

# THREATENED & ENDANGERED INVERTEBRATES CONFIRMED OR POSSIBLY OCCURRING IN WOODSTOWN & PILESGROVE

This guide is compiled from the New Jersey Threatened and Endangered Species Field Guide published online by the Conserve Wildlife Foundation of New Jersey. This searchable database is available at [www.conservewildlifenj.org/species/fieldguide/](http://www.conservewildlifenj.org/species/fieldguide/) For source information, please note all citations, references and photo credits.

## INSECTS / BUTTERFLIES

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The Bronze copper is listed as endangered in New Jersey. © Ron Hay

BRONZE COPPER LYCAENA HYLLUS

NJ CONSERVATION STAT US: ENDANGERED

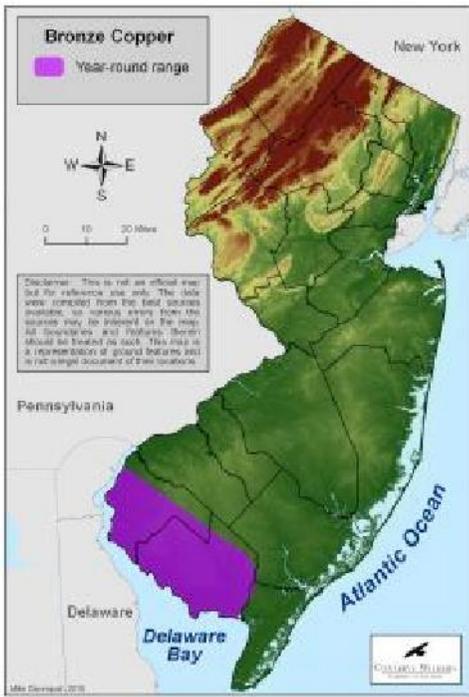
### IDENTIFICATION

The Bronze copper is one of the largest coppers. Adults reach 1.5 – 1.9 in. (37-47mm) in length. Male and female coppers have different colorings on the upper surface of their forewings. Males have a solid iridescent purple forewing. Females have orange forewings with a few black spots where only the forewing margin has a purple iridescence. Otherwise, the overall coloration of both sexes is orange.

### DISTRIBUTION AND HABITAT

In New Jersey the Bronze copper is rare. Its range is fairly widespread and it is found in most states above the Mason-Dixon Line. Its range extends into many Canadian Provinces.

Bronze coppers can be found in moist or wet areas, including brackish and freshwater marshes, bogs, fens, seepages, wet sedge meadows, riparian zones, wet grasslands, and drainage ditches.



Range of the Bronze copper in New Jersey.

## DIET

Larvae or caterpillars feed on water dock (*Rumex orbiculatus*), curled dock (*Rumex crispus*), and knotweeds (*Polygonum* spp.) (Iftner et. al. 1992; Opler and Malikul 1998). Adults nectar on red clover (*Trifolium pretense*), milkweeds (*Asclepias* spp.), asters (*Aster* spp.), thistles (*Cirsium* spp.), and a variety of other herbs and grasses.

## LIFE CYCLE

Each summer the Bronze copper goes through two brood cycles. Both generations of adults die after reproducing. Adults fly from mid-June to mid-September. Caterpillars are yellowish-green and have a dark dorsal stripe down their backs. They feed on water dock, curled dock, and knotweeds. The second generation of adults lay eggs that overwinter and hatch the next season.



Bronze copper. © Ron Hay

## CURRENT THREATS, STATUS, AND CONSERVATION

Since the 1940s only a few individuals have been observed. Bronze coppers were once common and were scattered throughout the state, primarily in the northern regions of New Jersey. Habitat loss from the draining of wetlands and the use of herbicides and insecticides has seriously affected the population.

in New Jersey. This butterfly was listed as endangered in 2001. Wetland protection is key for long-term success of this species in New Jersey.

## REFERENCES

Iftner, D.C., J.A. Shuey, and J.V. Calhoun. 1992. Butterflies and Skippers of Ohio. Ohio Biological Survey Bulletin, new series, vol. 9 no. 1.

Opler, P.A., and V. Malikkul. 1998. A Guide to Eastern Butterflies. New York: Houghton Mifflin.

Text derived from the book, Endangered and Threatened Wildlife of New Jersey. 2003. Originally written by David M. Golden. Originally edited by B.E. Beans & L. Niles. Edited and updated in 2010 by Ben Wurst.



