

Chittenango ovate amber snail
(Novisuccinea chittenangoensis)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
New York Field Office
Cortland, New York

November 2011

5-YEAR REVIEW

Species reviewed: Chittenango ovate amber snail (*Novisuccinea chittenangoensis*)
November 2011

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U.S. FISH AND WILDLIFE SERVICE
5-Year Review for Chittenango ovate amber snail (*Novisuccinea chittenangoensis*)
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1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office: Region 5, Ms. Mary Parkin, (617) 876-6173,
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Lead Field Office: New York Field Office, Ms. Robyn Niver, (607) 753-9334,
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Cooperating Field Office: none

Cooperating Region: none

1.2 **Methodology Used to Complete the Review:** This 5-year review was conducted as an individual effort by the lead endangered species biologist for the COAS. It summarizes new threats and status information gathered since the 2006 Review.

1.3 Background

1.3.1 **FR Notice announcing initiation of this review:** 75 Federal Register 47025 (August 4, 2010): Initiation of a 5-Year Review of 5 Listed Species: The Delmarva Peninsula Fox Squirrel (*Sciurus niger cinereus*), Northeastern Bulrush (*Scirpus ancistrochaetus*), Furish Lousewort (*Pedicularis furbishiae*), Chittenango Ovate Amber Snail (*Novisuccinea chittenangoensis*), and Virginia Round-Leaf Birch (*Betula uber*)

1.3.2 **Listing history:**

FR notice: 43 FR 28932
Date listed: July 3, 1978
Entity listed: species
Classification: threatened

1.3.3 **Associated rulemakings:** none

1.3.4 **Review History:** This review constitutes the second 5-year status review of the Chittenango ovate amber snail (COAS) since its listing. Information that has become available since the last review (Service 2006a) has been used to evaluate and assess the current status of the COAS.

1.3.5 Species' Recovery Priority Number at start of review: 5

1.3.6 Recovery Plan:

Name of plan: Chittenango ovate amber snail (*Novisuccinea chittenangoensis*)
Recovery Plan, First Revision

Date issued: July 11, 2006

Date(s) of previous plan/revision(s): March 1983

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review listed a vertebrate? No, the species is an invertebrate; therefore, the DPS policy is not applicable.

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria? Yes

2.2.2 Adequacy of recovery criteria:

2.2.2.1 Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat? Yes

2.2.2.2 Are all relevant listing factors addressed in the recovery criteria? Yes

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information.

[Note: The only recovery criteria that have been partially or fully met are those annotated in *bold italics*.]

Stabilization and Delisting Criteria:

In order to consider *Novisuccinea chittenangoensis* as **stabilized**, the following criteria should be met:

1. The population at Chittenango Falls is shown to be stable or improving for 10 years. To accomplish this, a baseline population size and distribution must be determined. ***Baseline (post-2006 rockslide) has been established.***

2. At least two healthy captive colonies of *Novisuccinea chittenangoensis* are successfully established in order to: (1) provide a source for augmenting the population at Chittenango Falls or introductions to new sites, (2) buffer against extinction in the wild, and (3) provide a source of *Novisuccinea chittenangoensis* for various scientific experiments related to their recovery. A healthy captive population is defined as having sufficient genetic diversity and being large enough to meet population goals, which will be specified in a new protocol based in part of the results of genetics research as well as results of research into the optimal conditions for propagation of *Novisuccinea chittenangoensis*. *The U.S. Fish and Wildlife Service (Service) held a captive management workshop for the COAS in 2011 to determine which of the above roles matched the species immediate needs. Management recommendations will be forthcoming.*
3. The genetic distinctiveness of *Novisuccinea chittenangoensis* from other snails occupying the site is demonstrated. *We have met this criterion through work by Dr. Tim King of the U.S. Geological Survey (USGS). COAS and Sp. B are unique species.*
4. With respect to the five listing factors, threats to the species are abated as follows (noting that no risks to the snail were identified under Factor B or, for as long as the snail is listed, Factor D):

