Common Name: Eastern pearlshell ***SGCN***
Scientific Name: *Margaritifera margaritifera*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G4
New York: S2
Tracked: Yes

Synopsis:
Margaritifera margaritifera, meaning pearl-bearer, is aptly named as this species has been fished for pearls at least since Roman times. *M. margaritifera* is North America's only native freshwater mussel whose range extends beyond the continent, occurring in New England and the Canadian Maritime Provinces, from eastern Pennsylvania to Newfoundland, Labrador, and Nova Scotia, as well as in northern Europe and Asia, from Spain, the British Isles, and Scandinavia, through central Europe to northern Asia and Japan (Strayer and Jirka 1997, Watters et al. 2009). Since 1970, *M. margaritifera* has been documented in 24 New York State waterbodies. It is also the only member of the family Margaritiferidae in New York, and its biology and distribution are unique among the state's unionoids. It uses salmonids as hosts and typically lives in cold, calcium-poor waters where it is often the only unionoid species present (Strayer and Jirka 1997).

Although not common, and ranked as "Imperiled" in New York, this edge of range species is considered "Apparently secure" throughout its range. In North America, approximately ⅔ to ¾ of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, it is assumed that they too are declining, due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%		Abundant		Moderate Decline	Moderate Decline
6% to 10%		Common			
11% to 25%	X	Fairly common	X		
26% to 50%		Uncommon			
> 50%		Rare			

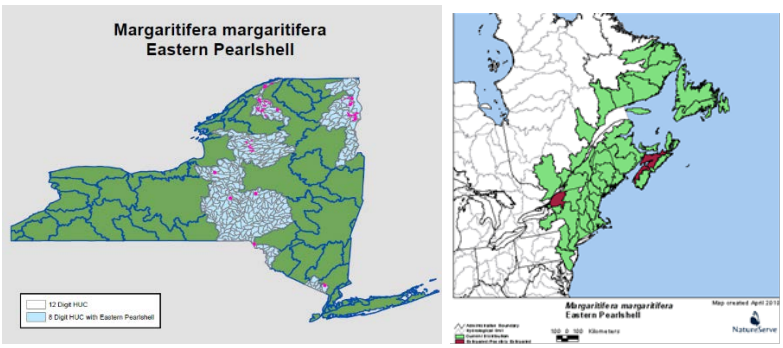
Habitat Discussion:
M. margaritifera lives in cold, nutrient-poor, softwater, mountain streams and small rivers that support populations of trout and salmon. It never occurs in lakes, ponds, or warm-water streams; although relict populations may exist in warm and degraded portions of streams whose thermal regime and upland landscape have been altered by human activities. Best habitats are fairly small streams that are heavily shaded by a riparian canopy, possess clean cold water with high dissolved oxygen, and have stable channels with clean, stable substrates of coarse sand, gravel, and cobble (Nedeau 2008, NatureServe 2013). Factors believed to limit this species are eutrophication, pH (acidity), sedimentation, and water temperature (Nedeau 2008). These habitats often are overlooked in surveys of other mussel species (Strayer and Jirka 1997).

M. margaritifera is rarely associated with more than a very few other mussel species (Watters et al. 2009). Bauer et al. (as cited in Watters et al. 2009) hypothesized that this species has a lower metabolism than other mussels and can utilize food-poor streams not available to other species.

Primary Habitat Type
Headwater/Creek; High Gradient; Low Buffered, Acidic; Cold
Headwater/Creek; Low Gradient; Moderately Buffered, Neutral; Transitional Cool
Headwater/Creek; Low-Moderate Gradient; Low Buffered, Acidic; Cold
Headwater/Creek; Low-Moderate Gradient; Moderately Buffered, Neutral; Cold
Headwater/Creek; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool
Headwater/Creek; Moderate-High Gradient; Low Buffered, Acidic; Cold
Headwater/Creek; Moderate-High Gradient; Moderately Buffered, Neutral; Cold
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Transitional Cool
Medium River; Moderate-High Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Small River; High Gradient; Moderately Buffered, Neutral; Cold
Small River; High Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Moderate-High Gradient; Moderately Buffered, Neutral; Cold

Distribution:

Since 1970, *M. margaritifera* has been documented in 24 New York State waterbodies. *M. margaritifera* is probably widespread along the margins of the Adirondacks and throughout eastern New York in nutrient-poor, soft water trout streams (Strayer and Jirka 1997). In the mid-1990s this species was confirmed in the Grass River and its tributaries including Grannis Brook, Leonard Brook, Little River, Black Brook, Plumb Brook, the North Branch of the Grass River, and Elm Creek (NY Natural Heritage Program 2013). Since the 1970s, this species has been found in the Black River and its tributaries including Butler Creek, Black Creek, Otter Creek, Fish Creek, and an unnamed tributary (NY Natural Heritage Program 2013, White et al. 2011); and in Fish Creek and Scriba Creek, tributaries to Oneida (Strayer and Jirka 1997, NY Natural Heritage Program 2013, Mahar and Landry 2013). In the Lake Champlain Valley, it is still found in Dry Mill Brook, the Boquet River, the North Branch of the Boquet River, and Salmon River and its tributary Riley Brook (NY Natural Heritage Program 2013). By 1994, the upper Hackensack River site in the lower Hudson basin had low density and no evidence of reproduction (Strayer 1995), probably a casualty of intensive residential development of the watershed (Strayer and Jirka 1997). A single specimen was found in the Susquehanna basin in headwaters of the East Fork of the Otselic River in 2008 (Harman and Lord 2010).



Post-1970 distribution of *M. margaritifera* in New York (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).

NatureServe (2013)

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions and Disturbance	Work and Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (impassable culverts)	W	M	H
3. Pollution	Agricultural and Forestry Effluents (pesticides, fertilizers, sediment)	R	L	M
4. Pollution	Household Sewage and Urban Waste Water (road runoff of salts and metals, other regulated discharges)	N	M	H
5. Pollution	Household Sewage and Urban Waste Water (sewer and septic overflows)	R	M	H
6. Climate Change and Severe Weather	Droughts	R	L	V
7. Natural System Modifications	Dams and Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	N	L	M
8. Climate Change and Severe Weather	Storms and Flooding (extreme storms)	P	M	V
9. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (Whirling disease affecting salmonids)	N	L	H
10. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (lampricide)	N	L	M

11. Climate Change and Severe Weather	Habitat Shifting and Alteration (presence of salmonids)	N	L	V
12. Pollution	Air-Borne Pollutants (atmospheric pollutants from point and nonpoint sources including acid deposition)	R	L	M

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Common Name: Eastern pondmussel ***SGCN***
Scientific Name: *Ligumia nasuta*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G4
New York: S2S3
Tracked: Yes

Synopsis:
L. nasuta is one of two species of the genus Ligumia that have been found in New York (Strayer and Jirka 1997). It is most often found in quiet waters in estuaries, lakes, in slackwater areas of rivers, canals, or slow streams, but it has also been found regularly in the Niagara River (Strayer and Jirka 1997, Nedeau 2008). *L. nasuta* inhabits in a wide range of substrates (Nedeau 2008), although it is thought to prefer fine sand and mud (Metcalfe-Smith et al. 2005, Watters et al. 2009).

Since 1970, *L. nasuta* has been found in 21 New York waterbodies. It is a widespread species that once was locally abundant from the Great Lakes to much of the Atlantic Slope, but has experienced decline in most areas (NatureServe 2013). Although not widespread in New York, *L. nasuta* can still be encountered regularly (Strayer and Jirka 1997). This species has been heavily impacted by zebra mussels in the St. Lawrence River basin, Hudson River estuary, lower Great Lakes, and elsewhere throughout the state (Strayer and Jirka 1997).

In New York, *L. nasuta* is ranked as Imperiled/Vulnerable, although it is apparently secure throughout its range (NatureServe 2013). In North America, approximately ⅔ to ¾ of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, it is assumed that they too are declining, due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%		Abundant		Stable	Stable
6% to 10%		Common			
11% to 25%	X	Fairly common			
26% to 50%		Uncommon	X		
> 50%		Rare			

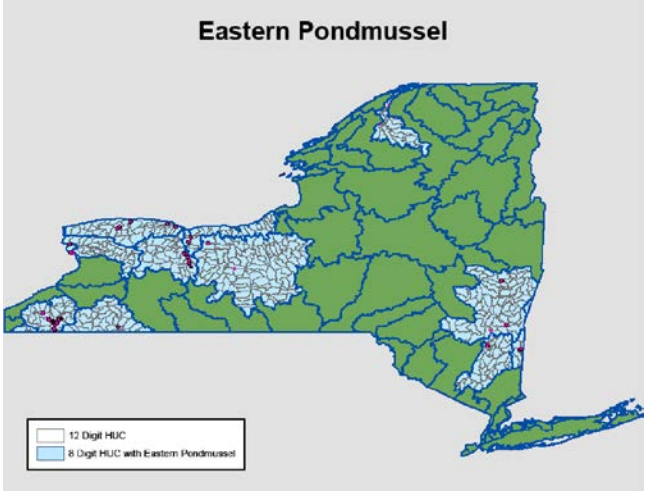
Habitat Discussion:
L. nasuta is most often found in quiet waters in estuaries, lakes, in slackwater areas of rivers, canals, or slow streams, but it has also been found regularly in the Niagara River (Strayer and Jirka 1997, Nedeau 2008). However, it is more commonly found in deeper areas of low-gradient and non-tidal rivers than in small shallow streams. It is also known to occur in ponds (Nedeau 2008). L. nasuta inhabits in a wide range of substrates, including gravel and cobble (Nedeau 2008), although it is thought to prefer fine sand and mud (Metcalfe-Smith et al. 2005, Watters et al. 2009).

Primary Habitat Type
Headwater/Creek; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool
Medium River; High Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Transitional Cool
Small River; Low Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Moderate-High Gradient; Moderately Buffered, Neutral; Transitional Cool

Distribution:
Since 1970, *L. nasuta* has been found in 21 New York State waterbodies.