Frosted elfin butterfly. © Bill Bouton

## FROSTED ELFIN CALLOPHRYS IRUS

NJ CONSERVATION STAT US: THREATENED

### IDENTIFICATION

The Frosted elfin is slightly larger than most other elfins that are similar in appearance. Adults range in size from 1 in.-1.25 in. (26-32 mm). Sexes are similar. The upper surface of the wings are a drab brown color. A small "tail" extending from the hindwings is a distinguishing feature used to help identify this species. The back edge of the hindwing often has a white "frosting," for which this species is named. A black spot near the "tail" on the hindwing is almost always present and is an important field mark for proper identification. Another characteristic feature of the under side of the hindwing is a very crooked white line that runs roughly parallel to the body and divides the wing in half.

### DISTRIBUTION AND HABITAT

The Frosted elfin is present along most of the east coast, except for Maine (where it is presumed to have been extirpated), with isolated populations existing in southeastern Texas (and surrounding areas), Michigan, Indiana, and Wisconsin. New Jersey may be the stronghold for this species (Schweitzer 1994), with Assunpink Wildlife Management Area (WMA) and Belleplain State Forest having well-known colonies in the state (Gochfield and Burger 1997).

Dry clearings and open areas that are natural (e.g. savannas) or of human origin (e.g. power-line right of ways and roadsides). The presence of food plants (see Diet) is also of importance.

### DIET

Lupine (*Lupinus perennis*) and indigo (*Baptisia spp.*) are the major food and host plants of this species. Larvae feed on the flowers of fruits of the host plants, and the adults are nectar feeders.



Wild Indigo (*Baptisia tinctoria*) is a host plant for the Frosted elfin. © Jeffrey Pippen

## LIFE CYCLE

Frosted elfins produce a single brood each year. Adults fly from late May to mid-June in New Jersey. The larvae or caterpillars feed on the host plants and then move into the leaf litter a few weeks after the adults stop flying in mid-June, and the larvae develop into pupae (Schweitzer 1994). Individuals overwinter as pupae in the soil or in leaf litter bound together with silk fibers. (Scott 1986).

## CURRENT THREATS, STATUS, AND CONSERVATION

This species was listed as threatened in New Jersey in 2001. The Frosted elfin is often locally rare and occurs in small isolated populations. It is believed to be extirpated from portions of its historic range, including Maine, Ontario, and possibly Texas. It currently is not listed for federal protection, but its rarity throughout its range might justify a federal status of threatened or endangered in the near future.

In 2005, several habitat enhancement projects, one inside Millville Wildlife Management Area (WMA), established host plants (wild indigo) along utility right-of-ways. It is unclear whether the habitat enhancement projects have been successful or not.

## REFERENCES

Schweitzer, D.F. 1994. Element ecology and life history. In *The Comprehensive Report of Callophrys irus*. NatureServe: An online encyclopedia of life. 2001. Version 1.5. Arlington, Virginia, USA: Association for Biodiversity Information. [www.natureserve.org](http://www.natureserve.org)

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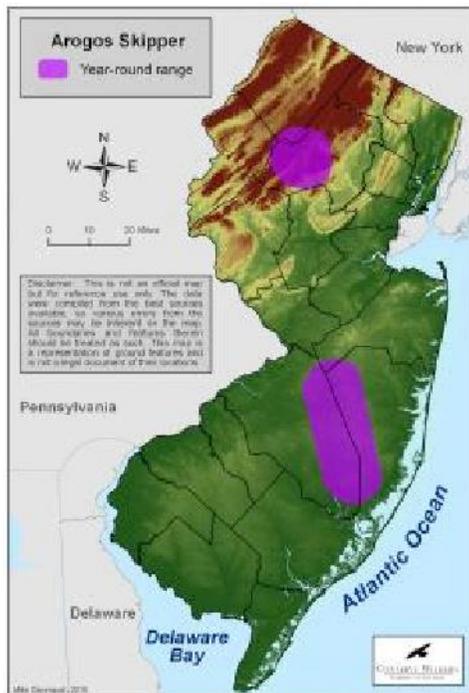
Arogos skippers are listed as endangered in New Jersey. © Jeffrey Phippen

## AROGOS SKIPPER ATRYTONE AROGOS AROGOS

NJ CONSERVATION STAT US: ENDANGERED

### IDENTIFICATION

Arogos skippers range in length from 1.3 -1.4 in. (35-41 mm) and look very similar to the abundant Delaware skipper (*Anatrytone logan*). Both species a light orange with black wing margins on the upper surface. The margins are thicker on the arogos. The arogos also have a white fringe on the underside of its hindwing and an overall deeper orange color on the undersu face of the wings.



Range of the Arogos skipper in New Jersey.

### DISTRIBUTION AND HABITAT

The Arogos skipper is very sparsely distributed throughout its range . It is largely restricted to a few states along the Atlantic Coast. Population strongholds for the species can be found in New Jersey, Florida, and North Carolina. The New Jersey Pinelands may hold the largest single population of Arogos skippers in the world.