Factor A. Protection of the snail's Chittenango Falls habitat by the NYSOPRHP is perpetuated. *NYSOPRHP permanently owns the habitat and manages access to the site.*

Factors C and E. A sufficient understanding of the relationship between *Novisuccinea chittenangoensis* and *Succinea* sp. B is gained and effective measures to reduce any negative interactions are in place. *Investigations have shown that control of *Succinea* sp. B is not a feasible option and does not appear warranted at this time (Campbell et al. 2010).*

Factor E. A sufficient understanding of any future threat of hybridization is gained to allow an effective response. *We have met this criterion through work by Dr. Tim King of the USGS. There does not appear to be any threat of hybridization.*

5. Monitoring of threats and effects of management practices indicate that recovery actions are contributing to the improved status of the species.

If and when the population is shown to be stable or increasing for at least five generations (10 years), recovery of *Novisuccinea chittenangoensis* can then focus on meeting conditions for delisting. **Delisting** will be considered when the following criteria (in addition to criteria 1-3) are met.

6. The *Novisuccinea chittenangoensis* population at Chittenango Falls must include at least 1000 snails with occupancy of both the lower and middle ledges. The population must be stable (or improving) for at least 10 years.

7. Threats to the snail are abated as follows:

Factor A. All sites with *Novisuccinea chittenangoensis* are permanently protected through acquisition, conservation easement, or another form of agreement.

Factor A. Written management/monitoring plans are in place for each site.

Factor A. A sufficient understanding of habitat and biological requirements is gained to conduct management efforts.

Factor D. *Novisuccinea chittenangoensis* is ensured continued protection by New York State after ESA protections are removed.

Factors C and E. Any negative interaction between *Novisuccinea chittenangoensis* and *Succinea* sp. B or other species is controlled with minimal management intervention. *Investigations have shown that control of Succinea sp. B is not a feasible option and does not appear warranted at this time (Campbell et al. 2010).*

Factor E. Searches for any other potential extant populations have been completed, and the extant population at Chittenango Falls has been successfully augmented.

Factor E. Searches for potential introduction sites have been completed, the potential for introduction has been thoroughly evaluated and, if warranted, one or more additional *Novisuccinea chittenangoensis* populations have been successfully established.

8. Monitoring of threats and effects of management practices indicate that recovery actions have led to a secure status for the species.

2.3 Current Species Status and Updated Information

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history: Since the 2006 Review, the Service funded a post-doctoral research project at the State University of New York College of Environmental Science and Forestry (ESF). Part of the project examined interactions between COAS and Sp. B, including their habitat use. Campbell et al. (2010) found that COAS and Sp. B exhibited a high degree of overlap in plant

species and substrate on which they were found, with some differences. For example, COAS were found spending time on (and presumably feeding on) wood more than Sp. B while Sp. B was found more on *Nasturtium officinale* than COAS. COAS occurred more often on dead parts of plants while Sp. B were found on living parts.

When comparing use of plants and substrate vs. their availability, COAS selected *Eupatorium purpureum* and avoided area dominated by rocks and *Nasturtium officinale* while Sp. B selected *Impatiens sp.* and *Pilea pumila* and avoided rocky areas.

Campbell et al. (2010) recommended further investigations to determine whether these differences are true preferences or are used as a means of niche differentiation from Sp. B.

2.3.1.2 Abundance, population trends, demographic features and/or trends: Overall, the population status is unknown.

For background on survey work conducted before 2002, please see p. 11 of the Recovery Plan.