In the Lower Genesee basin 20 live *L. nasuta* were found in Honeoye and Bebee Creeks. In the West Lake Ontario basin shells were found in Oak Orchard, West, and Larkin Creeks. Shells were also found in the Mid Lake Ontario basin in Irondequoit Creek and the Erie Canal (Mahar and Landry 2013). In recent surveys of the Allegheny basin, 42 live individuals were found in Conewago and Cassadaga Creeks of the Conewago sub-basin, and populations were considered viable at five sites. Catches peaked at 8.6 individuals per hour in lower Cassadaga Creek. It has also been recorded live from the Allegheny River basin near Weston Mills (NY Natural Heritage Program 2013), Chautauqua Lake, and the Chadokoin River (Strayer and Jirka 1997). It was probably introduced into the Chautauqua area, perhaps with stocked fish (Strayer and Jirka 1997). *L. nasuta* have been found live in the Niagara River at Beaver Island and as shells at Buckhorn Island (NY Natural Heritage Program 2013), in Spicer Creek (2) and at Strawberry Island (1) in 2011 (Burlakova, Karatayev, unpublished data). From 54 sites at 33 locations in Lake Ontario surveyed in 2012 (Burlakova, Karatayev et al. in preparation) we found 12 *L. nasuta* in Lake Ontario tributaries and nearby wetlands (3 in North Pond, 3 in Salmon River mouth (both in Oswego Co, near Pulaski), and 6 in Black River Bay (Jefferson Co, near Sackets Harbor)). In the Hudson basin there are records of live individuals in Lake Taghkanic and Webatuck Creek (28 live), and a single dead animal was found in Indian Kill at Norrie Point (NY Natural Heritage Program 2013, Strayer and Jirka 1997). One live mussel was found in Mohawk River (42.90464N, 73.68376W, Mechanicville, Saratoga Co.) in 2010 (Karatayev, Burlakova, unpublished data). In the Delaware basin, this species has been reported from Tennahnah Lake in Sullivan County (Strayer and Jirka 1997). In the St. Lawrence basin, it has been found in the Grass River and its tributary Harrison Creek (White et. al. 2011).

Waterbodies with greatest *L. nasuta* abundance include lower Cassadaga Creek, Webatuck Creek, and Honeoye Creek between Honeoye Falls and Honeoye Lake, and its tributary Bebee Creek, and Black River Bay of Lake Ontario.



Post-1970 distribution of *L. nasuta* in New York (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions and Disturbance	Work and Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, culverts)	W	M	H
3. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (zebra mussels)	R	L	H
4. Pollution	Agricultural and Forestry Effluents (pesticides, fertilizers, sediment)	P	L	M
5. Pollution	Household Sewage and Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage and Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change and Severe Weather	Droughts	W	L	V
8. Natural System Modifications	Dams and Water Management/Use (lowering of water table from agriculture, Erie Canal, etc…, causing drying of habitat)	W	L	L
9. Climate Change and Severe Weather	Storms and Flooding (extreme storms)	W	M	V

10. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

References Cited:

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Common Name: Elktoe ***SGCN***
Scientific Name: *Alasmidonta marginata*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G4
New York: S4
Tracked: No

Synopsis:
A. marginata is one of five species of the genus Alasmidonta that have been found in New York (Strayer and Jirka 1997). Alasmidonta, means "without a lateral tooth," a distinct characteristic in all species of this genus. The species marginata refers to the chalky whiteness of the nacre in the inside of the shell (Watters et al. 2009). *A. marginata* is closely related to and is often confused with *Alasmidonta varicosa* (Simpson 1914). Systematics of the genus have not been reviewed genetically.

This species is found in the Mississippi River system from Minnesota south to Arkansas including the Tennessee and Cumberland Rivers, the Laurentian system except for Lake Superior, and the Atlantic Slope in the Susquehanna River drainage (Watters et al. 2009). In New York, *A. marginata* is widespread in the Allegheny basin, the Susquehanna basin, and is found at scattered sites along the course of the Erie Canal from the Niagara River to Albany. It also lives in the St. Lawrence River and its tributaries in northern New York. This species is rarely abundant at any particular site, often occurring as single individuals. *A. marginata* is usually found in running waters of various sizes, characteristically in riffles (Strayer and Jirka 1997).

A. marginata is ranked as apparently secure in New York as well as throughout its range (NatureServe 2013). In North America, approximately 2/3 to 3/4 of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, it is assumed that they too are declining, due to a myriad of environmental stressors. As this species is abundant in the Allegheny Basin in NY, The Nature Conservancy mussel survey report suggests that this would be a candidate for removal from the SGCN list (2009).

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%		Abundant		Stable	Stable
6% to 10%		Common			
11% to 25%		Fairly common			
26% to 50%	X	Uncommon	X		
> 50%		Rare			

Habitat Discussion:
A. marginata usually lives in running waters of various sizes, from small creeks to medium-sized rivers (Cummings and Mayer 1992, Strayer and Jirka 1997, Watters et al. 2009, Metcalfe-Smith et al. 2005), although it is reported to be more typical of smaller streams (Wilson and Clark 1914, Goodrich and Van Der Schalie 1944, Parmalee 1967, Buchanan 1980), where it reaches its greatest abundance (Parmalee and Bogan 1998). It is usually found in mixed sand and gravel substrates (Ortman 1919, Cummings and

Mayer 1992, Parmalee and Bogan 1998, Metcalfe-Smith et al. 2005, McMurry et al. 2012), but may be found in cobble (Buchanan 1980, Watters et al. 2009). *A. marginata* lives in moderately fast current (Parmalee 1967, Parmalee and Bogan 1998) and is said to be characteristic of riffles (Ortman 1919, Strayer and Jirka 1997, Watters et al. 2009). It may be found at water depths of several inches to two feet (Parmalee 1967) and may be difficult to detect, as it is usually deeply buried in the substrate (Metcalfe-Smith et al. 2005). This species requires high water quality (Watters et al. 2009).

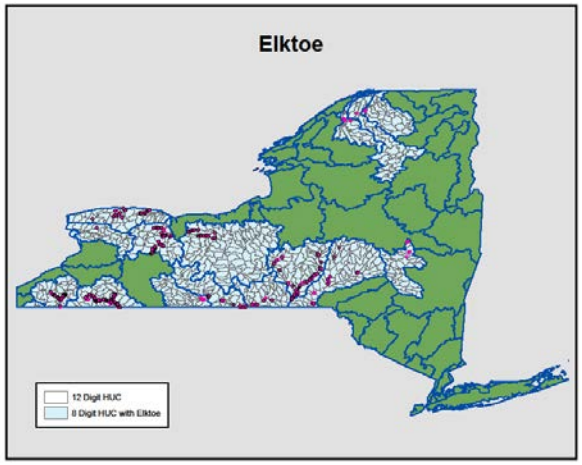
Primary Habitat Type
Large/Great River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Large/Great River; Low-Moderate Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; High Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Transitional Cool
Medium River; Low-Moderate Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Small River; Low Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Low-Moderate Gradient; Highly Buffered, Calcareous; Transitional Cool

Distribution:
Since 1970, *A.marginata* has been found in 33 New York State waterbodies.

In the recent Allegheny basin mussel survey (TNC 2009), a total of 1938 live *A. marginata* were found at 75 of 105 survey sites throughout both the Upper Allegheny (Allegheny River, Oswayo Creek, Olean Creek, Ischua Creek) and Conewango sub-basins (Conewango Creek, Cassadaga Creek). The greatest total catches (up to 43 per hour) were in the Allegheny River between Olean and Killbuck, NY and in Upper Olean and Lower Ischua Creek. This species was considered viable at 73% of the sites where found (55 of 75 sites).

In surveys of the Southern Lake Ontario basin115 *A. marginata* were found live. In the lower Genesee basin, *A. marginata* was found live in Black Creek (2 sites: 5 live), Conesus Creek (3 sites: 7 live), Honeoye Creek (7 sites: 12 live), and the Genesee River (6 sites: 39 live). In the Oswego basin it was found live in Red Creek (1 site: 8 live), Ganargua Creek (2 sites: 3 live), and Canandaigua Outlet (6 sites: 20 live). In the West Lake Ontario basin *A. marginata* was found live in Johnson Creek (1 site: 7 live), Sandy Creek (1 site: 1 live), and Oak Orchard (3 sites: 9 live). In addition, shells were found in the Erie Canal and Tonawanda Creek. This species was not detected in the tributaries of the Mid Lake Ontario basin (Mahar and Landry 2013).

In the Susquehanna basin, *A. marginata* was found in the Susquehanna River main stem (4 sites: 32 live), Chenango River (2 sites: 12 live), Chemung River (3 sites: 19 live), East Branch Tioughnioga River (2 sites: 8 live), Tioughnioga River (1 site: 3 live), and Unadilla River (5 sites: 44 live) (Harman and Lord 2010). This species was also found in Schoharie Creek and 2 unnamed tributaries, Grass River and its tributary Grannis Brook, an unnamed tributary to Trout Brook, a tributary of the St. Regis River, Raquette River, Tioga River, and Cole Creek, a tributary to Canisteo River (White et al. 2011).



Post-1970 distribution of *A. marginata* in New York (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions and Disturbance	Work and Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, culverts)	R	M	H
3. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (rusty crayfish, zebra mussel)	R	L	H
4. Pollution	Agricultural and Forestry Effluents (pesticides, fertilizers, sediment)	W	M	M
5. Pollution	Household Sewage and Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	L	H
6. Pollution	Household Sewage and Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	L	H
7. Climate Change and Severe Weather	Droughts	P	L	V
8. Natural System Modifications	Dams and Water Management/Use (lowering of water table from agriculture, NYC water use, etc…, causing drying of habitat)	W	L	M
9. Climate Change and Severe Weather	Storms and Flooding (extreme storms)	P	M	V

10. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H
11. Energy Production and Mining	Oil and Gas (hydraulic fracturing)	R	M	M

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Common Name: Kidneyshell ***SGCN***
Scientific Name: *Ptychobranchus fasciolaris*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G4G5
New York: S2
Tracked: Yes

Synopsis:
Ptychobranchus fasciolaris is grouped into the genus Ptychobranchus, named for its series of folds in the outer gills of a gravid female. The species name refers to banding pattern on the periostracum (Watters et al. 2009).

Since 1970, *P. fasciolaris* has been found in eight New York State waterbodies. It has recently been confirmed in multiple locations in the Allegheny basin, as well as in Lake Erie tributaries (The Nature Conservancy 2009, Mahar and Landry 2013). *P. fasciolaris* inhabits gravel riffles in large streams and small rivers.

Although rare and ranked as "imperiled" in New York, this edge of range species is considered secure throughout its range. In North America, approximately 2/3 to 3/4 of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, based on sparse historical information it is assumed that they too are declining due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%	X	Abundant		Moderate Decline	Moderate Decline
6% to 10%		Common			
11% to 25%		Fairly common	X		
26% to 50%		Uncommon			
> 50%		Rare			

Habitat Discussion:
P. fasciolaris is a high-water-quality species (Watters et al. 2009). It is most common in large creeks and small rivers, although can be found in large rivers (Niagara River) and some lakes (Erie, Chautauqua), where it attains a much smaller size (Strayer and Jirka 1997). It may be found at depths of less than three feet up to those as great as 18 to 24 feet (Parmalee and Bogan 1998). It is usually absent from headwater creeks less than 3 meters wide (COSEWIC 2003).

