

## **5-YEAR REVIEW**

### Short Form Summary

**Species Reviewed:** *Taylorconcha serpenticola* (Bliss Rapids Snail)

**Current Classification:** Threatened

#### **Federal Register Notice announcing initiation of this review:**

Initiation of 5-year status reviews of 133 species in Oregon, Washington, Idaho, Montana, California, Nevada, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. Federal Register March (88:17611–17614, March 23, 2023)

#### **Lead Region/Field Office:**

Region 1/Idaho Fish and Wildlife Office, Boise, Idaho

#### **Name of Reviewer(s):**

Alyssa Bangs, Idaho Fish and Wildlife Office, Fish and Wildlife Biologist  
Tracy Melbihess, Idaho Fish and Wildlife Office, Assistant State Supervisor  
Sandi Fisher, Idaho Fish and Wildlife Office, Deputy State Supervisor  
Lisa Ellis, Idaho Fish and Wildlife Office, State Supervisor

#### **Methodology used to complete this 5-year review:**

This review was conducted by staff of the Idaho Fish and Wildlife Office (IFWO) of the U.S. Fish and Wildlife Service (Service or USFWS), beginning on March 23, 2023. The review was based on a synthesis of current, available information since the last 5-year review for the Bliss Rapids snail in 2018 (USFWS 2018, entire). Information considered includes Endangered Species Act Section 7(a)(1) consultation documents, such as biological opinions and assessments, and letters of concurrence; comments submitted in response to the March 23, 2023, Federal Register notice of initiation of 5-year status reviews (88 FR 17611–17614); and annual monitoring reports and other data collected by IFWO. The evaluation conducted by IFWO biologists was reviewed by the Assistant State Supervisor and Deputy State Supervisor before submission to the Idaho State Supervisor for approval.

#### **Background:**

For information regarding the species listing history and other facts, please refer to the Service's Environmental Conservation On-line System database for threatened and endangered species (<https://ecos.fws.gov/ecp/>).

#### **Review Analysis:**

This 5-year review considers new information and data collected after completion of the 2018 5-year review (USFWS 2018, entire) and focuses on pertinent updates that reflect the current status of the species starting in 2018. No significant new information regarding the species biological status warrants a change to the Federal listing status of the Bliss Rapids snail as threatened.

New Information:

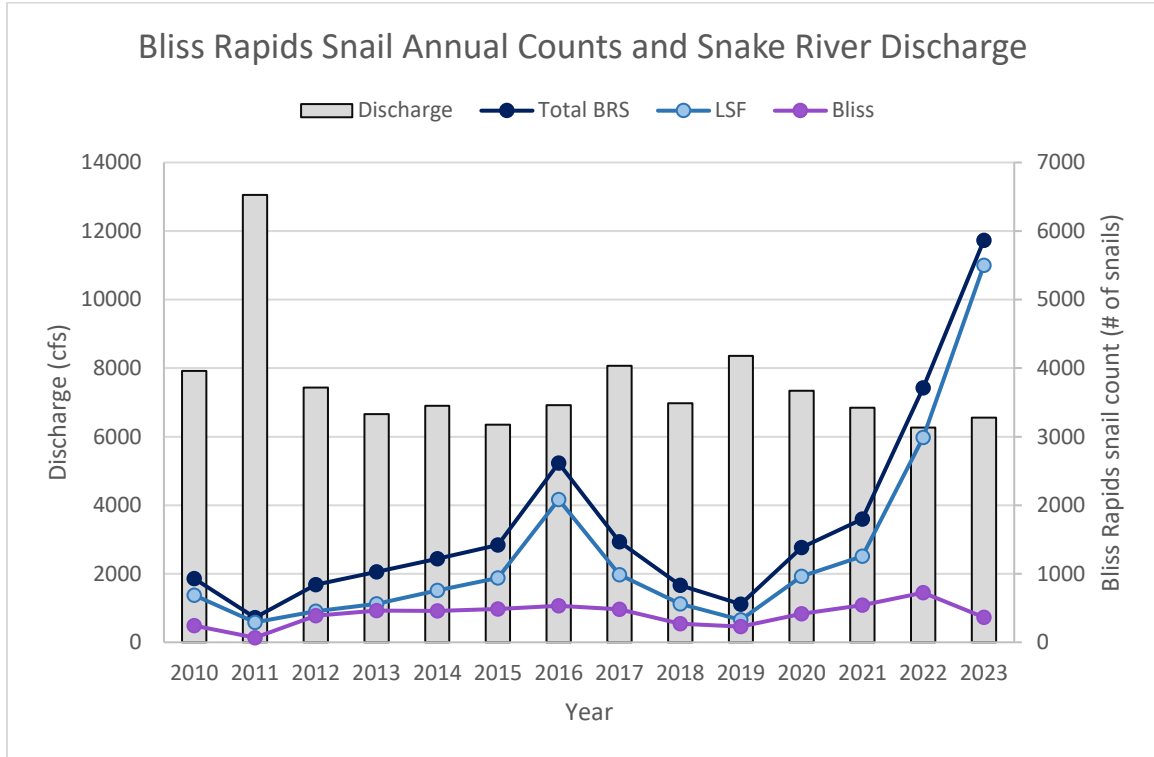


Figure 1. Graph showing Bliss Rapids snail counts during annual surveys (in number of snails) for each sampled river reach (Lower Salmon Falls Reach (LSF; River Mile (RM) 573 to RM 566.5) and Bliss Reach (RM 560.3 to RM 547.5) and both combined (Total BRS), as well average discharge in the Snake River at King Hill during the survey period (in cubic feet per second [cfs]) between 2010 and 2023. Data from Idaho Power Company annual Bliss Rapids snail monitoring reports.

*Snake River:*

In 2023, Bliss Rapids snail abundance in the Snake River was the highest recorded since surveys began, likely due to multiple low water years in the Snake River providing stable snail habitat and better access to snail habitat for surveyors. Based on annual survey data, the Snake River populations appear to be increasing since the low of 555 snails in 2019. Variation in total snail counts is primarily driven by the Lower Salmon Falls reach (River Mile (RM) 573 to RM 566.5), where counts have increased since 2019. The Bliss reach (RM 560.3 to RM 547.5) snail counts have stayed relatively stable, with a slight increasing trend from 2019 but a decline in 2023 (Figure 1). A population in the tailrace of Upper Salmon Falls Dam (RM 579.6) was added to annual river surveys in 2020 to include a river site protected from high flows and scouring; high flows are directed into a separate channel and do not impact this population. Monitoring at this population is not included in the total annual snail counts (Figure 1). Bliss Rapids snail counts at the Upper Salmon Falls location have varied from 116 in 2020 to a high of 396 in 2022, before declining to 91 in 2023 (Bates 2024c, p. 11).

*Malad River:*

Samples are collected at two sites within Cove Creek, a tributary to the Malad River. The upper pool site, where water emerges at a box canyon, has seen a declining trend in snail

relative abundance within the last 5 years and encroachment of aquatic and riparian vegetation such as cattails, which limits habitat availability for the species. At the lower site, near a diversion dam near the confluence of Cove Creek with the Malad River, the relative abundance seems to be trending upward, and has made up a higher proportion of the total Bliss Rapids snail abundance in Cove Creek for the last three years; historically, the upper pool had a much higher abundance (Bates 2024a, p. 22-24).

Bliss Rapids snail surveys also occur in the lower section of the Malad River, which is highly spring influenced. Bliss Rapids snail counts in this survey reach have been declining over the last 5 years, with only 4 snails documented during 2023 surveys compared to 1,322 in 2015 (Bates 2024b, p. 5).

