

Proposal for remainder RCN funds:

# Assessing the Status of Land Snails in the Northeast Region

## Need

This project informs the important conservation needs and opportunities associated with 245 land snail species of the northeastern United States, many of which are listed as Species of Greatest Conservation Need or Data Deficient by many of the 14 State Fish and Wildlife Agencies. This project will fill gaps in state wildlife agency capacity and provide targeted, technical expertise to enhance state agencies' abilities to conserve these species by collecting, organizing, and communicating information.

This project will assist states in proactive participation in the USFWS Federal Prelisting Process and potentially lead to preventing or minimizing additional listings under the Federal Endangered Species Act.

Land snails are an integral part of native habitats throughout the Northeast, playing important roles in cycling organic material and creating soil, moving energy and nutrients in food chains, and hosting major wildlife parasites. Understanding land snail diversity – rare and endangered species, habitat specialists, and invasive non-native snails – will help to promote their conservation, as well as the conservation of functioning ecosystems.

## Expected Results and Benefits

The primary deliverable is a comprehensive Northeast Region Land Snail website, established by expanding and upgrading the existing land snail and slug website of the Carnegie Museum of Natural History with data compiled from other museum collections. The database/website will be informed and updated in part by completion of targeted land snail inventories in the region. Approximately 300+ lots of land snail specimens collected will ultimately reside in the Carnegie Museum of Natural History's Mollusk Collection, Pittsburgh, PA.

As many states and land snail species are added to the website we should expect to see greatly increased access by site visitors, especially in parts of the Northeast not previously covered. The Carnegie Museum of Natural History tracks visitation to all of their web pages. Prior land snail website additions have led to the Mollusk Section becoming the most-visited science portion of the Carnegie's website.

By providing this information in a form readily used by state wildlife agencies and their conservation partners, these species can be better protected and managed without the need include some or all of them on the federal list of endangered and threatened species.

This work would fill a significant knowledge and expertise gap in the state fish and wildlife agencies since 245 species of land snail are known to exist in the Northeast, 11 of which are ranked highly in the RSGCN species assessment exercise conducted by NEFWDC and the NALCC. In 2013 not enough was known

about land snails to include them on the RSGCN list. This project will address these data deficient taxa and assist states and the region in its RSGCN process as well as help guide invertebrate conservation.

The second major deliverable is an inventory of selected high-priority and poorly-known snail species and habitats on the Atlantic Coast and Great Lakes - St. Lawrence River plain. This will result in species lists for each site inventory, which will be distributed to the appropriate state wildlife agencies, along with the relevant state field forms for tracked species. Approximately 300+ lots of land snail specimens collected will become part of the Carnegie Museum of Natural History's Mollusk Collection in Pittsburgh, PA. The field work will be conducted by Appalachian Conservation Biology in cooperation with and permitted by the appropriate state wildlife agencies.



## Land Snails and Slugs of the Mid-Atlantic and Northeastern United States



### Objectives

- 1) Expand and update the Northeast Region land snail website "Land Snails and Slugs of the Mid-Atlantic and Northeastern United States" to cover all of approximately 245 species found among the 14 state faunas of the region.
- 2) Advance RCN goals through inventory of data deficient, targeted land snail taxa during the 2017 field season by working with state biologists to prioritize areas for specific land snail habitats or species that are under-surveyed.

### Approach/Methods

This project will create a comprehensive Northeast Region Land Snail website, by expanding and upgrading our land snail and slug website at the Carnegie Museum of Natural History. The snail fauna of all of the region's 14 states will be covered by the website, including any uncommon or rare snails. This project will also include targeted land snail inventory in the region, as prioritized by states. Most of the region's states will be included in the field inventory, with an emphasis upon the states with the largest Atlantic Coast and Great Lakes Plain areas. The overall project will begin in January 2017 and be completed by the end of 2017, with field work conducted between May and July 2017.