Habitat requirements for this species differ dramatically throughout its range. In the New Jersey Pinelands, Arogos skippers tend to inhabit post -burn wetland habitats dominated by Pine Barrens reed grass (*Calamovilfa brevipilis*), which serves as its host plant (Schweitzer 1992). In northern New Jersey,

they inhabit dry grasslands that are dominated by Little bluestem (*Schizachyrium scoparius*), its host plant.

#### DIET

Caterpillars feed on Little bluestem in Northern New Jersey and in the Pinelands region they feed on Pine Barrens reed grass. Adults feed on nectar from knapweeds (*Centaurea spp.*), milkweeds (*Asclepias spp.*), thistles (*Cirsium spp.*), and blazing-stars (*Liatris spp.*).

#### LIFE CYCLE

The flight period for this species in New Jersey is brief (only from mid to late July into August). In Northern New Jersey, arosos fly during the first three weeks of July. Adults can be seen in flight during late morning to early afternoon, on sunny days, when temperatures are below 80oF. In the Pinelands, adults fly during late July/early August. They are easily flushed from nectar producing plants in the late afternoon/early evening when temperatures are below 90oF. The larvae stage lasts from late July to mid-June during the following year. The egg and pupae stages last from one to two weeks long.



An Arogos skipper nectars on Yellow balduina (*Balduina uniflora*). © Jeffrey Pippen

#### CURRENT THREATS, STATUS, AND CONSERVATION

This species is in serious jeopardy of becoming extirpated from large portions of its range. They were listed as endangered in 2001 and are protected by the New Jersey Endangered Species Conservation Act. The Pinelands reed-grass feeding arosos contains four of the (five total) largest populations in its entire range that specifically occupy this habitat ecotype. Habitat loss and changes in natural fire regimes are the two major threats to this species. In the Pinelands, reed-grass becomes established after wildfires. Without natural fire events, these natural grasslands have become extremely rare within the Pinelands and the arosos has suffered. Development and proper land management in Northern New Jersey threaten Arogos skippers. Many grasslands are left to succeed into forests and are lost to strip malls and housing developments, mostly because they are the easiest land to develop. Additional survey and natural history research are needed to fully understand the range and biology of the Arogos skipper. Research should also concentrate on identifying the effects of different land management techniques.

## REFERENCES

Schweitzer, D. F. 1992. Element ecology and life history. In *The Comprehensive Report of Atrytone arogos arogos*. NatureServe: An online encyclopedia of life.. 2001. Version 1.5. Arlington, Virginia, USA: Association for Biodiversity Information.

*Text derived from the book, Endangered and Threatened Wildlife of New Jersey. 2003. Originally written by Dave M. Golden & Jason Tesauro. Originally edited by B.E. Beans & L. Niles. Edited and updated in 2010 by Ben Wurst.*

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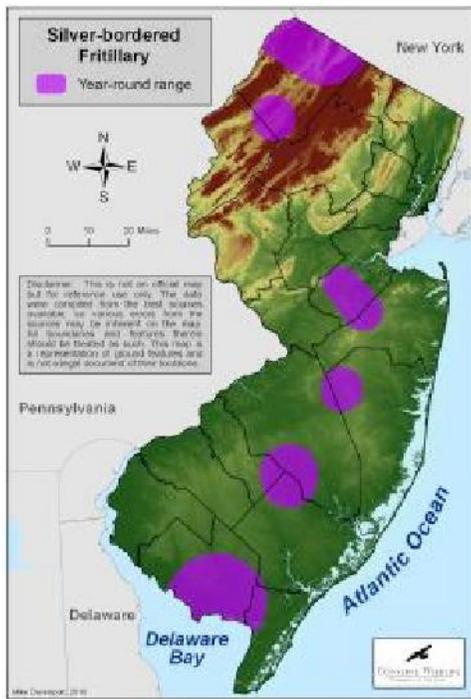
A Silver-bordered fritillary butterfly. © Jan Dixon

## SILVER-BORDERED FRITILLARY BOLORIA SELENE MYRINA

NJ CONSERVATION STAT US: ENDANGERED

### IDENTIFICATION

The wings of the silvered-bordered fritillary are orange with black markings. This species reaches sizes of 1.6 in. to 2.75 in. (39-45 mm). It can be distinguished from other closely related species by the presence of silver spots on the underside of the hindwing. Another very useful diagnostic characteristic is the black margin that encloses several small orange spots on the upper surface of the forewing .



Range of the Silver-bordered fritillary in New Jersey.

## DISTRIBUTION AND HABITAT

New Jersey is the southeastern range limit for this butterfly. It ranges west to Oregon and north throughout most Canadian provinces.

The Silver-boardered fritillary inhabits moist open areas, like bogs, sedge meadows, wet grasslands, and other wet areas.