*Springs:*

Nine springs with known populations of Bliss Rapids snail (located between RM 605.8 and RM 576.5) were surveyed annually between 2010 and 2017, and biennially between 2018 and 2022 (Figure 2). One of these springs, Ellison 2, was deemed extirpated in 2016 and monitoring has been discontinued. Two springs, Niagara and Banbury, are surveyed for relative abundance and percent occupied cobble (POC; a metric which reduces impacts of surveys upon the snail colony but allows the prediction of relative abundance), while the remaining are surveyed for POC only. The survey methods used in the majority of the springs, while designed to minimize impacts to snails, still involves moving cobble substrate in a proportion of each spring. In 2018, after impacts to snail abundance were noticed in several of the surveyed springs, surveys were shifted from annual to biennial. Therefore, spring surveys since the last 5-year review occurred in 2018, 2020, and 2022. The relative abundance at Banbury Springs was the lowest observed value since sampling began, with an almost 30% decline in the total number of counted snails, although the percent occupied of cobble (POC) was similar to previous years. Other sites saw an increase in POC between 2020 and 2022, but some of the lowest POCs since sampling began in 2010 (Figure 2; Bates 2023, entire).

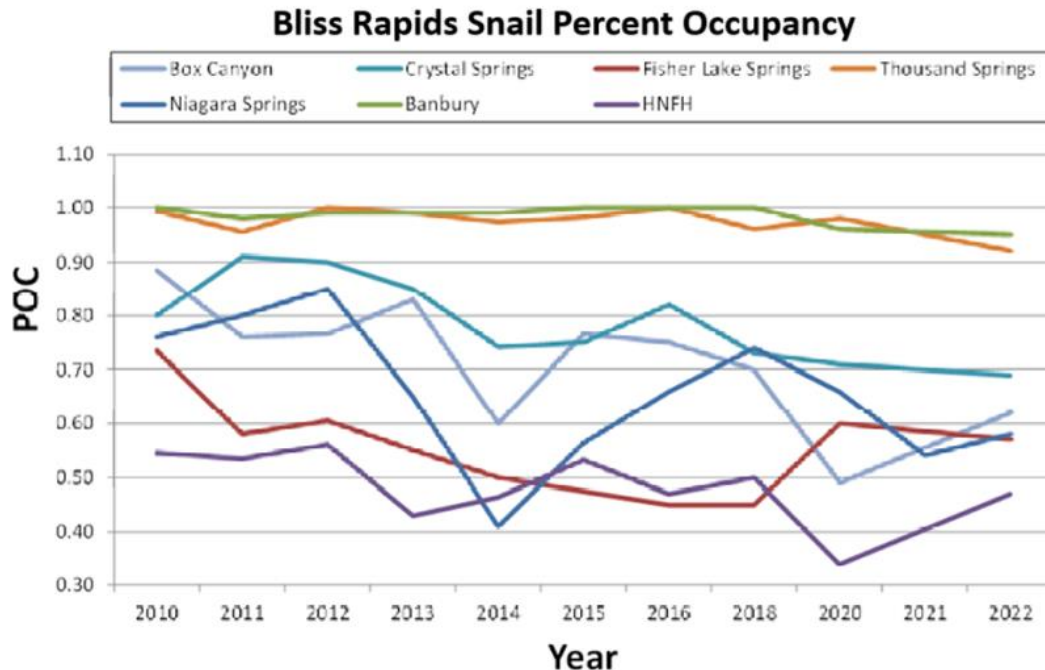


Figure 2. Percent Occupied Cobble (POC) at seven monitored Bliss Rapids snail spring colonies (HNFH: Hagerman National Fish Hatchery) between 2010 and 2022 (From Bates 2023, p. 14).

Two privately-owned springs in the Thousand Springs area were also resurveyed for the first time since 2006. Bliss Rapids snail presence was documented in both, including Devil’s Corral, a spring-fed creek upstream of Twin Falls, Idaho, and the upstream-most known spring population of the species.

