

5-Year Review

Short Form Summary

Species Reviewed: Snake River Physa

(Physa (Haitia) natricina)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

U.S. Fish and Wildlife Service. 2018. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 18 species in Hawaii, Oregon, Washington, Idaho, and Canada. Federal Register 83(14): 3014-3015.

Lead Region/ Field Office: Region 1/ Idaho Fish and Wildlife Office, Boise, Idaho

Name of Reviewer(s):

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Methodology used to complete the 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 (USFWS), beginning on January 22, 2018. The review was based on a synthesis of current, available information since the last 5-year review for the Snake River Physa in 2014 (USFWS 2014, entire). Information considered includes: Endangered Species Act (ESA) Section 10(a)(1)(A) annual reports submitted by the Idaho Power Company and U.S. Bureau of Reclamation; ESA Section 7(a)(1) consultation documents, such as biological opinions and assessments, along with letters of concurrence; and, comments submitted in response to the 2018 Federal Register notice of initiation of 5-year status reviews (83 FR 3014-3015). The evaluation conducted by IFWO biologists was reviewed by the Chief of Classification and Recovery, Assistant State Supervisor for Endangered Species, 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 U.S. Fish and Wildlife Service's Environmental Conservation On-line System (ECOS) database for threatened and endangered species (<https://ecos.fws.gov/ecp/>).

Review Analysis:

Complete review of the specie's status, threats, and management efforts was conducted for the May 23, 2014 5-year review of the Snake River physa (USFWS 2014, entire; available at https://ecos.fws.gov/docs/five_year_review/doc4373.pdf). This review focuses on pertinent updates that reflect the current status of the species.

New Status Information:

The Snake River physa (*Physa (Haitia) natricina*) is listed as endangered and is restricted to 494 river kilometers (RKM, 307 River Miles (RM)) or less in the Snake River in southern Idaho from RKM 1086 (RM 675) at Minidoka Dam downstream to RKM 592 (RM 368) near Ontario, Oregon (USFWS 2014, p. 9; Figure 1). The species' highest abundance and densities currently occur in the 18.5 kilometer (km; 11.5 mile (mi)) river segment downstream of Minidoka Dam (i.e., Minidoka reach), though the species rarely exhibits high-density colony behavior in this area (Gates and Kerans 2010, p. 37; U.S. Bureau of Reclamation 2018, p. 44). Gates and Kerans (2010, p. 20) reported Snake River physa from 19.7 percent of their samples with relatively high density samples ranging from 30 to 64 individuals per square meter (m²; Gates and Kerans 2010, p. 23). Historically, Snake River physa was considerably less commonly encountered outside the Minidoka reach below C.J. Strike reservoir, with only 4.3 percent of 787 inspected samples containing live animals and those positive samples most typically not exceeding 4 individuals per m² (Keebaugh 2009, entire).

Since completion of the last 5-year status review for the species in 2014, numerous additional surveys for the Snake River physa have occurred both within and outside the Minidoka reach¹. The species continues to be regularly found within the Minidoka reach (U.S. Bureau of Reclamation 2014-2018), although densities have fluctuated in recent years. For example, within the Minidoka reach the percentage of survey plots at the Jackson Bridge survey site containing the species have ranged from 7.5 to 37.5 percent (U.S. Bureau of Reclamation 2014-2018). At the Minidoka Dam spillway survey site, the species was not detected in 2012, 2014, and 2015, while 3 and 26 individuals were found in 2013 and 2016 respectively.

The species has not been found outside the Minidoka reach in the remaining 475 km (295 mi) of its range since 2002, the last time a live specimen was collected outside of the Minidoka reach (Idaho Power Company (IPC) in litt. 2018; Keebaugh 2009, entire). Recent surveys outside of the Minidoka Reach have produced other Physidae species, but no live Snake River physa have been found. Several of these survey events targeted suitable habitat locations that had positive detections prior to 2002. Our 2014 5-year review utilized the most recent survey data available at that time, from 2010. Since 2010, the Idaho Power Company collected 553 samples outside of the Minidoka reach targeting Snake River physa as part of hydropower relicensing, compliance, and biological assessment studies. While their efforts produced 8,698 individuals from the Physidae family, none were positively identified as Snake River physa (IPC in litt. 2018).

¹ The most recent survey data utilized in our 2014 5-year review was 2012 within the Minidoka reach, and 2010 outside the Minidoka reach (USFWS 2014, pp. 8-9).