As described in the 2006 Review, the COAS population was estimated to be 178 in 2003, 680 in 2004, and 819 in 2005. Analyses have since been rerun (Campbell et al. 2010) with estimates of 262.4 (± 35.68), 225.1 (± 31.76), 716.5 (± 68.97), and 784.2 (± 38.10) for 2002-2005, respectively. However, all work at the Falls was stopped in July 2006 due to a massive flood event that caused a rockslide in the primary COAS habitat. Surveys were reinitiated in 2007 after human safety concerns were addressed at the site. Campbell et al. (2010) reported population estimates for 2007, 2008, and 2009 of 551.1 (± 50.01), 322.6 (± 27.59), and 339.2 (± 52.85), respectively. The 2009 population estimate suggests a decline of 56.7% from the pre-rockslide estimate. Surveys were also conducted in 2010; however, analyses of the raw data have not been conducted to date. No surveys were conducted in 2011; however, plans for work in 2012 are underway.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation: The USGS obtained samples from 34 COAS for genetics research and successfully developed and characterized 12 microsatellite markers (In Review 2011). Of the 12 primers, overall allelic diversity ranged from 2 to 9 with an average of 5.2 alleles/locus. While COAS are hermaphroditic, allelic diversity indicates no evidence of individuals reproducing with themselves as the fewest number of allele differences detected among the 34 individuals sampled was six.

USGS also estimated effective population size using the same 34

samples. Preliminary results indicate an effective population size of 73.7 individuals (95% CL, 43.5 and 194.7) that has remained constant over time, suggesting that recent flooding events have not resulted in significant changes in genetic variation.

Genetic variation in the population was also evaluated and some fine scale spatial structuring was detected with individuals collected from the low, medium, and high sampling zones across the sampling transect being more closely related to each other.

Publications are anticipated later this year or in 2012.

- 2.3.1.4 **Taxonomic classification or changes in nomenclature:** The listed entity, COAS, continues to have an incorrect genus (*Succinea*) in the Code of Federal Regulations.
- 2.3.1.5 **Spatial distribution, trends in spatial distribution, and/or historic range:** No update since 2006 Review.
- 2.3.1.6 **Habitat or ecosystem conditions:** No update since 2006 Review.
- 2.3.1.7 **Other:** Not applicable
- 2.3.2 **Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)**
 - 2.3.2.1 **Factor A. The present or threatened destruction, modification, or curtailment of its habitat or range:** No update since 2006 Review.
 - 2.3.2.2 **Factor B. Overutilization for commercial, recreational, scientific, or educational purposes:** No update since 2006 Review.
 - 2.3.2.3 **Factor C. Disease or predation:** No update since 2006 Review.
 - 2.3.2.4 **Factor D. Inadequacy of existing regulatory mechanisms:** No update since 2006 Review.
 - 2.3.2.5 **Factor E. Other natural or manmade factors affecting its continued existence:** As discussed above, in late June 2006, a massive flood event resulted in a rockslide in the COAS' primary habitat at the Falls. It is likely that these types of events have occurred periodically throughout the entire existence of COAS at the Falls and will continue to occur in the future. On an optimistic note, as mentioned in the genetics section above, the effective population size appears to be stable suggesting that COAS has not recently undergone any sort of genetic bottleneck from the 2006 flooding event. There is really nothing that we can do to

prevent future natural flooding events and we plan to continue to monitor COAS population size over time. Boosting COAS population size at the Falls may be our only option to buffer against future events.

As discussed in the 2006 review, the Service has been concerned about the presence of *Succinea* sp. B that may be competing with *Novisuccinea chittenangoensis* for food and/or breeding or wintering habitat. Campbell et al. (2010) found evidence for both competition and coexistence at the Falls. During a two-week experiment COAS and Sp. B were placed in containers at the Falls at various densities and growth rates were monitored. At densities of 10:1 Sp. B to COAS, COAS growth rates were unaffected. However, COAS growth rates were 73 and 83% lower at densities of 25:1 and 50:1, respectively. Growth rates of Sp. B showed no difference between the treatments containing 10 and 25 Sp. B, but there was a 62% reduction in Sp. B growth rates in the treatment containing 50 Sp. B. Campbell et al. (2010) also investigated possible differences in competitive effects based on the size class of Sp. B. They found that no effect on COAS growth from 10 small Sp. B. In addition, they found that 50 small Sp. B had the same effect on COAS as 10 large Sp. B.