New Threats:

*Invasive Species:*

Invasive dreissenid mussels (quagga and zebra mussels) impact native mollusks through competition for food resources and habitat. Invasive mussels have negatively impacted native snail species in at least one region of the United States (Van Appledorn and Bach 2007, entire). Most treatments for dreissenid mussels are targeted molluscicides or involve the smothering of the substrate, both of which are likely to negatively impact the Bliss Rapids snail if present in the impacted area. Dreissenid mussels have become established in watersheds throughout the United States but had not been found within the Columbia River Basin until recently.

In September 2023, Idaho State Department of Agriculture (ISDA) dreissenid early detection monitoring program surveys detected quagga mussel veligers (planktonic larvae) in the Snake River near Twin Falls, Jerome County, Idaho. Further delineation found quagga mussel veligers in the Snake River between Twin Falls Dam (RM 617.5) and Centennial Park (RM 611), and a single adult quagga mussel in the pool below Shoshone Falls (RM 614.7). After initiation of the Idaho Emergency Rapid Response Plan for Dreissenids, the impacted river reach was treated with a liquid chelated copper (Natrix®). Copper is a molluscicide; in a study on copper toxicity to Bliss Rapids snail, 28-day LD<sub>50</sub> for copper (the amount at which 50% of the tested population died after 28

days of exposure) was 15µm/L or 0.015 parts per million (ppm). Due to the large scale of the impacted reach and the free-flowing nature of the Snake River, copper was added to the entire 6-mile impacted reach at 1 ppm and allowed to dilute naturally as it travelled downstream. Based on initial models, ISDA expected the copper plume to travel approximately 16 miles before returning to background levels via absorption into macrophytes and sediment as well as dilution from spring inputs downstream of the treatment area. This river reach has historical shell records of Bliss Rapids snails, and Bliss Rapids snails are found in springs both up- and downstream of this reach. The closest known river population to the treatment area is Upper Salmon Falls Dam/Dolman Rapids, approximately 34 miles downstream of Shoshone Falls. In the Biological Assessment for the treatment, the U.S. Army Corps of Engineers used copper samples taken before, during, and after treatment throughout the treatment reach to model copper levels downstream and determined that copper may have reached the Upper Salmon Falls Dam/Dolman Rapids population at low, but not discountable, levels. Surveys post-treatment found Bliss Rapids snail still present at the Upper Salmon Falls Dam colony at similar levels to those before treatment (M. Stevenson, pers. comm.).

Although the recent quagga treatment in the Snake River seems to have been successful, quagga veligers may have survived and established downstream of the treatment area. Additionally, the Snake River basin is at a continued risk for invasion, including in areas occupied by Bliss Rapids snail. Future treatments within the Snake River to remove invasive mollusks with copper or other molluscicides have the potential to impact Bliss Rapids snail populations, as will any successful establishment of dreissenid mussels. However, the extent of potential lethal and non-lethal effects associated with invasive mussel treatment or establishment are unknown.

#### New Management Actions:

##### *Captive Population:*

Due to population declines of Bliss Rapids snails in the Malad River and several springs, as well as the quagga mussel discovery and treatment in the Snake River upstream of the species, the USFWS partnered with the University of Idaho (University) to determine if Bliss Rapids snails could be maintained in captivity. The goals of the captive effort were to determine the infrastructure and habitat needs for short-term survival (for temporary holding during periods of impact to occupied Bliss Rapid snail habitat, such as drought, chemical impacts, or infrastructure projects) and long-term captive propagation (for biological and life history research and/or potential reintroduction into declining populations). The University runs the Hagerman Fish Culture Experiment Station (HFCES) near Hagerman, Idaho. This facility utilizes water from a spring stemming from the Eastern Snake River Plain Aquifer (ESPA); Bliss Rapids snails are found in a creek adjacent to the HFCES property and fed from the same spring. After several successful tests maintaining a conspecific pebblesnail (*Fluminicola* sp.), a small number of Bliss Rapids snails were brought into the facility in 2023 and early 2024. Live snails have been maintained in HFCES aquaria for 7 months at the time of this document.