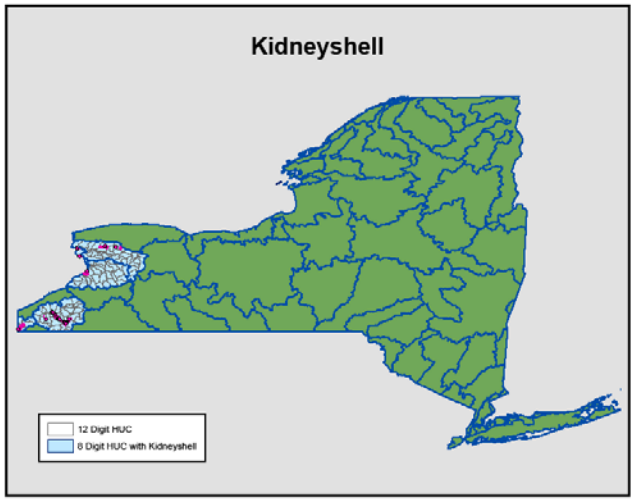
It is said to favor riffle areas with firmly-packed coarse gravel and sand substrate with moderate to swift flows, and to have an aversion to ponded or backwater conditions (Strayer and Jirka 1997, COSEWIC 2003, Metcalfe-Smith et al. 2005, Watters et al. 2009). However, there is some evidence that it occurs most frequently in low gradient streams (Strayer and Jirka 1997). Furthermore, this species is often found near beds of aquatic vegetation (Metcalfe-Smith et al. 2005).

Primary Habitat Type
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Small River; Low Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Moderate-High Gradient; Moderately Buffered, Neutral; Transitional Cool

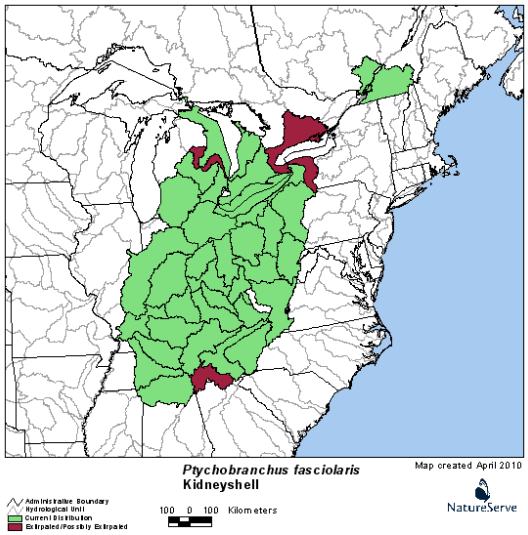
Distribution:
Since 1970, *P.fasciolaris* has been found in eight New York State waterbodies.

In the Allegheny watershed, 347 live *P. fasciolaris* were found in Conewango Creek and Cassadaga Creek, with most of the individuals found in the Cassadaga. This species was found at 16 of 105 Allegheny basin survey sites, with a mean catch of 1.65 per hour; its population was considered viable at 69% of these sites. A single unverified *P. fasciolaris* was reported from Oswayo Creek (The Nature Conservancy 2009). *P. fasciolaris* has also been found in French Creek (New York National Heritage Program 2013, Mahar and Landry 2013) and in abundance in Chautauqua Lake at Midway Park (2008, one live), Bemus Point (1987-1990, shells), and hundreds of live, some with mature glochidia, at Long Point (1989) (New York National Heritage Program 2013).

Since 1987, *P. fasciolaris* has been found in the Lake Erie basin, including locations in Lake Erie (shells at Athol Springs), an unnamed tributary to Lake Erie at Mount Vernon, west of Hamburg, and the Niagara River (live at Beaver Island and shells at Buckhorn Island) (Strayer and Jirka 1997, White et al. 2011, New York National Heritage Program 2013). In addition, live P. fasciolaris has recently been confirmed in Tonawanda Creek (Mahar and Landry 2013). Post 1970, *P. fasciolaris* has not been found in Johnson Creek, despite recent survey efforts (Mahar and Landry 2013).



Post-1970 distribution of *A. marginata* in New York (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).



NatureServe (2013)

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions and Disturbance	Work and Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, impassable culverts)	W	M	H
3. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (zebra mussels)	R	L	H
4. Pollution	Agricultural and Forestry Effluents (pesticides, fertilizers, sediment)	P	L	M
5. Pollution	Household Sewage and Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage and Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change and Severe Weather	Droughts	W	L	V
8, Natural System Modifications	Dams and Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	W	L	L
9. Climate Change and Severe Weather	Storms and Flooding (extreme storms)	W	M	V

10. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

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Williams, J.D., M.L. Warren, K.S. Cummings, J.L .Harris and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries. 18(9):6-22.

Common Name: Lilliput ***SGCN***
Scientific Name: *Toxolasma parvum*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G5
New York: SH
Tracked: Yes

Synopsis:
T. parvum is known for being one of the smallest unionoid species. The name *parvum* refers to its small size; most individuals never grow beyond 50mm in length. *T. parvum* typically lives in quiet waters of low-gradient streams, rivers, and reservoirs, often in muddy bottoms (Strayer and Jirka 1997). It has been shown to be a generalist even while being fairly rare (Pilger and Gido 2012). Since 1970, evidence of this species has been found in six New York waterbodies. Live specimens have been recently found in the Erie Canal and the Genesee River, with shells having been recently found in the Lake Ontario and lower Genesee basins (Mahar and Landry 2013). The New York state rank for *T. parvum* should be updated from "historic" to a rank reflecting its rarity and continued presence in the state.

In North America, approximately ⅔ to ¾ of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While *T. parvum* population trends in New York are unknown, it is assumed that they too are declining, due to a myriad of environmental stressors.

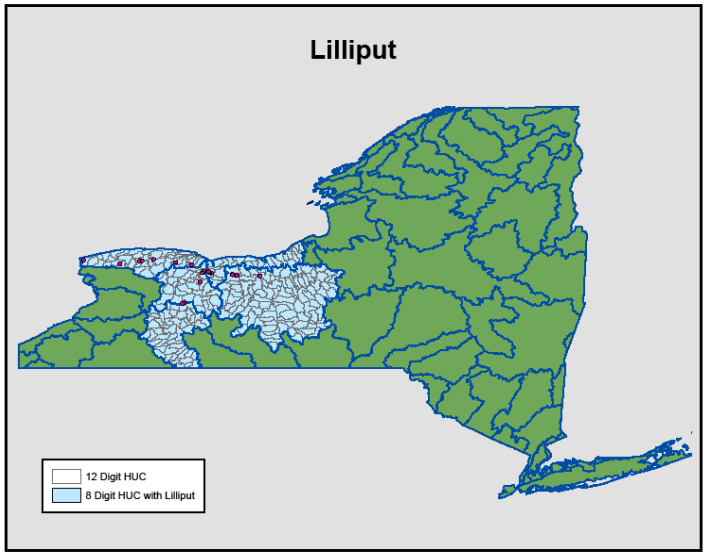
Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%		Abundant		Stable	Stable
6% to 10%	X	Common			
11% to 25%		Fairly common			
26% to 50%		Uncommon			
> 50%		Rare	X		

Habitat Discussion:
T. parvum can be found in the shallows of lakes, ponds, and reservoirs, as well as in low gradient, quiet waters of creeks, and small to large rivers, where it lives in soft substrate of mud, sand, or fine gravel (Cummings and Mayer 1992, Parmalee and Bogan 1998, Strayer and Jirka, 1997, Metcalfe-Smith et al. 2005, McMurray et al. 2012). In large rivers and wetlands, it can be found in backwater areas with little current. In New York, *T. parvum* is most common in the muddy substrate of low gradient canals and creeks (Mahar and Landry 2013). *T. parvum* is considered a generalist (Pilger and Gido 2012, NatureServe 2013).

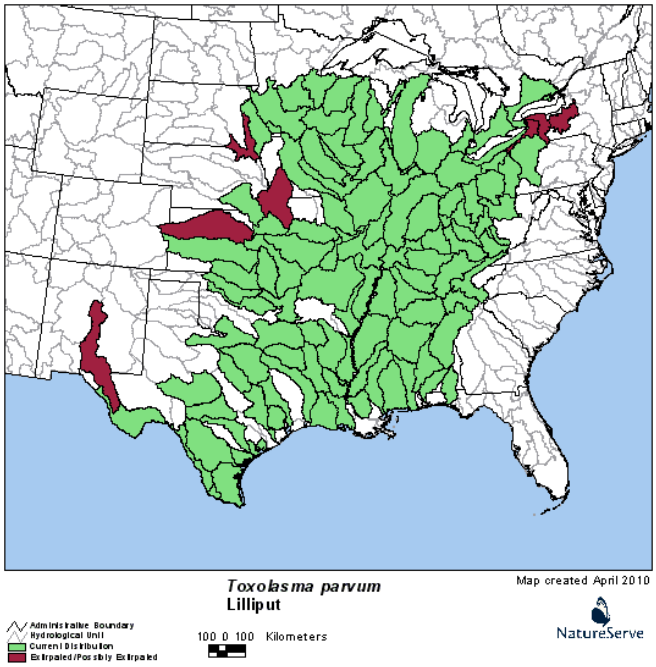
Primary Habitat Type
Headwater/Creek; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Moderate-High Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm

Distribution:
Since 1970, *T. parvum* has been found in six New York State waterbodies.

T. parvum was found live in the Genesee River at Mt. Morris, and in the Erie Canal in Palmyra and at Lock 30 (Macedon, Wayne Co.). Fresh shells have been found in the West Lake Ontario basin (Fourmile Creek, Niagara County), the Mid Lake Ontario basin (Red Creek and Allen Creek, both in Monroe County), and the Lower Genesee basin (Honeoye Creek, a tributary to the Genesee River). In addition, 55 lilliput shells were found in the Erie Canal at eleven locations between the Royalton, Niagara County and Lyons, Wayne County, with 27 of those shells found in Brockport, Monroe County (Mahar and Landry 2013).



Post-1970 distribution of *T. parvum* in New York (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).



T.parvum distribution in North America (NatureServe 2013). This map is incorrect. Although rare, *T. parvum* is not extirpated from New York's SE and SW Lake Ontario basins (Mahar and Landry 2013).

