.T., Jr., B.T. Watson, T.W. Stewart, and W.K. Reeves. 2006. The freshwater gastropods of North America. Available: <http://www.fwgna.org>. Accessed: 17 June, 2013.

Hunt, P.C. and J.W. Jones. 1972. The food of brown trout in Ilyn Alaw, Anglesey, North Wales. *Journal of Fish Biology*, 4: 333-352.

Jokinen, E.H. 1992. The freshwater snails (Mollusca: Gastropoda) of New York State. *New York State Museum Bulletin* 482: 1-112.

Levri, E. P., A. A. Kelly, and E. Love. 2007. The invasive New Zealand mud snail (*Potamopyrgus antipodarum*) in Lake Erie. *Journal of Great Lakes Research* 33: 1-6.

Kipp, R.M., A.J. Benson, J. Larson, and A. Fusaro. 2013. *Gillia altilis*. USGS Nonindigenous Aquatic Species Database, Gainesville, FO. Available: <http://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=1007>. Revision Date: 7 June, 2012.

NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available: <http://www.natureserve.org/explorer>. Accessed: 17 June, 2013.

New York State Department of Environmental Conservation (NYSDEC). 2005. New York State Comprehensive Wildlife Conservation Strategy. Available: <http://www.dec.ny.gov/index.html>. Accessed: 17 June 2013.

Salanki, J., A. Farkas, T. Kamardina, and K. S. Rozsa 2003. Molluscs in biological monitoring of water quality. *Toxicology Letters* 140-141: 403-410.

Strayer, D. 1987. Ecology and zoogeography of the freshwater mollusks of the Hudson River basin. *Malacological Review*. 20: 1-68.

Townes, Jr., H.K. 1936. Studies of the food organisms of fish. A biological survey of the Lower Hudson watershed. State Of New York Conservation Department Annual Report 26. 217-230.

Zaranko, D.T., D.G. Farara, and F.G. Thompson. 1997. Another exotic mollusk in the Laurentian Great Lakes: the New Zealand native *Potamopyrgus antipodarum* (Gray 1843) (Gastropoda, Hydrobiidae).

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