*Groundwater Recharge:*

The State of Idaho and private parties began a recharge program to add water to the ESPA in 2014, and all Idaho Water Resource Board managed recharge sites are upgradient of most Bliss Rapids snail-occupied springs. These springs, and therefore the Bliss Rapids snails, may benefit from continued recharge efforts.

**Status of Recovery Criteria:**

**Table 1. Status of threats to *Taylorconcha serpenticola* from listing through current 5-year review.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Management</b>
Habitat loss/modification – spring habitats and groundwater/aquifer	A, D	Ongoing	Partially
Invasive species	A, E	Ongoing	Partially
Climate change	E	Increasing	No

In 1995 the Service completed the Snake River Aquatic Species Recovery Plan (Plan) (USFWS 1995, entire) to provide the recovery needs and criteria for 5 species of federally listed mollusks in the Snake River, including the Bliss Rapids snail. Since the publication of that Plan, two of the five mollusks have been delisted based on expanded range and increased abundance (75 FR 52272, August 25, 2010) or taxonomic revisions (72 FR 43560, August 6, 2007), but the Plan has not been updated since the original 1995 publication. Two general recovery criteria were identified in the Plan to achieve recovery of all 5 of those listed species, with specific criteria provided for each species.

The general recovery criteria are:

- Criteria 1: Recovery will be based on detection of increasing, self-reproducing colonies at pre-selected monitoring sites within each species’ recovery area for a 5-year period. Three monitoring sites will be selected in areas of known live snail collections from the past 15 years and will generally represent the outer most boundaries of the recovery area for each species.
  - Specific to the Bliss Rapids snail: three river colonies and three spring colonies were identified in the Plan to serve as reference sites for monitoring population trends. The river colonies/sites include Clover Creek (River Kilometer (RK) 881 (RM 547.5), Bliss Bridge (aka Shoestring Bridge) (RK 909, RM 565), and Bancroft Springs (RK 890, RM 553). These sites were selected in part because they represented the known, down-river extent of the species’ range in the Snake River at that time. The three spring populations identified for monitoring in the Plan were Banbury (RK 948, RM 589), Box Canyon (RK 946, RM 588), and Thousand (RK 940, RM 584) Springs.

- Criteria 2: Standards for habitat conditions will be based on State water quality standards for cold-water biota including annual water temperatures that average below 18 °C; dissolved oxygen concentrations greater than 6 parts per million; and pH levels that are within the range of 6.5 to 9.5 mg/l.

#### Criteria 1:

Based on our review, Criteria 1 for the Bliss Rapids snail has not been adequately met. None of the three river sites identified in the recovery plan have been monitored regularly and data on the population trends of those colonies has been poorly and/or insufficiently collected since publication of the recovery plan. We know of no data collected at these river locations since publication of the recovery plan that provide an estimate of density or abundance to be used as a baseline for the species' status or changes over time. Based on our improved understanding of the species' distribution and biology, those three river sites may no longer represent the best locations for long-term monitoring. However, these sites may still "represent the outer most boundaries of the recovery area" within the river as stated in the Plan, and as such provide crucial information on changes in the species' range. Starting in 2010, numerous other river areas were included in annual monitoring and indicate these populations can fluctuate greatly between years (Figure 1), likely influenced by environmental factors such as river flow. These colonies are self-reproducing and the 5-year period between 2019 and 2023 shows overall increasing numbers of Bliss Rapids snails. However, Bliss Rapids snail numbers declined in the Bliss reach in 2023 and the 2019 counts were the second lowest since sampling began. Revision of Criteria 1 would provide an opportunity to more clearly articulate an objective and measurable recovery goal based on our current knowledge of the species.