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions and Disturbance	Work and Other Activities (bridge projects and other instream work)	R	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, culverts)	R	L	H
3. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (zebra mussels, rusty crayfish)	P	L	H
4. Pollution	Agricultural and Forestry Effluents (pesticides, fertilizers, sediment)	P	L	M
5. Pollution	Household Sewage and Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage and Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change and Severe Weather	Droughts	P	L	V
8. Natural System Modifications	Dams and Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	W	L	M
9. Climate Change and Severe Weather	Storms and Flooding (extreme storms)	W	M	V

10. Invasive and Other Problematic Species and Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

References Cited:

Cummings, K. S., and C. A. Mayer. 1992. Field guide to freshwater mussels of the Midwest (p. 194). Champaign, Illinois: Illinois Natural History Survey.

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Williams, J.D., M.L. Warren, K.S. Cummings, J.L .Harris and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries. 18(9):6-22.

Common Name: Mucket ***SGCN***
Scientific Name: *Actinonaias ligamentina*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G5
New York: S1S2
Tracked: Yes

Synopsis:
Actinonaias ligamentina belongs to the subfamily Ambleminae and the tribe Lampsilini, which includes 17 extant and 6 likely extirpated New York species of the genera Actinonaias, Epioblasma, Lampsilis, Leptodea, Ligumia, Obovaria, Potamilus, Ptychobranchus, Toxolasma, Truncilla, and Villosa (Graf and Cummings 2011, Haag 2012). *A. ligamentina* belongs to the genus Actinonaias, which is characterized by rays on the periostracum. *A. ligamentina* is named for its large, strong ligament (Watters et al. 2009).

This species typically inhabits fast flowing sections of large streams and rivers in cobble and gravel, and is occasionally found in slow water (Strayer and Jirka 1997). Since 1970, it has been found in seven New York waterbodies. It is often the most abundant mussel in the Allegheny River system's medium gradient streams (The Nature Conservancy 2009). In addition to the upper Allegheny basin and Conewango Creek basin, *A. ligamentina* is also found in the French Creek and Lake Erie basins.

Although ranked as "critically imperiled" in New York, this edge of range species is considered secure throughout its range. In North America, approximately 2/3 to 3/4 of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, based on sparse historical information, it is assumed that they too are declining due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%	X	Abundant		Stable	Stable
6% to 10%		Common	X		
11% to 25%		Fairly common			
26% to 50%		Uncommon			
> 50%		Rare			

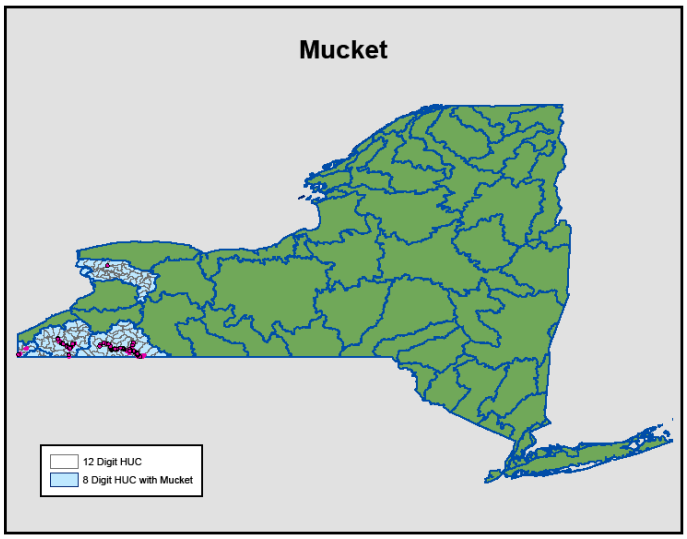
Habitat Discussion:
Mucket typically inhabits large creeks and rivers (Strayer and Jirka 1997, Cummings and Mayer 2002, NatureServe 2013). It is "best fitted for the rough parts, riffles with strong current and heavy gravel and rocks," but may also be found in sandy mud or gravel along stream margins (Ortmann, 1919). This early habitat assessment is consistent with Watters et al. (2009) and with Strayer and Jirka (1997), who note that the species is most common in cobble and sand in moving water, although habitats in New York range from stony riffles to soft–bottomed pools. It may rarely occur in shallow water areas of large lakes (NatureServe 2013).

Primary Habitat Type
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Transitional Cool
Medium River; Low-Moderate Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Moderate-High Gradient; Assume Moderately Buffered (Size 3+ rivers); Transiti
Small River; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool

Distribution:
Since 1970, *A. ligamentina* has been found in seven New York State waterbodies.

A. ligamentina is currently found in medium and large creeks and rivers of the greater Allegheny River system, in which it is arguably the most abundant species (Strayer and Jirka 1997, Smith and Crabtree 2005, Smith and Meyer 2008, Smith and Crabtree 2009, The Nature Conservancy 2009), and often is the dominant species in medium-gradient habitats (such as the main stem of the Allegheny River) (The Nature Conservancy 2009). The Nature Conservancy found 4,163 live *A. ligamentina* at 61 of 105 survey sites with greatest total catches (up to 117 per hour) in the Allegheny River upstream of Olean. *A. ligamentina* populations were found throughout both the Upper Allegheny and Conewango sub-basins, including Oswayo Creek, Olean Creek, Conewango Creek, Cassadaga Creek, and the mainstem of the Allegheny River from downstream of Salamanca upstream to Portville. Populations were considered viable at 82% of the sites where they were found (The Nature Conservancy 2009).

Between 1988 and 1990, live *A. ligamentina* were found at several locations in the New York portion of French Creek. During this same time period, old shells were found in Tonawanda Creek in the Erie Basin (New York Natural Heritage Program 2013). In 2013 over 50 live *A. ligamentina* were found in French Creek, southwest of French Creek town, Chautauqua Co (Burlakova, Karatayev, unpublished data).



Post-1970 distribution of *A. ligamentina* in New York (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions & Disturbance	Work & Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, impassable culverts)	W	M	H
3. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (zebra mussels)	W	L	H
4. Pollution	Agricultural & Forestry Effluents (pesticides, fertilizers, sediment)	P	L	M
5. Pollution	Household Sewage & Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage & Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change & Severe Weather	Droughts	P	M	V
8. Natural System Modifications	Dams & Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	R	L	L
9. Climate Change & Severe Weather	Storms & Flooding (extreme storms)	W	M	V

10. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

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Williams, J.D., M.L. Warren, K.S. Cummings, J.L .Harris and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries. 18(9):6-22.

Common Name: Paper pondshell ***SGCN***
Scientific Name: *Utterbackia imbecillis*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G5
New York: SH
Tracked: Yes

Synopsis:
Utterbackia imbecillis is the only member of the Utterbackia genus. The species name *imbecillis* comes from the Latin word meaning feeble or weak, most likely describing the thin, fragile shell of *U. imbecillis* (Watters et al. 2009).

U. imbecillis generally prefers muddy/silty habitats with relatively slow moving water (Watters et al. 2009, NatureServe 2013). In New York this species is currently found in four streams in the Oswego and Mid-Ontario basins, and in the Erie Canal from Orleans County to Wayne County (Mahar and Landry 2013). Historically, *U. imbecillis* was also found in the Alleghany, Mohawk, and upper Hudson basins (Strayer and Jirka 1997). The New York state rank for *U. imbecillis* should be updated from Historic to a rank reflecting its rarity and continued presence in the state.

In North America, approximately 2/3 to 3/4 of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, based on sparse historical information, it is assumed that they too are declining due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%		Abundant		Stable	Stable
6% to 10%	X	Common			
11% to 25%		Fairly common			
26% to 50%		Uncommon			
> 50%		Rare	X		

Habitat Discussion:
U. imbecillis is most typically found in soft substrates in quiet waters of ponds, lakes, and sluggish mud-bottomed pools and backwaters of creeks and rivers (Cummings and Mayers 1992, Strayer and Jirka 1997 Metcalfe-Smith et al. 2005, Watters et al. 2009, McMurray et al. 2012). It is commonly found in artificial waters (e.g., canals, impoundments, boat basins, retention ponds, old phosphate pits) (Watters et al. 2009, NatureServe 2013). This species seems to be tolerant of moderately poor water and habitat quality (muddy substrates). Such substrates have become more prevalent with increased eutrophication (NatureServe 2013).

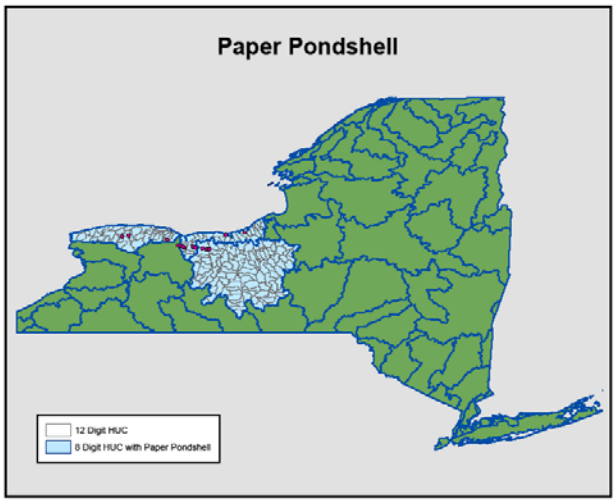
Primary Habitat Type
Headwater/Creek; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Small River; Low Gradient; Moderately Buffered, Neutral; Transitional Cool

Distribution:
Since 1970, *U. imbecilis* has been known from five New York State waterbodies.

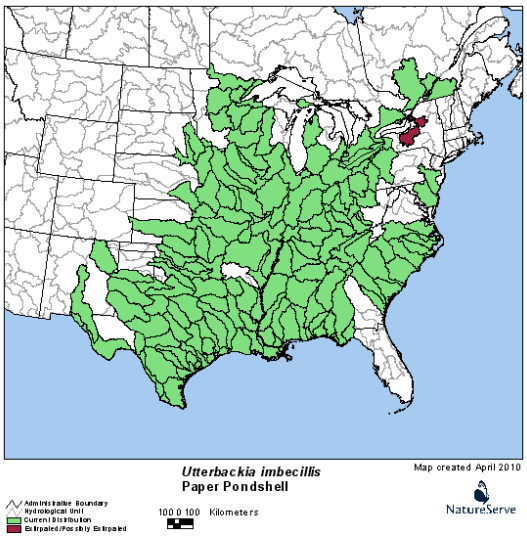
In the Oswego basin, this species has been found live in Red Creek (Palmyra) and Pond Brook, an outflow of Junius Ponds, both in Wayne County, and Catharine Creek Canal in Schuyler County. In the Mid Lake Ontario basin, it has been found live in Red Creek (Wolcott) and First Creek, also both in Wayne County. A total of 57 fresh shells were found at 13 Erie Canal locations between Ridgeway, Orleans Co. and Macedon, Wayne County, with the majority of the shells (32) found at a single site in Macedon (Mahar and Landry 2013).