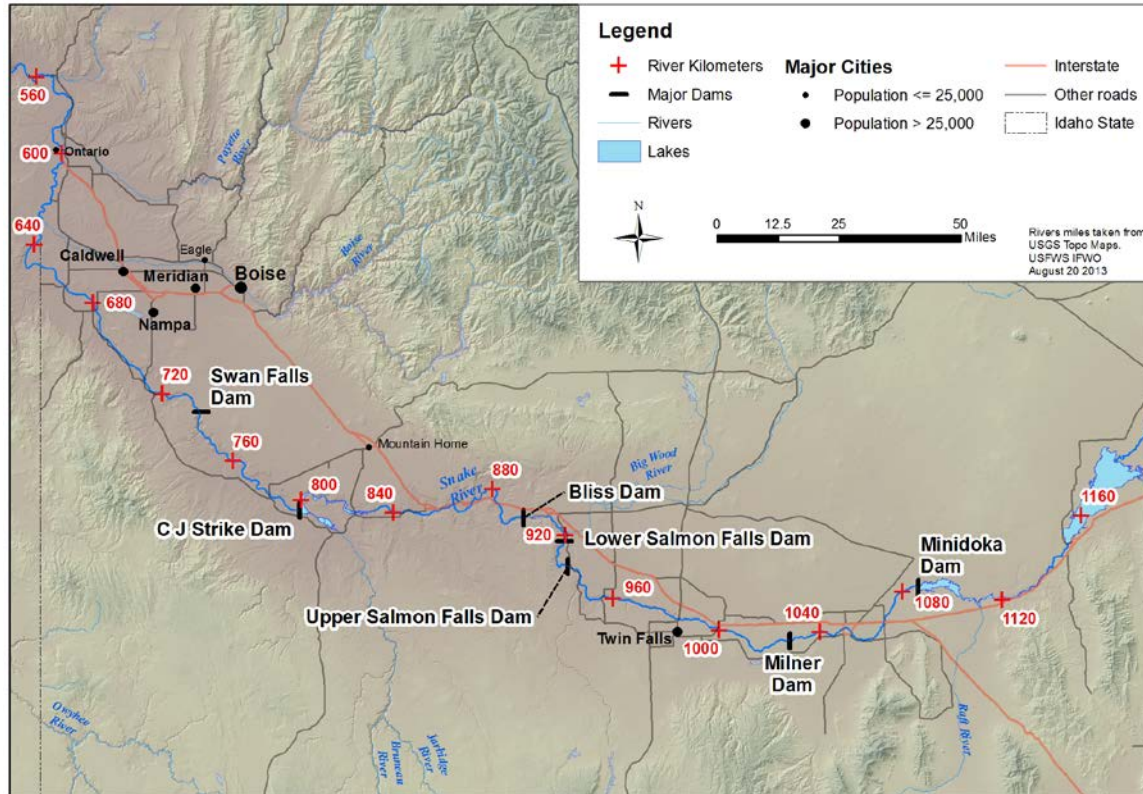


Figure 1: The Snake River encompassing the known range of the Snake River physa, from approximately Minidoka Dam, Idaho, to Ontario, Oregon,

Two shells recovered from Idaho Power Company’s 2014 Snake River physa sampling for the Bayha Island Research project (RKM 707 (RM 439.5)) were identified as “putative” (generally considered or reputed to be) Snake River physa (Stephenson et al. 2015, p. 10). These two shells have been the only indication since 2002 that Snake River physa might persist in the Snake River outside of the Minidoka reach². In contrast, within the Minidoka reach Kerans and Gates (in litt. 2006, p. 8) reported finding 7,540 empty Snake River physa shells during their 2006 sampling, while more recently the U.S. Bureau of Reclamation found shells in ≥ 87.5 percent of samples collected from 2015-2017 at the Jackson Bridge monitoring site (U.S Bureau of Reclamation 2016-2018).

Previously, Keebaugh (2009, entire) identified 52 live-when-captured Snake River physa from over 19,000 physids collected from 917 collection events outside of the Minidoka reach from 1995-2003. This equates to a 0.26 percent recovery rate of SRP collected versus total number of physids collected between 1995-2003 (Keebaugh 2009, p. 122). Had the population remained the same outside of the Minidoka reach since the species was last found there in 2002, applying this same recovery rate (0.26 percent) to the 8,689 physids collected by the Idaho Power Company from 2010-2017 outside of the Minidoka reach would equate to approximately 23 Snake River physa collected. It is unknown at this time whether lack of detection reflects a change in the population and range of the

² Shells do not necessarily indicate the presence of live animals since they can be transported many kilometers downstream and/or could represent individuals that have been dead for a considerable time.

species outside of the Minidoka reach, insufficient survey effort to detect the species in this area, or Snake River physa have been reduced to very low densities due to ongoing threats to its habitat in this portion of its range (USFWS 2014, p. 20).