## DIET

Caterpillars feed exclusively on the leaves of violets (*Viola* spp.). Adults feed on nectar from the flowers of red clover (*Trifolium pratense*), aldafla (*Medicago sativa*), common milkweed (*Asclepias syriaca*), butterfly weed (*Asclepias tuberosa*), and purple coneflower (*Echinacea purpurea*).

## LIFE CYCLE

The Silver-bordered fritillary is active from late May to early September in New Jersey. Its peak flight period is around late June and August. They are known to have two broods per year. Caterpillars (larvae) are a dark grayish black with many black spots and a lateral orange line and orange spines with black tips. Adult females lay eggs on or near host plants (violets). Once hatched, the larvae move to the host plant to feed. They overwinter as larvae in New Jersey.



Silver-bordered fritillaries feed on nectar. © Jackie Riley

Two

#### CURRENT THREATS, STATUS, AND CONSERVATION

Like other wetland dependant species in New Jersey, the silver-bordered fritillary has been negatively affected from loss of habitat, especially the filling of wetlands. The use of insecticides to control mosquitoes and gypsy moths has also contributed to the decline of this species. The silver -bordered fritillary is widespread and abundant across much of its range. Because New Jersey is located along the southeastern limit of this species range, silver-bordered fritillaries are less common in New Jersey than in many northern states and Canadian provinces. Surveys for this species could help identify and protect suitable wetland habitat that would benefit this rare butterfly.

*Text derived from the book, Endangered and Threatened Wildlife of New Jersey. 2003. Originally written by David M. Golden. Edited by B.E. Beans & L. Niles. Edited and updated in 2010 by Ben Wurst.*

# BIVALVES / FRESHWATER MUSSELS

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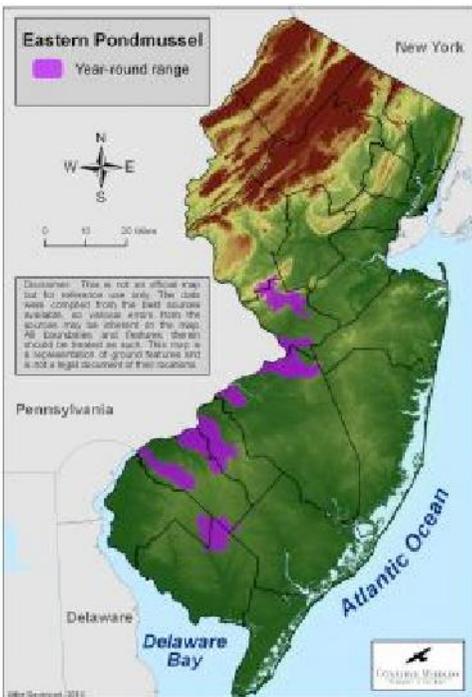
Eastern pondmussel shell. © Allen Barlow

## EASTERN PONDMUSSEL *LIGUMIA NASUTA*

NJ CONSERVATION STAT US: THREATENED

### IDENTIFICATION

The eastern pondmussel can be distinguished by its bluntly pointed posterior and distinctive posterior ridge. The bivalve (two shells hinged together) shells are elongate and twice as long as wide. The dorsal margin (the hinged side) is straight and the ventral margin (the side that opens) is curved. The nacre (inside the shell) is white, but can also vary from an iridescent blue to salmon. The outer shell is greenish yellow to dark olive or brown.



Range of the Eastern pondmussel in New Jersey.

### DISTRIBUTION AND HABITAT

The eastern pondmussel occurs from Cape Fear River Basin, North Carolina, to the St. Lawrence River Basin, Canada, and westward through northern parts of the continent's Interior Basin. In New Jersey, the species can be found in the Delaware River and several of its tributaries such as the Stony Brook,

Raccoon Creek, and Maurice River. The eastern pondmussel is often associated with tidewaters, and is reportedly found in ponds and lakes. The host fish is unknown.

## DIET

Adult freshwater mussels are filter-feeders. They strain plankton (microscopic plants and animals), bacteria and other particles from the water column. The larval stage of the freshwater mussel, known as glochidia, are external parasites and feed on a host (usually a fish).

## LIFE CYCLE

Although many species of mollusks are hermaphrodites (one individual has both male and female reproductive organs), freshwater mussel sexes are generally separate. During spawning, males release sperm directly into the water. If a mature female happens to draw in the sperm through its siphon, the eggs which are contained within her body will be fertilized. The eggs then develop within the female's gills into the larval stage of the mussel known as "glochidia". This period of larval development within the female's body may last a few days to several months. At the end of this stage, up to several million glochidia will be expelled into the water through the female's exhalant siphon.