Specifically, we will:

1) Expand and update the Northeast Region land snail website “Land Snails and Slugs of the Mid-Atlantic and Northeastern United States” to cover all of approximately 245 species found among the 14 state faunas of the region. This site will continue to be hosted at the Carnegie Museum of Natural History (see <http://www.carnegiemnh.org/science/mollusks/>). Activities will include:

- Upgrading the website infrastructure to make it more user-friendly and functional.
- Obtaining regional museum specimen records and building range maps for the 11 states not already covered.
- Imaging newly-added land snail species and some current species that need a better-quality image.
- Cross-linking all snail species profiles with state species lists.
- Adding conservation needs and recommendations for all rare, threatened or endangered species profiles.
- Updating current ecology sections and adding new land snail ecology sections on topics such as invasive species and climate change.
- Expanding the snail identification key to include all regional species.
- Adding illustrations to the glossary and key.
- Making the website Americans with Disabilities Act (ADA) compliant (for example, links need to be key-clickable in addition to mouse-over).

Content including research, citations, images, and range maps will be created by Appalachian Conservation Biology (ACB). Website guidelines, layout, and structure will be developed by ACB and executed by a subcontractor.

2) Inventory targeted land snail species and groups in May through July 2017 field season. In early 2017 coordination of inventory work will begin with contact of state biologists, and applications for state permits. We will work with state biologists to check parks and natural areas for specific land snail habitats or species that are high priority and under-surveyed on the Atlantic Coast and Great Lakes plain.

Focus snail taxa will be the amphibious, enigmatic Succineids and other snails of coastal riparian zones (coastal Virginia through Maine); and Pupillid and other land snails of Great Lakes and St. Lawrence limestone habitats such as alvars (Pennsylvania, New York, and Vermont). In addition, the non-native species *Succinea putris*, *Arion subfuscus*, and *Cepaea nemoralis* will be targeted for inventory in coastal habitats. Twenty inventory days with a field crew, plus lab work and identification are planned.

Field inventory will be executed along two major travel transects – one on the Atlantic Coast and the other on the Great Lakes and St. Lawrence River Plain. Five days will be devoted to the Great Lakes and 15 to the coast. Parks and natural areas for collection will be selected in coordination with state wildlife agencies.

The actions proposed in this grant will take place throughout Region 5 in 2017. Most activities involve office and lab work (writing, mapping, or identification of specimens). Handling of animals will be conducted or supervised by the contractor using standard protocols, documentation, and safety procedures. Activities will not be conducted in areas with any federally listed, proposed or candidate

species or designated critical habitat. If listed species are encountered at a site, work will stop immediately and the state endangered species coordinator will be contacted.

Inventory protocols are designed to protect sensitive species and habitats. Any globally-rare or state-listed species will be collected to avoid population impacts by limiting the search area to <1% of available habitat. Most uncommon species are typically encountered in small numbers, <10 per sample site, such that that inventory has no effect upon populations. Small field teams work on foot, causing limited habitat disturbance and replacing any moved logs or rocks. Known locations of federally listed species will be avoided. If a federally listed species is encountered, then work stops immediately.

## Budget and Timeline

The budget is developed based upon a 155-day project (0.65 of a 48-week year), not including contractual services time. Fifty percent of the project total budget is provided through in-kind services, by donating 60.2% of “personal service” costs. Work will begin Jan. 1, 2017 and end Dec. 31, 2017.

	<b>GRANT FUNDS</b>	<b>MATCH*</b>	<b>TOTAL</b>
<b><u>Personal Service Cost</u></b>			
Salaries and/or Wages	41,830	63,275	105,105
Fringe Benefits	4,225		4,225
Personal Service Indirect Cost %			
<b><u>Non-personal Service Cost</u></b>			
Travel	2850		2850
Equipment			
Supplies & Materials	453		453
Contractual Services	8200		8200
Other			
Non-personal Indirect Cost___%	5,718		5,718
<b>TOTAL</b>	<b>63,276</b>	<b>63,275</b>	<b>126,551</b>