No evidence of *U. imbecillis* was found in the Lower Genesee basin and the only occurrences of this species in the West Lake Ontario basin were from the Erie Canal (Mahar and Landry 2013). This species was not detected in the recent Allegheny basin and Susquehanna basin mussel surveys (The Nature Conservancy 2009, Harman and Lord 2010).

Live *U. imbecillis* were found in Spicer Creek (Niagara River Tributary, Grand Island, 2 specimens) in 2011, and in Lake Ontario watershed: 2 in Twelve Mile Creek (Niagara Co.) and one in the Black River Bay in 2012 (Burlakova, Karatayev et al. unpublished data).



U. imbecillius post-1970 distribution in New York (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).



U. imbecillis distribution in North America (NatureServe 2013). This map is incorrect, as *U. imbecillis* has recently been found live in New York's Mid Lake Ontario basin (Mahar and Landry 2013).

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Pollution	Household Sewage & Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	L	H
2. Natural System Modifications	Dams & Water Management/Use (Lowering of water table from agriculture, etc…, causing drying of habitat)	R	L	L
3. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

References Cited:

Harman, W.N. and P.H. Lord 2010. Susquehanna Freshwater Mussel Surveys, 2008-2010. Final report submitted to New York State Department of Environmental Conservation. SUNY Oneonta. Cooperstown, NY. 24 pp + plus appendix.

Mahar, A.M. and J.A. Landry. 2013. State Wildlife Grants Final Report: Inventory of Freshwater Mussels in New York's Southeast and Southwest Lake Ontario Basins, 2008-2013. New York State Department of Environmental Conservation. Avon, NY. In progress.

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NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: February 12, 2013).

Strayer, D.L. and K.J. Jirka. 1997. The Pearly Mussels of New York State. New York State Museum Memoir (26): 113 pp., 27 pls

The Nature Conservancy 2009. Freshwater Mussel (Unionidae) Distributions, Catches, and Measures of their Viability across the Catches, and Measures of their Viability across the Allegheny River Basin in New York. Report submitted New York State Department of Environmental Conservation. The Nature Conservancy, Central and Western NY Chapter. Rochester, NY. 63 pp.

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Common Name: Pink heelsplitter ***SGCN***
Scientific Name: *Potamilus alatus*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G5
New York: S2S3
Tracked: Yes

Synopsis:
Potamilus alatus is one of two species of the genus Potamilus that have been found in New York (Strayer and Jirka 1997). It is found in the Mississippi River system as well as in the Great Lakes drainage and the upper St. Lawrence River. In New York's it is currently found in 18 waterbodies in the Lower Genesee, West Lake Ontario (Mahar and Landry 2013), east Lake Ontario (Black River Bay, Burlakova et al. unpublished), Finger Lakes (White et al. 2011), Erie (Mahar and Landry 2013, NY Natural Heritage Program 2013), and Lake Champlain basins (White et al. 2011, NY Natural Heritage Program 2013), and in the Erie Canal (Mahar and Landry 2013). Its habitat ranges from quiet waters of lakes and canals to riffles of creeks and rivers (Watters et al. 2009).

Although rare and ranked as "Imperiled/Vulnerable" in New York, this edge-of-range species is considered secure throughout its range. In North America, approximately 2/3 to 3/4 of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, based on sparse historical information it is assumed that they too are declining due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%		Abundant		Moderate Decline	Moderate Decline
6% to 10%		Common			
11% to 25%	X	Fairly common			
26% to 50%		Uncommon	X		
> 50%		Rare			

Habitat Discussion:
P. alatus is especially common in quiet backwaters in silty sand and mud. It is widespread in shallow lake habitat, impoundments, canals, and medium to large rivers (Cummings and Mayer 1992, Strayer and Jirka 1997, Metcalfe-Smith et al. 2005, Watters et al. 2009, NatureServe 2013). Although less common, it can also be found in riffles of creeks and rivers (Strayer and Jirka 1997).

Primary Habitat Type
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Low-Moderate Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Moderate-High Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm

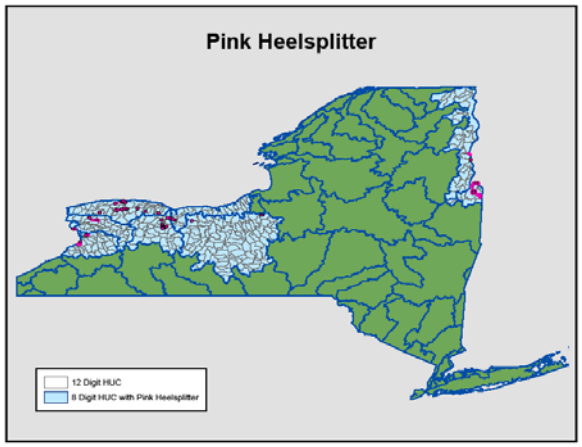
Small River; High Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Low Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool

Distribution:

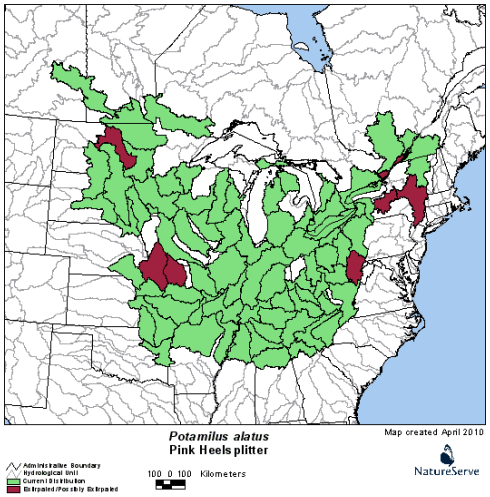
Since 1970, *P. alatus* is has been found in 17 New York State waterbodies. In the Lower Genesee basin, this species has been found live in Black Creek, Honeoye Creek, and the Genesee River. In the West Lake Ontario basin, it was found live in Johnson Creek and as shells in Oak Orchard Creek (Mahar & Landry 2013). In the Finger Lakes basin, it has been found in Canandaigua Lake at Vine Valley (White et al. 2011). In the Erie basin it has been found alive in Tonawanda Creek (Mahar and Landry 2013) and Cayuga Creek, and fresh shells were found in Lake Erie (Athol Springs), Niagara River and Buffalo River (NY Natural Heritage Program 2013). In the Lake Champlain basin, live mussels were found in Putnam Creek Delta, Poultney River, the Mettawee River at Whitehall (NY Natural Heritage Program 2013), and in Lake Champlain at Crown Point (White et al. 2011). *P. alatus* has also been collected from the Lake Ontario's Black River Bay (Mahar and Landry 2013). In the Erie Canal, live specimens were found from Gasport to Albion and over 300 shells, including many fresh dead and juveniles, have been found from Gasport to Macedon, and in the Seneca River at Baldwinsville (Mahar and Landry 2013).

Waterbodies with greatest *P. alatus* abundance include the Poultney River with 42 live, include Honeoye Creek with 38 live, Johnson Creek with 22 live, Black River Bay with 15 live, and the Erie Canal (Mahar and Landry 2013, NY Natural Heritage Program).

Recent surveys did not find *P. alatus* in the Mid Lake Ontario basin, except where the Erie Canal passes through the watershed (Mahar and Landry 2013). However it has been found in East Lake Ontario basin, in the Black River Bay in 2012 (Burlakova et al., in preparation). Although *P. alatus* has not been reported from the St. Lawrence or its tributaries in northern New York, it may turn up in these waters (Strayer and Jirka 1997).



Potamilus alatus post-1970 distribution in New York (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).



NatureServe (2013)

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions & Disturbance	Work & Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, impassable culverts)	W	M	H
3. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (zebra mussels)	P	L	H
4. Pollution	Agricultural & Forestry Effluents (pesticides, fertilizers, sediment)	P	L	M
5. Pollution	Household Sewage & Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage & Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change & Severe Weather	Droughts	R	L	V
8. Natural System Modifications	Dams & Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	R	L	L
9. Climate Change & Severe Weather	Storms & Flooding (extreme storms)	R	M	V

10. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H
11. Invasive & Other Problematic Species & Genes/Pollution?	Invasive Non-Native/Alien Species (lampricide)	R	L	H

References Cited:

Cummings, K. S., and Mayer, C. A. 1992. Field guide to freshwater mussels of the Midwest (p. 194). Champaign, Illinois: Illinois Natural History Survey.

Harman, W.N. and P.H. Lord 2010. Susquehanna Freshwater Mussel Surveys, 2008-2010. Final report submitted to New York State Department of Environmental Conservation. SUNY Oneonta. Cooperstown, NY. 24 pp + plus appendix.

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Strayer, D.L. and K.J. Jirka. 1997. The Pearly Mussels of New York State. New York State Museum Memoir (26): 113 pp., 27 pls

The Nature Conservancy. 2009. *Freshwater Mussel (Unionidae) Distributions, Catches, and Measures of their Viability across the Catches, and Measures of their Viability across the Allegheny River Basin in New York.* Report submitted New York State Department of Environmental Conservation. The Nature Conservancy, Central and Western NY Chapter. Rochester, NY. 63 pp.

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Williams, J.D., M.L. Warren, K.S. Cummings, J.L .Harris and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries 18(9):6-22.

Common Name: Plain pocketbook ***SGCN***
Scientific Name: *Lampsilis cardium*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G5
New York: S4
Tracked: No

Synopsis:
Lampsilis cardium is one of seven species of the genus *Lampsilis* that have been found in New York (Strayer and Jirka 1997).

Although the NYS CWCS (2006) combines *L. ovata* and *L. cardium* under the L. ovata listing, almost all New York material is "*L. cardium*" with only specimens from the Allegheny River basin classified as "*L. ovata*" (Strayer and Jirka 1997, The Nature Conservancy 2009). Additionally, NY Natural Heritage Program (2013), NatureServe (2013) and most recent species reference guides (Cummings and Mayer 1992, Parmalee and Borgan 1998, Watters et al. 2009,) regard *L. ovata* and *L. cardium* as separate species. For the purpose of this assessment, *L. ovata* as described in the NYS CWCS will be divided into *L. ovata* and *L. cardium*.

Since 1970, *L. cardium* has been found in 19 New York waterbodies. In New York, it has been found in the Lower Genesee, Oswego, Erie (Mahar and Landry 2013), Allegheny (The Nature Conservancy 2009), Champlain (Strayer and Jirka 1997), Hudson, and St. Lawrence basins (NY Natural Heritage Program 2013). *L. cardium* is present in creeks, rivers, ponds, and lakes. It tolerates many substrates and water flows (Watters et al. 2009).