Glochidia are microscopic and have a thin shell with two valves. Once released from the female, glochidia must find a host (usually a specific species of fish) on which to attach. Each species of freshwater mussel has its own specific species of fish that can serve as a host for the glochidia. The glochidia effectively become a parasite on the fish, attaching to the gills, scales, fins or even eyes of the host fish. While attached to the fish, the glochidia feed on them, much like a flea or tick feeds on terrestrial mammals. If the glochidia do not attach themselves to a host fish, they will die.



Eastern pondmussel shell. © Allen Barlow

While attached to the host fish, the glochidia go through a metamorphosis, transforming into a juvenile mussel which looks like a much smaller version of the adult. After anywhere from 6 to 160 days, the juvenile mussel will fall off of the host fish and begin its life in the bottom of the water body. If the appropriate substrate is available, it will burrow into the bottom sediment. Juvenile mussels spend their first year of life beneath the substrate.

Growth of the mussel is most rapid while it is young. The average age at which freshwater mussels become sexually mature is six years. Once a freshwater mussel reaches maturity, its chances for survival increase dramatically. Some species may live as long as 100 years or more.

Although very slow-moving, freshwater mussels are capable of moving along the substrate using their powerful foot. A mussel "track" can sometimes be seen in the mud or sand next to a mussel which has recently moved. During the winter in New Jersey, freshwater mussels will burrow into the sediment and enter a period of dormancy.

Many small aquatic animals will feed on the mussel glochidia. Adults may be eaten by raccoons, muskrats, otters, bears, herons, some waterfowl, some turtles, and large fish such as sturgeon.

#### CURRENT THREATS, STATUS, AND CONSERVATION

One in ten of North America's freshwater mussel species has gone extinct in this century. Meanwhile, 75% of the remaining species are either rare or imperiled. This alarming decline is directly tied to the degradation and loss of essential habitat, and the invasion of exotic species such as the Asian clam. Exotic species compete for space and food with native mussels.

Destruction of freshwater mussel habitat has ranged from dam construction, channelization, and dredging to siltation and contaminants. Dams alter the physical, chemical, and biological stream environment, sometimes destroying 30% to 60% of the mussel fauna upstream and downstream of the construction. The most harmful effect of dams, however, is the elimination of host species and resulting disruption in the reproductive cycle. Increased silt loads and shifting stream bottoms caused by erosion also threaten mussel habitats, as do contaminants such as heavy metals and pesticides, and discharge from sewage treatment plants.

One in ten of North America's freshwater mussel species has gone extinct in this century.

Eastern pondmussels were listed as state threatened in late 2002. Federal and state Clean Water acts, stream encroachment rules, environmental reviews of proposed development projects and the state Endangered Species Act serve to help protect existing populations.

Surveys for endangered and threatened freshwater mussel species are currently being conducted each spring, summer, and fall. It is recommended that such surveys continue in order to determine special distributions, population sizes, and age distributions. Threats to populations, such as barriers to host fish and glochidia movement, must also be further explored. Sufficient buffer areas along streams should also be created and stream bank restoration efforts encouraged. Lastly, protection classifications of streams with endangered and threatened freshwater mussel species should be upgraded in order to protect water quality.

For more detailed information on NJ's freshwater mussels, please visit the American Museum of Natural History.

***Text derived from the book, Endangered and Threatened Wildlife of New Jersey. 2003. Originally edited by Bruce E. Beans and Larry Niles. Edited and updated Jeanette Bowers-Altman and Michael J. Davenport in 2010.***



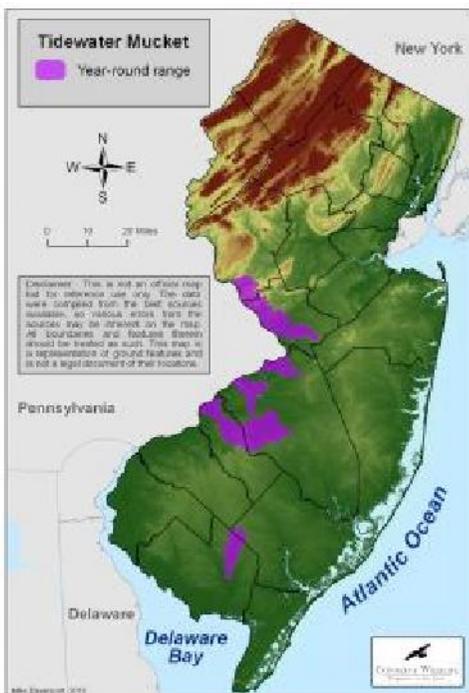
Tidewater mucket shell. © Allen Barlow

## TIDEWATER MUCKET LEPTODEA OCHRACEA

NJ CONSERVATION STAT US: THREATENED

### IDENTIFICATION

The tidewater mucket appears similar to the yellow lampmussel. The bivalve (two shells hinged together) shell is small. Males are elliptical and females are ovate and thin. The anterior end is rounded; the posterior margin is evenly rounded, somewhat pointed in males and truncated in females. The beaks are moderately swollen and are located near the middle of the shell. The outer shell is yellow to brown or olive green and is often covered with fine green rays. The nacre (inside the shell) is pinkish or salmon.