The three spring colonies identified in the recovery plan have been regularly monitored along with several other springs, although, as mentioned above, sampling was reduced from annual to biennial to minimize impacts to the spring populations. The Banbury Springs population undergoes quantitative sampling, with total counts of individuals from 300 selected cobbles, while Box Canyon and Thousand Springs are qualitative, providing an estimate of habitat occupancy (POC) without recording total number of individuals. As discussed in the New Information section, Banbury Springs had the lowest count of individuals since sampling began in 2010, although the POC has only slightly decreased since 2018. Thousand Springs has had a slight downward trend in POC since 2020; Box Canyon, while POC increased between 2020 and 2022, had the lowest POC measured since sampling began (Figure 2).

#### Criteria 2:

Criteria 2 has also not been met. Although the 9 monitored spring populations have stayed within Idaho cold water criteria in the last 5 years, retaining average temperatures near 15° C, there is variation in temperature highs and lows between springs (Bates 2023, p. 26). Summer highs at Box Canyon Springs have exceeded the cold-water temperature criteria at least once since the species was listed (USFWS 2018, p. 5). Within the Snake River, annual mean temperatures at King Hill (USGS gage 13154500) remain below 18° C, likely partly due to the influence of ESPA springs upstream. However, mean daily temperatures have exceeded both of Idaho's coldwater standards (daily average 19° or

below; 22° or less daily maximum; IDAPA 58.01.02) every summer since 2001 (USFWS 2018, p 5-6; Figure 3). Additionally, as our understanding of water quality changes in the ESPA have improved, we recognize that recovery criteria do not reflect all of the components of water quality standards that we now consider important. Other water parameters not identified in Criteria 2, such as nitrogen and orthophosphate, experienced spikes within the last five years at the three springs where water quality samples are taken, and aquifer levels are continuing to decline from a peak in 2019 (Bates 2023, p. 31, 41-48). As was identified in the 2018 5-year review (USFWS 2018, p. 7), studies to assess the impacts of various water quality parameters on Bliss Rapids snails should be performed and the results incorporated into a revision to Criteria 2 that adequately protects water quality for the species' conservation.

Recovery Status:

The delisting goals for this species have not been met, as populations have not maintained an increasing trend for a period of 5 years, and water quality is outside of Idaho cold water standards for at least a portion of each year. Therefore, *Taylorconcha serpenticola* remains threatened.