In New York, *L. cardium* is ranked as Apparently Secure, and as secure throughout its range (NatureServe 2013). In North America, approximately 2/3 to 3/4 of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, it is assumed that they too are declining, due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%		Abundant		Stable	Stable
6% to 10%		Common			
11% to 25%	X	Fairly common	X		
26% to 50%		Uncommon			
> 50%		Rare			

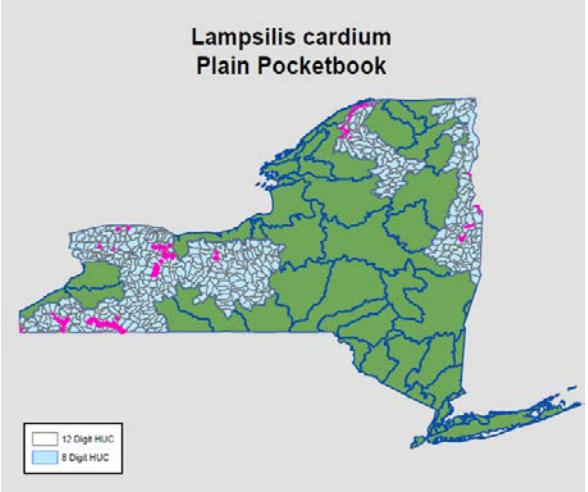
Habitat Discussion:
Watters et al. (2009) notes that L. cardium is widespread in creeks, rivers, ponds, and lakes and tolerates many substrates and water flows. However, other sources state only that this species is found in flowing water, with moderate to strong current, and stable substrates of mud, silt, sand, or gravel (Parmalee and Bogan1998, Cummings and Mayer 1992, Metcalfe-Smith et al. 2005, McMurry et. al. 2012).

Primary Habitat Type
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Transitional Cool
Medium River; Low-Moderate Gradient; Assume Moderately Buffered (Size 3+ rivers); Transitional Cool
Medium River; Low-Moderate Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Moderate-High Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Small River; Low-Moderate Gradient; Highly Buffered, Calcareous; Transitional Cool
Small River; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Moderate-High Gradient; Highly Buffered, Calcareous; Transitional Cool
Small River; Moderate-High Gradient; Moderately Buffered, Neutral; Transitional Cool

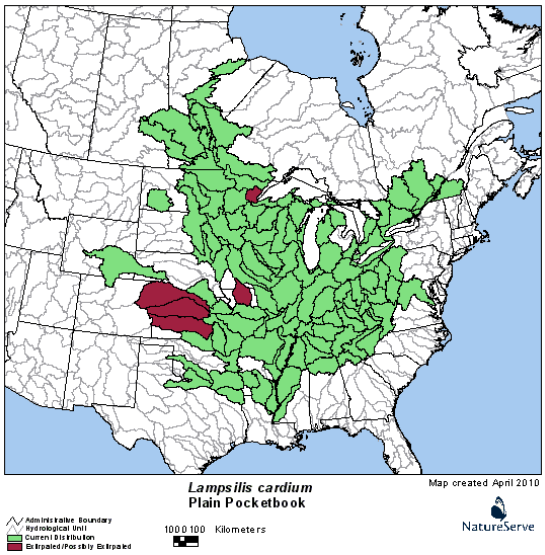
Distribution:
L. cardium was found at 48 of 105 sites surveyed in the Allegheny basin. It was distributed throughout the Upper Allegheny and Conewango sub-basins but at relatively low numbers. *L. cardium* were considered viable at 21 of the sites where they were found. During this survey effort, a total of 405 L. cardium were found in Oswayo Creek, Olean Creek, Allegheny River, Conewango Creek, Cassadaga Creek (The Nature Conservancy 2009). This species is also present in Red House Brook (Mahar and Landry 2013). In addition, recent records exist for French Creek (Strayer and Jirka 1997), where it was found live in 2013 (Burlakova, Karatayev, unpublished data).

In the Lower Genesee basin, *L. cardium* has been found in Black Creek, Conesus Creek, Genesee River, Honeoye Creek. In the Oswego basin, this species was found in Canandaigua Outlet (Mahar and Landry 2013). In the Erie basin, *L. cardium* was collected from Cayuga Creek (NY Natural Heritage Program 2013) and from 4 of 38 sites surveyed in the Tonawanda Creek watershed (Marangelo and Strayer 2000, NY Natural Heritage Program 2013, Mahar and Landry 2013). Records from the St. Lawrence River basin include Raquette River, Grass River (Strayer and Jirka 1997), Salmon River, and Little Salmon River (NY Natural Heritage Program 2013). In addition, Strayer and Jirka (1997) report records in the southern Champlain basin (likely the southern end of Lake Champlain and the Lake Champlain Canal), as well as sites in the Hudson basin (Hudson River and possibly 1–2 tributaries) near the entrance of the Champlain Canal.

Streams of greatest *L. cardium* abundance include the Genesee River with 1261 live, Honeoye Creek with 352 live (Mahar and Landry 2013), the Allegheny River upstream of Olean, and Oswayo Creek (The Nature Conservancy 2009). *L. cardium* was not found in the recent Susquehanna survey (Harman and Lord 2010).



L. cardium post-1970 distribution in New York (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).



NatureServe (2013)

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions & Disturbance	Work & Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, culverts)	R	M	H
3. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (zebra mussels)	P	L	H
4. Pollution	Agricultural & Forestry Effluents (pesticides, fertilizers, sediment)	P	L	M
5. Pollution	Household Sewage & Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage & Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change & Severe Weather	Droughts	R	L	V
8. Natural System Modifications	Dams & Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	R	L	L
9. Climate Change & Severe Weather	Storms & Flooding (extreme storms)	R	M	V

10. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

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Common Name: Pocketbook ***SGCN***
Scientific Name: *Lampsilis ovata*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G5
New York: S2S3
Tracked: Yes

Synopsis:
Lampsilis ovata is one of seven species of the genus *Lampsilis* that have been found in New York (Strayer and Jirka 1997). Although the NYS CWCS (2006) combines *L. ovata* and *L. cardium* under the *L. ovata* listing, almost all New York material is "*L. cardium*" with only specimens from the Allegheny River basin classified as "*L. ovata*" (Strayer and Jirka 1997, The Nature Conservancy 2009). Additionally, NY Natural Heritage Program (2013), NatureServe (2013) and most recent species reference guides (Cummings and Mayer 1992, Parmalee and Borgan 1998, Watters et al. 2009) regard *L. ovata* and *L. cardium* as separate species. For the purpose of this assessment, *L. ovata* as described in the NYS CWCS will be divided into *L. ovata* and *L. cardium*.

Since 1970, *L. ovata* has been found in five New York waterbodies. This species is considered a large creek or riverine species, usually found in strong currents, occasionally in riffles (Cummings and Mayer 1992, Parmalee and Borgan 1998, Watters et al. 2009).

In New York, *L. ovata* is ranked as Imperiled/Vulnerable, although it is secure throughout its range (NatureServe 2013). In North America, approximately 2/3 to 3/4 of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, it is assumed that they too are declining, due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%	X	Abundant		Stable	Stable
6% to 10%		Common			
11% to 25%		Fairly common	X		
26% to 50%		Uncommon			
> 50%		Rare			

Habitat Discussion:
L. ovata is considered a large creek or riverine species, usually found in strong currents, occasionally in riffles (Cummings and Mayer 1992, Parmalee and Borgan 1998, Watters et al. 2009). However, in Tennessee, it has been found to adapt well to impoundments, and may be found at depths between 2 and 20 feet (Parmalee and Borgan 1998). It occurs in substrates of sandy mud, coarse sand and gravel, and cobble, although it seems to thrive on a stable substrate composed of a high percentage of mud and silt (Watters et al. 2009, Cummings and Mayer 1992, Parmalee and Borgan 1998).

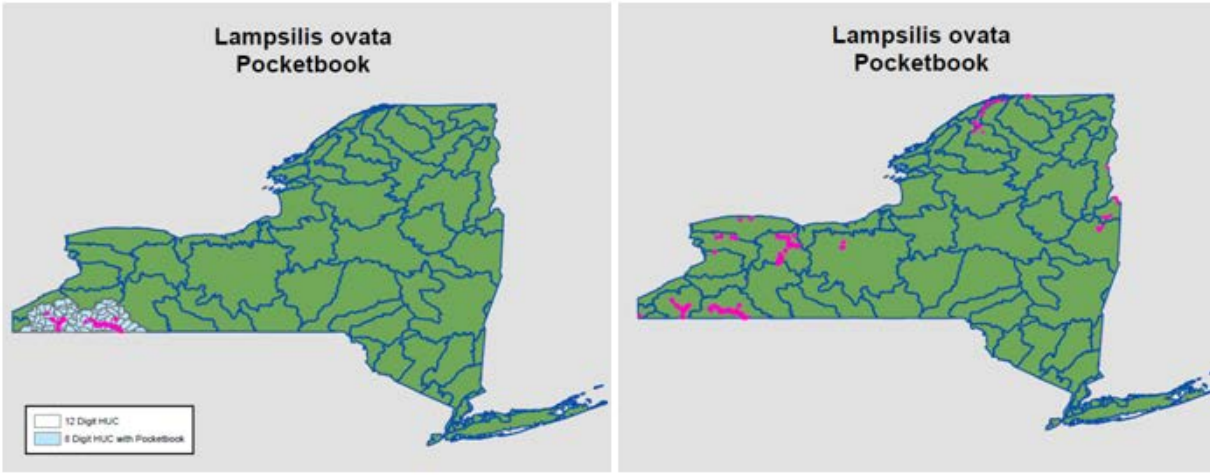
Primary Habitat Type
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Low-Moderate Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm

Distribution:
Since 1970, *L. ovata* has been found in five New York waterbodies.

A total of 286 *L. ovata* were found at 36 of 105 sites surveyed in the Allegheny basin. The greatest catches (up to 7 per hour) were in the Allegheny River near and upstream of Olean. *L. ovata* was also found in Olean Creek, Oswayo Creek, Conewango Creek, and Cassadaga Creek, where it was present at relatively low numbers. *L. ovata* populations were considered viable at 18 of the sites where they were found (The Nature Conservancy 2009).

Also in the Allegheny watershed, Strayer and Jirka (1997) noted a recent occurrence in French Creek. *L. ovata* are known to be present in the French Creek watershed (Crabtree personal communication 2008), therefore, this referenced occurrence is thought be *L. ovata*.

Based on shell morphology (where documentation has been available, such as in recent surveys of the Erie and Southern Lake Ontario basins) and location, mussels found throughout the remainder of New York are assumed to be *L. cardium*, and have been classified as such for the purpose of this assessment.