Range of the Tidewater mucket in New Jersey.

### DISTRIBUTION AND HABITAT

The tidewater mucket ranges from the Savannah River Drainage Basin in Georgia north into Nova Scotia. In New Jersey, the species occurs in the Delaware River as well as several tributaries such as Manantico, Rancocas and Alloway creeks. This species is associated with tidewaters and can be found in sand/silt substrates. Although the host fish is not known, this species is thought to rely on anadromous fish runs for glochidial distribution.

## DIET

Adult freshwater mussels are filter-feeders. They strain plankton (microscopic plants and animals), bacteria and other particles from the water column. The larval stage of the freshwater mussel, known as glochidia, are external parasites and feed on a host (usually a fish).

## LIFE CYCLE

Although many species of mollusks are hermaphrodites (one individual has both male and female reproductive organs), freshwater mussel sexes are generally separate. During spawning, males release sperm directly into the water. If a mature female happens to draw in the sperm through its siphon, the eggs which are contained within her body will be fertilized. The eggs then develop within the female's gills into the larval stage of the mussel known as "glochidia". This period of larval development within the female's body may last a few days to several months. At the end of this stage, up to several million glochidia will be expelled into the water through the female's exhalant siphon.

Glochidia are microscopic and have a thin shell with two valves. Once released from the female, glochidia must find a host (usually a specific species of fish) on which to attach. Each species of freshwater mussel has its own specific species of fish that can serve as a host for the glochidia. The glochidia effectively become a parasite on the fish, attaching to the gills, scales, fins or even eyes of the host fish. While attached to the fish, the glochidia feed on them, much like a flea or tick feeds on terrestrial mammals. If the glochidia do not attach themselves to a host fish, they will die.



Tidewater mucket shell. © Allen Barlow

While attached to the host fish, the glochidia go through a metamorphosis, transforming into a juvenile mussel which looks like a much smaller version of the adult. After anywhere from 6 to 160 days, the juvenile mussel will fall off of the host fish and begin its life in the bottom of the water body. If the appropriate substrate is available, it will burrow into the bottom sediment. Juvenile mussels spend their first year of life beneath the substrate.

Growth of the mussel is most rapid while it is young. The average age at which freshwater mussels become sexually mature is six years. Once a freshwater mussel reaches maturity, its chances for survival increase dramatically. Some species may live as long as 100 years or more.

Although very slow-moving, freshwater mussels are capable of moving along the substrate using their powerful foot. A mussel "track" can sometimes be seen in the mud or sand next to a mussel which has recently moved. During the winter in New Jersey, freshwater mussels will burrow into the sediment and enter a period of dormancy.

Many small aquatic animals will feed on the mussel glochidia. Adults may be eaten by raccoons, muskrats, otters, bears, herons, some waterfowl, some turtles, and large fish such as sturgeon.

## CURRENT THREATS, STATUS, AND CONSERVATION

One in ten of North America's freshwater mussel species has gone extinct in this century. Meanwhile, 75% of the remaining species are either rare or imperiled. This alarming decline is directly tied to the

degradation and loss of essential habitat, and the invasion of exotic species such as the Asian clam. Exotic species compete for space and food with native mussels.

Destruction of freshwater mussel habitat has ranged from dam construction, channelization, and dredging to siltation and contaminants. Dams alter the physical, chemical, and biological stream environment, sometimes destroying 30% to 60% of the mussel fauna upstream and downstream of the construction. The most harmful effect of dams, however, is the elimination of host species and resulting disruption in the reproductive cycle. Increased silt loads and shifting stream bottoms caused by erosion also threaten mussel habitats, as do contaminants such as heavy metals and pesticides, and discharge from sewage treatment plants

Tidewater mussels were listed as state threatened in late 2002. Federal and state Clean Water acts, stream encroachment rules, environmental reviews of proposed development projects and the state Endangered Species Act serve to help protect existing populations.

Surveys for endangered and threatened freshwater mussel species are currently being conducted each spring, summer, and fall. It is recommended that such surveys continue in order to determine special distributions, population sizes, and age distributions. Threats to populations, such as barriers to host fish and glochidia movement, must also be further explored. Sufficient buffer areas along streams should also be created and stream bank restoration efforts encouraged. Lastly, protection classifications of streams with endangered and threatened freshwater mussel species should be upgraded in order to protect water quality.

For more detailed information on NJ's freshwater mussels, please visit the American Museum of Natural History.