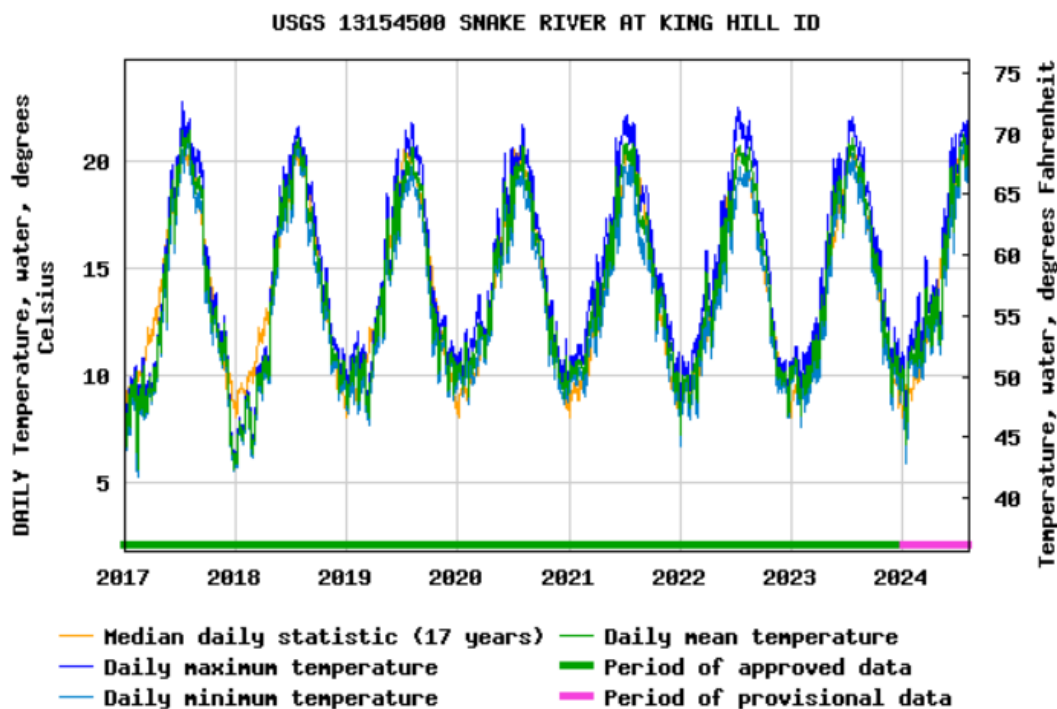


Figure 3. Daily water temperatures for the Snake River at King Hill, ID from 2017 to 2024.

**Recommendations for Future Actions:**

- Survey for Bliss Rapids snails in springs where Bliss Rapids snails have been previously documented, but which have not been surveyed for 10 or more years. Survey for Bliss Rapids snail in springs and waterways fed by the ESPA that have not been previously surveyed.

- Continue efforts to determine conditions needed to maintain and propagate Bliss Rapids snail in captivity.
- Conduct research to assess how emerging contaminants, water quality parameters, and nutrients can affect the species. Results should inform an updated water quality criterion for inclusion in a revision to the recovery plan.
- Revise the statutorily-required elements of the Snake River Aquatic Species Recovery plan, including the recovery criteria, actions, and time and cost estimates.
- Continue collaborative conservation efforts with partners to monitor populations and implement ecosystem-level restoration and management to benefit this species.

**References:**

See previous 5-year review for a full list of references. Only references for new information are provided below.

Bates, D. 2023. 2022 Annual Spring Habitat Bliss Rapids snail monitoring report. Compliance Report, Lower Salmon Falls, FERC Project No. 2061. Idaho Power Company. Boise, ID. 61 pp.

Bates, D. 2024a. 2023 Annual Cove Creek Snail Protection Report. Compliance Report, Upper & Lower Malad Project, FERC Project No. 2276-012 (Article 406). Idaho Power Company. Boise, ID. 29 pp.

Bates, D. 2024b. 2023 Endangered Species Act Section 10 Report. Annual Report, Malad License Article 407. Idaho Power Company. Boise, ID. 7 pp.

Bates, D. 2024c. Snail Protection Plan - Snake River Bliss Rapids snail monitoring study 2023. Annual Report. Idaho Power Company. Boise, ID. 11 pp.

Schultz, J. and Bean, B. 2023. Middle Snake River water-quality five-year trend report: water years 2013-2022. Compliance Report. Idaho Power Company. Boise, ID. 26 pp.

[USFWS] U.S. Fish and Wildlife Service. 2018. Bliss Rapids snail (*Taylorconcha serpenticola*) 5-Year review: summary and evaluation. Boise, Idaho. 43 pp.

Van Appledorn, M., and C.E. Bach. 2007. Effects of zebra mussels (*Dreissena polymorpha*) on mobility of three native mollusk species. The American Midland Naturalist 158: 329-337.

**U.S. FISH AND WILDLIFE SERVICE**

SIGNATURE PAGE for 5-YEAR REVIEW of *Taylorconcha serpenticola* (Bliss Rapids snail)

**Pre-1996 DPS listing still considered a listable entity?**  N/A

**Recommendation resulting from the 5-year review:**

- Delisting
- Reclassify from Endangered to Threatened status
- Reclassify from Threatened to Endangered status
- X   No Change in listing status

**State Supervisor, Idaho Fish and Wildlife Office**

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Date \_\_\_\_\_