Post-1970 *L. ovata* distribution in New York State, left. Post 1970 distribution of *L. ovata* and *L. cardium* combined, right (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions & Disturbance	Work & Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, impassable culverts)	W	M	H
3. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (zebra mussels)	P	L	H
4. Pollution	Agricultural & Forestry Effluents (pesticides, fertilizers, sediment)	P	L	M
5. Pollution	Household Sewage & Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage & Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change & Severe Weather	Droughts	W	L	V
8. Natural System Modifications	Dams & Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	R	L	L
9. Climate Change & Severe Weather	Storms & Flooding (extreme storms)	W	M	V

10. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

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Common Name: Round pigtoe ***SGCN***
Scientific Name: *Pleurobema sintoxia*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G4
New York: S1
Tracked: Yes

Synopsis:
Pleurobema sintoxia is one of two species of the genus *Pleurobema* that have been found in New York (Strayer and Jirka 1997). In general, the shells of this tribe are unsculptured and larvae are brooded only in the outer demibranchs (with exceptions) (Graf and Cummings 2011). The genus name Pleurobema, meaning step, refers to the ribs found between the shell annulae (Watters et al. 2009).

In Strayer and Jirka's *The Pearly Mussels of New York State* (1997), this New York species is referred to as *Pleurobema cordatum*. However, *P. cordatum* is part of a complex of closely related species or ecophenotypes (*P. cordatum*; *P. coccineum = P. sintoxia*; *P. plenum*; *P. rubrum = P. pyramidatum*) that are found throughout the Ohio River drainage and in parts of the Mississippi and Great Lakes basins. These were widely regarded as intergrading ecophenotypes (e.g., Ortmann 1919), but more recently they have been recognized as distinct species (Stansbery and King 1983, Williams et al. 1993). Only the coccineum form (and its large lake ecophenotype form pauperculum) has been seen in New York (Strayer and Jirka 1997), while *P. cordatum* refers to a similar species not found in New York State. Both Watters et al. (2009) and Strayer and Jirka (1997) note that both *P. coccineum* and *P. pauperculum* fall under the species designation *P. sintoxia*. In addition, the New York Natural Heritage Program refers to this New York species as *P. sintoxia*.

Impoundments have caused declines for this species across its range, with long term trends suggesting between 30% and 50% declines (NatureServe 2013). Although rare and ranked as "Critically Imperiled" in New York, this edge of range species is considered "Apparently Secure" throughout its range. In North America, approximately 2/3 to 3/4 of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, based on sparse historical information it is assumed that they too are declining due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%	X	Abundant		Moderate Decline	Moderate Decline
6% to 10%		Common			
11% to 25%		Fairly common	X		
26% to 50%		Uncommon			
> 50%		Rare			

Habitat Discussion:
Although *P. sintoxia* is commonly cited as living in medium-sized to large rivers (Cummings and Mayer 1992, Metcalfe-Smith et al. 2005, Watters et al. 2009, McMurry et al. 2012), in New York, it may be found in creeks and rivers of all sizes, but is more likely to be found in large creeks and small- to

medium-sized rivers (Strayer and Jirka 1997). Its large lake ecophenotype form *pauperculum* is found in the Great Lakes and the Niagara River (Strayer and Jirka 1997).

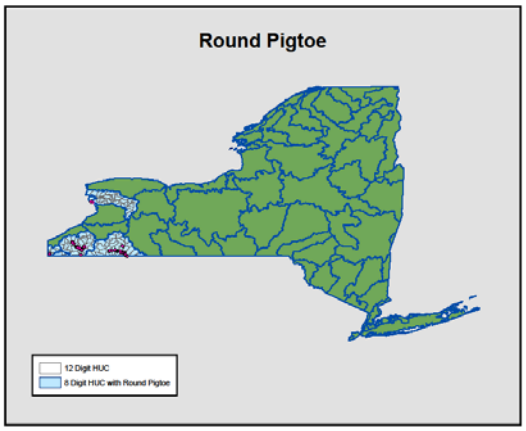
P. sintoxia may be found in a variety of substrates from mud and silt to gravel, cobble, and boulder (Cummings and Mayer 1992, Metcalfe-Smith et al. 2005, McMurry et al. 2012). Although most commonly found in moving water, it has been found in water depths of 1 inch to 5 feet in standing to moderately flowing water (Metcalfe-Smith et al. 2005, Watters et al. 2009). This species is somewhat sensitive to pollution, siltation, habitat perturbation, inundation, and loss of glochidial hosts (NatureServe 2013).

Primary Habitat Type
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Transitional Cool
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Moderate-High Gradient; Assume Moderately Buffered (Size 3+ rivers); Transitional Cool
Small River; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Moderate-High Gradient; Moderately Buffered, Neutral; Transitional Cool

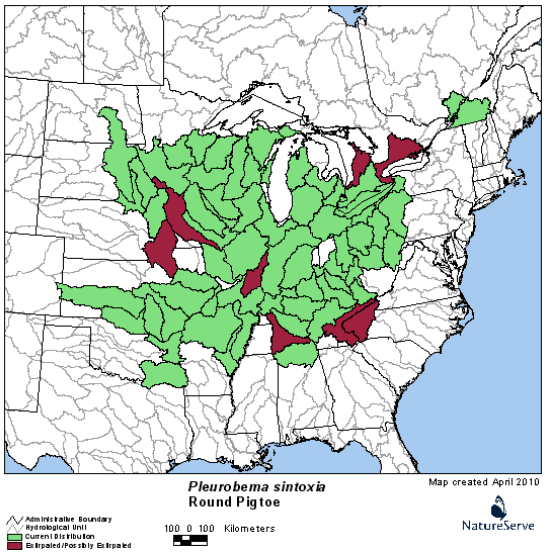
Distribution:
Since 1970, *P. sintoxia* has been found in eight New York State waterbodies. *P. sintoxia* is a common species in parts of its range, but it is uncommon at its New York localities, constituting only a few percent of the unionoid community (Strayer and Jirka 1997).

In a recent survey of the Allegheny basin, 223 live *P. sintoxia* were found throughout the Upper Allegheny and Conewango sub-basins at 37 of 105 survey sites. It was considered viable at 18 of the sites where it was found. The greatest catches (up to 7 per hour) were in the Allegheny River upstream of Olean, but patches of *P. sintoxia* were found in Conewango, Cassadaga, Olean, Ischua, and Oswayo Creeks (The Nature Conservancy 2009). As recently as 2005, recruitment was verified in Cassadaga Creek (NY Natural Heritage Program 2013). Also in the Allegheny basin, NY Natural Heritage Program notes *P. sintoxia* occurrences in French Creek (2013), and three live individuals were found south-west of French Creek town in 2013 (Burlakova et al., unpublished data).

In addition, in 1990, one live adult and many recently dead shells, including young animals, were found at Beaver Island on the Niagara River, indicating that there is likely a good population at or near this site (NY Natural Heritage Program 2013)), and two live *P. sintoxia* were found there in 2011 (Burlakova, unpublished data). *P. sintoxia* may very well live in creeks tributary to Lake Erie and the Niagara River (Strayer and Jirka 1997).



Post 1970 *P. sintoxia* distribution in New York State (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).



NatureServe (2013)

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions & Disturbance	Work & Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, impassable culverts)	W	M	H
3. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (zebra mussels)	P	L	H
4. Pollution	Agricultural & Forestry Effluents (pesticides, fertilizers, sediment)	P	L	M
5. Pollution	Household Sewage & Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage & Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change & Severe Weather	Droughts	W	L	V
8. Natural System Modifications	Dams & Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	R	L	L
9. Climate Change & Severe Weather	Storms & Flooding (extreme storms)	W	M	V

10. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

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Common Name: Threeridge ***SGCN***
Scientific Name: *Amblema plicata*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: Not Listed

Natural Heritage Program Rank:
Global: G5
New York: S1
Tracked: Yes

Synopsis:
Amblema plicata belongs to the subfamily Ambleminae and the tribe Amblemini, which includes a single New York species of the genus *Amblema* (Haag 2012). Until the advent of molecular phylogenetic analyses using mitochondrial DNA, the *Amblemini* and *Quadrulini* were united into a single taxon. Members of both tribes brood their larvae in all four demibranchs, and they tend to have shells sculptured with ridges, pustules or both (Graf and Cummings 2011). *A. plicata* belongs to the genus *Amblema*, which is characterized by blunt margins on all four sides of its shell. *A. plicata* is characterized by folds on the lateral surface of the shell (Watters et al. 2009).

This species lives in lakes, creeks, and rivers, where it is often the most dominant species in the unionoid community. It is common in muddy, low-gradient streams and rivers (Strayer and Jirka 1997). Since 1970, this species has been found in four New York waterbodies. It is prevalent in Cassadaga and Conewango Creeks in the Allegheny basin and shell specimens have been recently located in the Erie Canal at Macedon (Mahar and Landry 2013). It has been extirpated from the Buffalo River drainage, yet remains abundant in Tonawanda Creek (Erie Basin). Watters et al. (2009) stated that this once widespread and abundant species has been locally extirpated in many parts of its former range, for unknown reasons.

In New York, *A. plicata* is ranked as "Critically Imperiled," although it is apparently secure throughout its range (NatureServe 2013). In North America, approximately ⅔ to ¾ of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993, Stein et al. 2000). While population trends in New York are unknown, it is assumed that they too are declining, due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%	X	Abundant		Stable	Stable
6% to 10%		Common			
11% to 25%		Fairly common	X		
26% to 50%		Uncommon			
> 50%		Rare			

Habitat Discussion:
A. plicata can be found in a variety of habitats, ranging from small streams to big rivers, and from locations such as lakes, reservoirs, rivers, and streams with little or no current to areas of very swift current. Individuals are found in a variety of substrates that are stable enough to support them, including mud, sand, and gravel (Cummings and Mayer 1992, Metcalfe-Smith et al. 2005, Watters et al., 2009). In New York, it is especially common in muddy, low-gradient creeks and rivers (Strayer and Jirka 1997). It

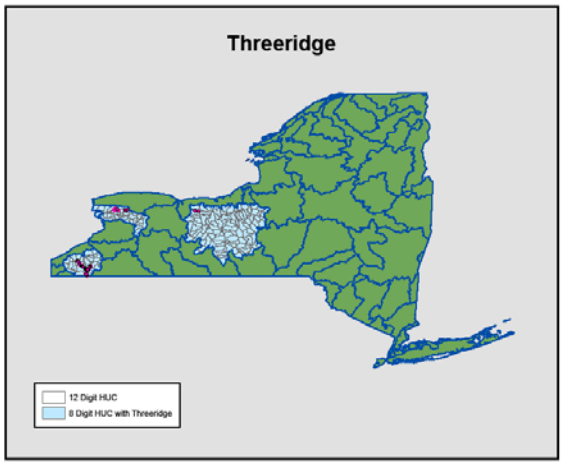
is most common in one to three feet of water, but has been found at depths of 30 feet (Parmalee and Bogan 1998).