*Text derived from the book, Endangered and Threatened Wildlife of New Jersey. 2003. Originally edited by Bruce E. Beans and Larry Niles. Edited and updated Jeanette Bowers-Altman and Michael J. Davenport in 2010.*



The shell of a Triangle floater. © Allen Barlow

## TRIANGLE FLOATER *ALASMIDONTA UNDULATA*

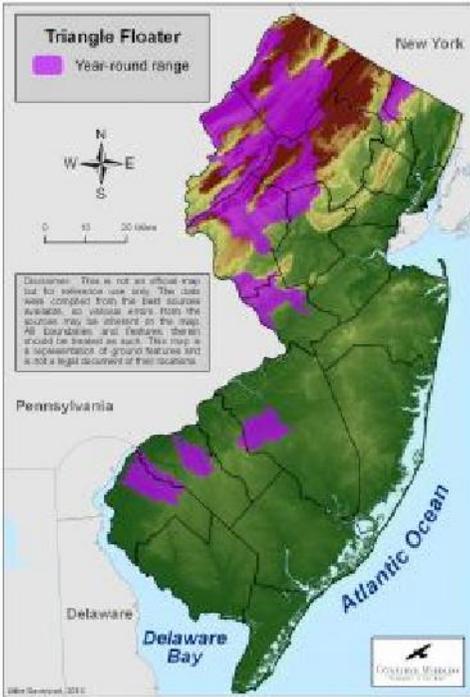
NJ CONSERVATION STAT US: THREATENED

### IDENTIFICATION

The triangle floater is a small, ovate to triangular shaped mussel. The outer shell is yellowish-green to black and is extensively rayed in young. The nacre (inside the shell) is pinkish-salmon on the posterior and whitish on the anterior portion. The shell is inflated, moderately thick and sturdy.

### DISTRIBUTION AND HABITAT

The triangle floater is a generalist and can be found in a variety of stream, river and lake habitats. In New Jersey, it can be found from Salem County in the south to Sussex County in the north. Possible host fish include common shiner, blacknose dace, longnose dace, pumpkinseed, white sucker, slimy sculpin, largemouth bass, and fallfish. Although widely distributed in NJ waterways, the species seldom occurs in large numbers.



Range of the Triangle floater in New Jersey.

## DIET

Adult freshwater mussels are filter-feeders. They strain plankton (microscopic plants and animals), bacteria and other particles from the water column. The larval stage of the freshwater mussel, known as glochidia, are external parasites and feed on a host (usually a fish).

## LIFE CYCLE

Although many species of mollusks are hermaphrodites (one individual has both male and female reproductive organs), freshwater mussel sexes are generally separate. During spawning, males release sperm directly into the water. If a mature female happens to draw in the sperm through its siphon, the eggs which are contained within her body will be fertilized. The eggs then develop within the female's gills into the larval stage of the mussel known as "glochidia". This period of larval development within the female's body may last a few days to several months. At the end of this stage, up to several million glochidia will be expelled into the water through the female's exhalent siphon.

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While attached to the host fish, the glochidia go through a metamorphosis, transforming into a juvenile mussel which looks like a much smaller version of the adult. After anywhere from 6 to 160 days, the juvenile mussel will fall off of the host fish and begin its life in the bottom of the water body. If the appropriate substrate is available, it will burrow into the bottom sediment. Juvenile mussels spend their first year of life beneath the substrate.



The shell of a Triangle floater. © Allen Barlow

Growth of the mussel is most rapid while it is young. The average age at which freshwater mussels become sexually mature is six years. Once a freshwater mussel reaches maturity, its chances for survival increase dramatically. Some species may live as long as 100 years or more.

Although very slow-moving, freshwater mussels are capable of moving along the substrate using their powerful foot. A mussel “track” can sometimes be seen in the mud or sand next to a mussel which has recently moved. During the winter in New Jersey, freshwater mussels will burrow into the sediment and enter a period of dormancy.

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#### CURRENT THREATS, STATUS, AND CONSERVATION

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Destruction of freshwater mussel habitat has ranged from dam construction, channelization, and dredging to siltation and contaminants. Dams alter the physical, chemical, and biological stream environment, sometimes destroying 30% to 60% of the mussel fauna upstream and downstream of the construction. The most harmful effect of dams, however, is the elimination of host species and resulting disruption in the reproductive cycle. Increased silt loads and shifting stream bottoms caused by erosion also threaten mussel habitats, as do contaminants such as heavy metals and pesticides, and discharge from sewage treatment plants

Triangle floaters were listed as state threatened in late 2002. Federal and state Clean Water acts, stream encroachment rules, environmental reviews of proposed development projects and the state Endangered Species Act serve to help protect existing populations.

Surveys for endangered and threatened freshwater mussel species are currently being conducted each spring, summer, and fall. It is recommended that such surveys continue in order to determine special distributions, population sizes, and age distributions. Threats to populations, such as barriers to host fish and glochidia movement, must also be further explored. Sufficient buffer areas along streams should also be created and stream bank restoration efforts encouraged. Lastly, protection classifications of streams with endangered and threatened freshwater mussel species should be upgraded in order to protect water quality.