While there were observed effects on COAS growth rates during the experiments, as discussed above, COAS and Sp. B appear to be partitioning available resources in the wild at the Falls. In addition, natural population densities (8:1) are well below the densities at which negative competitive effects (25-50:1) were observed. Finally, there may be a temporal partitioning of resources due to varying life history strategies between the species (COAS is a slower growing and smaller biennial species, and Sp. B is a faster growing annual species). There is an annual adult die-off of Sp. B in the late summer with a replacement by the new cohort of hatched individuals that may compete less with COAS during this late summer, early fall period. Campbell et al. (2010) found that past manual removal of Sp. B has not been an effective means of control at the Falls and is not warranted.

A new potential threat has recently been identified at the Falls. Pale swallowwort (*Cynanchum rossicum*) has been discovered in multiple areas at the Park including directly above COAS habitat.

For more information on Factor E, please see p. 15 of the Recovery Plan.

2.4 Synthesis

Based on the single population and existing threats, *Novisuccinea chittenangoensis* may be more accurately classified as an endangered rather than threatened species. Please refer to the 2006 Review for further discussion.

3.0 RESULTS

3.1 **Recommended Classification:** Uplist to endangered

Rationale: The species should be uplisted to endangered given its single known location and current threats, as described above.

3.2 **New Recovery Priority Number:** 5 (maintain current)

Rationale: The rarity and acute threats facing this snail and its habitat indicate a high threat level. The current lack of management options for abating the threats of overcompetition by invasive species and natural disturbances such as flooding, as well as past lack of success in efforts to propagate the species to overcome small population effects, indicate a low potential for recovery. The species does occur within a protected area, thus precluding economic conflicts. In accordance with Table 3 in 48 FR 184: 43104, a priority number of 5 is based on high threat, low recovery potential, taxonomic standing as a species, and no economic conflicts.

3.3 **Listing and Reclassification Priority Number:** 2 (maintain current)

Rationale: Based on Table 1 in 48 FR 184: 43103, the magnitude of the threats facing the COAS is rangewide and severe, and the threats are documented and imminent, lead to a priority number of 2.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- The Service should continue to implement the Recovery Plan and Spotlight Species Action Plan (Service 2010).
- The Service should revise the official scientific name in the Code of Federal Regulations and ECOS.
- A proposal to uplist the COAS to endangered should be prepared.

5.0 REFERENCES

Data and literature are located within the U.S. Fish and Wildlife Service's New York Field Office, 3817 Luker Road, Cortland, New York 13045.

- Breisch, A.R. 1987. 1986-87 Endangered Species Report- Project Number E-1-10, Job Number VIII-13. New York State Department of Environmental Conservation.
- Campbell, S.P., J.L. Frair, and J.P. Gibbs. July 2010. Competition and coexistence between the federally-threatened Chittenango Ovate Amber Snail (*Novisuccinea chittenangoensis*) and a non-native snail (*Succinea* sp. B). Final Progress Report to the U.S. Fish and Wildlife Service. SUNY College of Environmental Science and Forestry, Syracuse, New York.
- U.S. Fish and Wildlife Service. 2006a. Chittenango Ovate Amber Snail (*Novisuccinea chittenangoensis*) 5-Year Review: Summary and Evaluation. Cortland, New York.
- U.S. Fish and Wildlife Service. 2006b. Chittenango Ovate Amber Snail (*Novisuccinea chittenangoensis*) Recovery Plan, First Revision. Hadley, Massachusetts. xiii + 55 pp.
- U.S. Fish and Wildlife Service. 2010. Chittenango Ovate Amber Snail (*Novisuccinea chittenangoensis*) Spotlight Species Action Plan. Cortland, New York.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Chittenango ovate amber snail (*Novisuccinea chittenangoensis*)

Current classification: Threatened

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change is needed

Appropriate Listing/Reclassification Priority Number, if applicable: 2

Review conducted by: Robyn Niver, New York Field Office

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve Patricia Cole Date 11/22/2011
for David Stilwell

REGIONAL OFFICE APPROVAL:

for Lead Regional Director, Region 5, Fish and Wildlife Service

Approve Paul R. Py Date 11/8/12