Primary Habitat Type
Medium River; Low Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Medium River; Moderate-High Gradient; Assume Moderately Buffered (Size 3+ rivers); Warm
Small River; Low Gradient; Moderately Buffered, Neutral; Transitional Cool
Small River; Low-Moderate Gradient; Moderately Buffered, Neutral; Transitional Cool

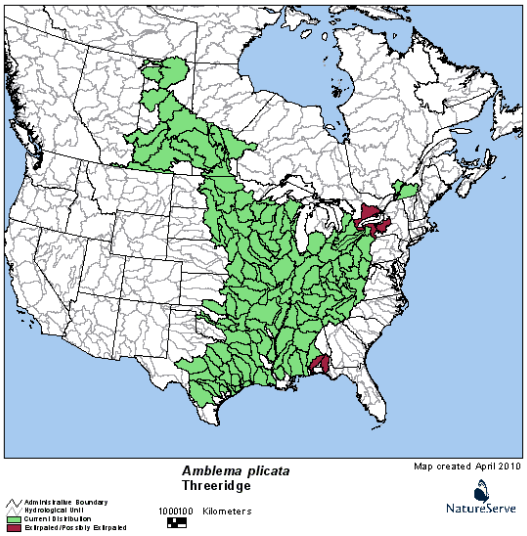
Distribution:
Since 1970, *A. plicata* has been found in four New York State waterbodies.

A. plicata has apparently been eliminated from the Buffalo River basin, but it remains abundant in Tonawanda Creek (Strayer and Jirka 1997). In Tonawanda Creek at Rapids a moderate to relatively large population exists in stable habitat (Mahar and Landry 2013, NY Natural Heritage Program 2013). At Royalton 4–5 animals per square meter of various sizes and age classes were found in 1998 (NY Natural Heritage Program 2013). During The Nature Conservancy's 2005–2007 survey of the Allegheny drainage, 1,584 live *A. plicata* were found at 30 of 105 sites. The greatest catches (up to 148 per hour) were in the mid and upper reaches of Cassadaga Creek, with some found in the mid and lower reaches of Conewango Creek. *A. plicata* was considered viable at 77% of the sites where found. None were found in the Upper Allegheny subbasin (The Nature Conservancy 2009).

In Central NY, fresh shells, including juveniles and adults, were found in the Erie Canal at Macedon (Wayne County) (Mahar and Landry 2013).



Post 1970 *A. plicata* distribution in New York State (The Nature Conservancy 2009, Harman and Lord 2010, White et al. 2011, Mahar and Landry 2013, New York Natural Heritage Program 2013).



NatureServe (2013)

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions & Disturbance	Work & Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, culverts)	R	M	H
3. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (zebra mussels)	R	L	H
4. Pollution	Agricultural & Forestry Effluents (pesticides, fertilizers, sediment)	W	L	M
5. Pollution	Household Sewage & Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage & Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change & Severe Weather	Droughts	W	L	V
8. Natural System Modifications	Dams & Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	W	L	L
9. Climate Change & Severe Weather	Storms & Flooding (extreme storms)	W	L	V

10. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

References Cited:

Cummings, K. S., and C. A. Mayer. 1992. Field guide to freshwater mussels of the Midwest (p. 194). Champaign, Illinois: Illinois Natural History Survey.

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The Nature Conservancy. 2009. *Freshwater Mussel (Unionidae) Distributions, Catches, and Measures of their Viability across the Catches, and Measures of their Viability across the Allegheny River Basin in New York.* Report submitted New York State Department of Environmental Conservation. The Nature Conservancy, Central and Western NY Chapter. Rochester, NY. 63 pp.

Watters, G. T., M. A., Hoggarth, and D. H. Stansbery. 2009. The freshwater mussels of Ohio. Columbus: Ohio State University Press.

White, E.L., J.J. Schmid, T.G. Howard, M.D. Schlesinger, and A.L. Feldmann. 2011. New York State freshwater conservation blueprint project, phases I and II: Freshwater systems, species, and viability metrics. New York Natural Heritage Program. The Nature Conservancy. Albany, NY. 85 pp. plus appendix.

Common Name: Yellow lampmussel ***SGCN***
Scientific Name: *Lampsilis cariosa*
Taxon: Freshwater Mollusks

Federal Status: Not Listed
New York Status: SGCN

Natural Heritage Program Rank:
Global: G3G4
New York: S3
Tracked: Yes

Synopsis:
Lampsilis cariosa belongs to the subfamily Ambleminae and the tribe Lampsilini, which includes 17 extant and 6 likely extirpated New York species of the genera Actinonaias, Epioblasma, Lampsilis, Leptodea, Ligumia, Obovaria, Potamilus, Ptychobranchus, Toxolasma, Truncilla, and Villosa (Haag 2012; Graf and Cummings 2011). L. cariosa is one of seven species of the genus Lampsilis that have been found in New York (Strayer and Jirka 1997).

Since 1970, L. cariosa has been found in 25 New York waterbodies. L. cariosa occurs in small to large rivers, especially in riffles (Ortmann 1919, Strayer 1993), and is often fairly abundant where it occurs (Strayer & Jirka 1997). This species has declined between 30% and 50% in both the short and long term (NatureServe 2013). It is declining everywhere along its range, which includes most of the Atlantic coast, from Georgia to Nova Scotia.

In New York, L. cariosa is ranked as vulnerable, and as vulnerable/apparently secure throughout its range (NatureServe 2013). In North America, approximately 2/3 to ¾ of native mussel species are extinct, listed as endangered or threatened, or are in need of conservation status (Williams et al. 1993; Stein et al., 2000). While population trends in New York are unknown, it is assumed that they too are declining, due to a myriad of environmental stressors.

Distribution (% of NY where species occurs)		**Abundance** (within NY distribution)		**NY Distribution Trend**	**NY Abundance Trend**
0% to 5%		Abundant		Declining	Declining
6% to 10%		Common			
11% to 25%	X	Fairly common			
26% to 50%		Uncommon	X		
> 50%		Rare			

Habitat Discussion:
In New York, L. cariosa lives in small to large rivers, especially in riffles (Ortmann 1919, Strayer 1993 in Staryer and Jirka 1997). It is often fairly abundant where it occurs. L. cariosa also lives in lakes in Maine, but no records are known from New York lakes (Strayer and Jirka 1997). Throughout its range, it has been found in medium to large rivers and lakes, including free-flowing rivers with rocky substrates. In the Connecticut River, it has been found in shallow water and areas more than 30 feet deep, usually in slow to moderate flow conditions. Within its core range in Massachusetts, it exhibited a distinct preference for sand and fine gravel substrates, and was proportionately more abundant in shallow sandbars than it was in nearby areas that were deeper and had a rocky or muddy substrate (Nedeau 2008).

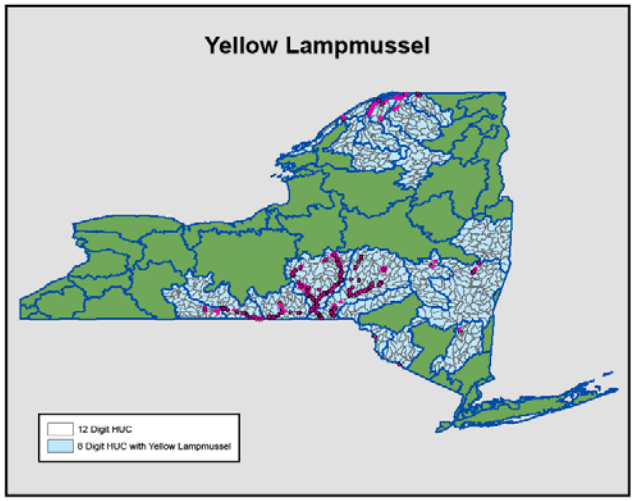
Primary Habitat Type
Headwater/Creek; Low Gradient; Moderately Buffered, Neutral; Transitional Cool

Distribution:
L. cariosa is currently found in 25 waterbodies in New York State. It seems to be rare in the Hudson River, although it is still reproducing and common in the Susquehanna basin and lower Schoharie Creek. It also still occurs in several tributaries of the St. Lawrence in northern New York (Strayer and Jirka 1997).

In the Susquehanna basin, they were recently found in the main stem of the Susquehanna River, Butternut Creek, Canisteo River, Catatonk Creek, Chemung River, Chenango River, Genegantslet Creek, Otego Creek, Otselic River, Payne Brook, Sangerfield River, Schenevus Creek, Susquehanna River, Tigoa River, Tioughnioga River, East Branch Tioughnioga River, and the Unadilla River (Harman and Lord 2010, NY Natural Heritage Program 2013).

In the Hudson basin, it has been found post-1970 in Schoharie Creek and Indian Kill at Norrie Point. In the St. Lawrence River basin, it has been found in the Grass River, Little Salmon River, Oswegatchie River, Raquette River, St. Regis River, and West Branch Deer Creek. It has also been found in the Delaware River in the Delaware basin (NY Natural Heritage Program 2013).

Streams with high densities of *L. cariosa* include the Chenango River, Norwich and north; the Raquette River at Sugar Island and between Raymondville and Rooseveltown; and the Susquehanna River, especially at sites near Damascus, north of Windsor and east of Binghamton, and at Otego (NY Natural Heritage Program 2013, Harman and Lord 2010).



Post 1970 *L. cariosa* distribution in New York State (Mahar & Landry 2013; Harman & Lord 2010; The Nature Conservancy 2009; New York Natural Heritage Program 2013; White et al. 2011).

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Human Intrusions & Disturbance	Work & Other Activities (bridge projects and other instream work)	N	L	L
2. Natural System Modifications	Other Ecosystem Modifications (levees and flood walls, channelization, dredging, culverts)	W	M	H
3. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (zebra mussels, rusty crayfish)	P	M	H
4. Pollution	Agricultural & Forestry Effluents (pesticides, fertilizers, sediment)	P	L	M
5. Pollution	Household Sewage & Urban Waste Water (road runoff of salts and metals, other regulated discharges)	P	M	H
6. Pollution	Household Sewage & Urban Waste Water (waste water treatment effluent, sewer and septic overflows)	P	M	H
7. Climate Change & Severe Weather	Droughts	P	L	V
8. Natural System Modifications	Dams & Water Management/Use (lowering of water table from agriculture, etc…, causing drying of habitat)	W	L	M
9. Climate Change & Severe Weather	Storms & Flooding (extreme storms)	P	L	H
10. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (die offs from unknown disease)	N	L	H

11. Energy Production & Mining	Oil & Gas (hydraulic fracturing)	W	L	M

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