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**Complete (Statewide) List of Endangered, Threatened and Special Concern Invertebrate Species  
As Proposed January 18, 2011**

<u>Species</u>	<u>Scientific Name</u>	<u>Status</u>
<b>BIVALVES (MUSSELS)</b>		
Creeper	<i>Strophitus undulatus</i>	SC
Brook Floater	<i>Alasmidonta varicosa</i>	E
Dwarf Wedgemussel	<i>Alasmidonta heterodon</i>	E
Eastern Lampmussel	<i>Lampsilis radiata</i>	T
Eastern Pondmussel	<i>Ligumia nasuta</i>	T
Green Floater	<i>Lasmigona subviridis</i>	E
Tidewater Mucket	<i>Leptodea ochracea</i>	T
Triangle Floater	<i>Alasmidonta undulata</i>	T
Yellow Lampmussel	<i>Lampsilis cariosa</i>	T
<b>INSECTS</b>		
Allegheny River Cruiser	<i>Macromia alleghaniensis</i>	SC
American Burying Beetle	<i>Nicrophorus mericanus</i>	E
Appalachian Grizzled Skipper	<i>Pyrgus wyandot</i>	E
Argos Skipper	<i>Atrytone argos argos</i>	E
Arrowhead Spiketail	<i>Cordulegaster obliqua</i>	SC
Banner Clubtail	<i>Gomphus apomyius</i>	T
Bronz Copper	<i>Lycaena hyllus</i>	E
Brook Snaketail	<i>Ophiogomphus aspersus</i>	T
Brush-tipped Emerald	<i>Somatochlora walshii</i>	SC
Checkered White	<i>Pontia protodice</i>	T
Cobra Clubtail	<i>Gomphus (Gomphurus) vast us</i>	SC
Coppery Emerald	<i>Somatochlora georgiana</i>	SC
Crimson-ringed Whiteface	<i>Leucorrhinia glacialis</i>	SC
Dotted Skipper	<i>Hesperia attalus slossonae</i>	SC
Extra-striped Snaketail	<i>Ophiogomphus anomalus</i>	SC
Forcipate Emerald	<i>Somatochlora f orcipata</i>	SC
Frosted Elfin	<i>Callophrys irus</i>	T
Georgia (Lakehurst) Satyr	<i>Neonympha areolatus septentrionalis</i>	SC
Golden-winged Skimmer	<i>Libellula auripennis</i>	SC
Gray Petaltail	<i>Tachopteryx thoreyi</i>	E
Green-faced Clubtail	<i>Gomphus (Hylogomphus) viridifrons</i>	SC
Harpoon Clubtail	<i>Gomphus descriptus</i>	T
Harris Checkerspot	<i>Chlosyne harrisii</i>	SC
Hessel's Hairstreak	<i>Callophrys hesseli</i>	SC
Hoary Elfin	<i>Callophrys polios</i>	SC
Hudsonian Whiteface	<i>Leucorrhinia hudsonica</i>	SC
Kennedy's Emerald	<i>Somatochlora kennedyi</i>	T
Leonard's Skipper	<i>Hesperia leonardus</i>	SC
Maine Snaketail	<i>Ophiogomphus mainensis</i>	SC
Midland Clubtail	<i>Gomphus (Gomphurus) fraternus</i>	SC
Mitchell's Satyr	<i>Neonympha mitchellii mitchellii</i>	E
New England Bluet	<i>Enallagma laterale</i>	SC
Northeastern beach tiger beetle	<i>Cincindela dorsalis dorsalis</i>	E
Northern Metalmark	<i>Calephelis borealis</i>	SC
Pine Barrens Bluet	<i>Enallagma recurvatum</i>	SC
Rapids Clubtail	<i>Gomphus (Gomphus) q uadricolor</i>	SC
Robust Baskettail	<i>Epithea spinosa</i>	T

Sable Clubtail	Gomphus (Gomphurus) rogersi	SC
Scarlet Bluet	Enallagma pictum	SC
Septima's Clubtail	Gomphus septima	SC
Silver-bordered Fritillary	Bolaria selene myrina	T
Ski-tailed Emerald	Somatochlora elongata	SC
Spatterdock Darner	Rhionaeschna mutata	SC
Subarctic Darner	Aeshna subarctica	SC
Superb Jewelwing	Calopteryx amata	T
Tiger Spiketail	Cordulegaster erronea	SC
Two-spotted Skipper	Euphyes bimacula	SC
Williamson's Emerald	Somatochlora williamsoni	SC
Zebra Clubtail	Stylurus scudderi	SC