## Budget

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Personal Service .....	<b>\$105,105.00</b>
Labor – coordination, editing, permitting (20 days @ \$637/d) .....	12,740.00
Labor – writing ecology content, new spp. profiles, ID key (25 days @ \$637/d) .....	15,925.00
Labor – obtaining records, creating range maps (45 days @ \$637/d) .....	28,665.00
Labor – new spp. images, illustrating snail key and glossary (15 days @ \$637/d) .....	9,555.00
Labor – field collection (20 days @ \$637/d) .....	12,740.00

Labor – sorting, identification, reporting (40 days @ \$637/d) .....	25,480.00
<u>Fringe Benefits .....</u>	<u>\$4,225.00</u>
Insurance and coverage; health, dental, vision, liability (\$4,500/yr x 0.65) .....	2,925.00
Retirement (\$2,000/yr x 0.65) .....	1,300.00
<u>Indirect Overhead .....</u>	<u>\$5,718.00</u>
Office/lab space/website (\$1,650/yr x 0.65) .....	1,073.00
Vehicle (\$7,000/yr x 0.65) .....	4,450.00
Hardware (computer, printer, microscope; \$300/yr x 0.65) .....	195.00
<u>Supplies .....</u>	<u>\$453.00</u>
Collecting vials, glassware, printer ink.....	453.00
<u>Equipment.....</u>	<u>no charge</u>
Sieves, flashlights, magnification, daypacks, etc. ....	no charge
<u>Travel .....</u>	<u>\$2,850.00</u>
Mileage (2,500 mi x 0.50) .....	1,250.00
Room and Board (20 days @ \$80/d).....	1,600.00
<u>Contractual Services .....</u>	<u>\$8,200.00</u>
Subcontract for website construction (lump sum estimate).....	5,000.00
Subcontract field assistance (20 days @ \$160) .....	3,200.00
<b><u>Project Total .....</u></b>	<b><u>126,551.00</u></b>
<u>In-Kind Services.....</u>	<u>-63,275.00</u>
60.2% discount on personal service labor (\$105,105 x 0.602) .....	-63,275.00
<b><u>Total Request .....</u></b>	<b><u>63,276.00</u></b>

## Cost: \$63,276 RCN funds

The proposed work will be performed by the contractor: Appalachian Conservation Biology.

**Match:** The contractor proposed to provide \$63,276 in in-kind match.

### About the Contractor

Project Director: Ken Hotopp, Principal  
Appalachian Conservation Biology  
and Research Associate, Section of Mollusks  
Carnegie Museum of Natural History  
Appalachian Conservation Biology  
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Appalachian Conservation Biology is a small environmental consulting company specializing in the biogeography, ecology, and conservation of land snails. Other work includes freshwater snails, butterflies, natural areas planning, rare plant inventory, old growth forest research, and native grassland, wetland, and forest restoration.

ACB projects are conducted with specially-assembled teams of collaborators and subcontractors, with field activities ranging from Maine to western Virginia. Clients are often state and federal agencies, but also include non-profit conservation groups, private landowners, and other environmental consulting firms.

The company is owned and operated by conservation biologist Ken Hotopp. Ken started ACB in 1997 in western Maryland, and since 2005 has been located in Bethel, Maine. He worked previously for the Maryland Dept. of Natural Resources, and has an M.S. from SUNY Albany, NY (1987) and a B.S. from SUNY College of Environmental Science and Forestry, Syracuse, NY (1982).

Ken is also a Research Associate with the Carnegie Museum of Natural History, Section of Mollusks. Mollusk Section head Timothy A. Pearce, PhD, is a frequent collaborator. Ken taught "snail school" summer field courses at Eagle Hill Institute, Steuben, Maine for two years, in addition to various public presentations on snails, old forest, and climate change.

Appalachian Conservation Biology practices energy conservation and sustainable resource use in its field and office operations.

For published work please see ResearchGate:

[https://www.researchgate.net/profile/Kenneth\\_Hotopp](https://www.researchgate.net/profile/Kenneth_Hotopp),

or request a complete list of publications and unpublished reports.