Since the previous Snake River physa 5-year review in 2014, the IFWO contracted the identification of unsorted gastropod samples collected in 2004 from the Upper Snake River drainage (Keebaugh 2014, entire). The 2004 effort was focused on determining the extent and distribution of the Utah valvata snail (*Valvata utahensis*; previously listed as endangered but delisted in 2010). Those collections were conducted upstream of American Falls Reservoir (RKM 1,182 (RM 735)), including the Snake River and certain larger tributaries. This is further upstream of the upstream known range for the Snake River physa, which is directly below Minidoka Dam. No Snake River physa, either live-when-captured or empty shells, were identified from the inspection of 183 vials of unidentified Gastropoda taken from 21 sample locations (Keebaugh 2014, p. 7). This further supports our 2014 5-year status review finding that the upstream range of Snake River physa is currently the population just downstream of Minidoka Dam (RKM 1,086, RM 675).

New and/or Updated Threats:

The existing threats affecting the Snake River physa include operation of existing dams, water quality degradation, climate change, pollution control regulations, lack of state (Idaho) invertebrate species regulations, and small population size, habitat fragmentation, and loss of connectivity (Table 1). Most of these threats (i.e., operation of existing dams, water quality degradation, climate change, pollution control regulations, lack of state (Idaho) invertebrate species regulations) are ongoing and have not changed significantly since the 2014 5-year status review for the species.

Given recent surveys (since 2010) have all failed to recover the Snake River physa outside of the Minidoka reach, and that it was last found live outside the Minidoka reach in 2002, we find that the threat of small population size, habitat fragmentation, and loss of connectivity is an emerging and increasing threat. The Minidoka reach population is essentially isolated during certain periods from the rest of its possible downstream range due to the presence and operation of Milner Dam. As described in the previous 5-year status review, Milner Dam regularly diverts the entire flow of the Snake River for irrigation, leaving the river essentially dry for approximately 2.6 km (1.6 mi) downstream of Milner Dam. The Snake River physa cannot survive when its river habitat is dry. Due to the lack of surplus water (not allocated for irrigation or other purposes), this diversion of the entire Snake River often recurs seasonally over consecutive years until water is released again past Milner Dam (Figure 1). The closest historical downstream occurrence of Snake River physa is downstream of Lower Salmon Falls Dam (RKM 592). This is over 146 km (88 mi) below the downstream extent of the Minidoka population. This lower reach, along with other historical collection sites (Taylor, 1988, pp. 67-74), was intensively searched in 2003, but no live Snake River physa, nor their shells, were recovered (Frest and Johannes 2004, entire). In addition, there are 4 hydroelectric dams or diversions (Twin Falls, Shoshone Falls, Upper Salmon Falls, and Lower Salmon Falls) between Milner Dam and the next known downstream historical

occurrence of Snake River physa below Lower Salmon Falls Dam. Given the species reliance on river flow for dispersal purposes, these facilities and unsuitable habitat conditions they create within the Snake River likely further fragment and limit connectivity opportunities for the Snake River physa.

Given the species can only be reliably found within the Minidoka reach (approximately 4 percent of its known range), and even though that population is considered stable, its occupation of this relatively small river reach also makes it susceptible to stochastic or other events that would affect its persistence. For example, the U.S. Bureau of Reclamation is under section 7 formal consultation requirements to provide 11.2 cubic meters (cms; 400 cubic feet per second (cfs)) year-round minimum outflow below Minidoka Dam for 30 years, starting in 2005 (USFWS 2005, p. 27). This flow requirement is critically important during winter months when flows are lowest (flows typically increase during spring through fall for downstream irrigation purposes). Because Snake River physa occupy the deepest, permanently wetted portions of the Snake River within this reach, any future event such as severe drought that limits the ability of the U.S. Bureau of Reclamation to carry out this minimum flow requirement could negatively affect the species persistence.

Table1: Threats to Snake River physa (*Physa (Haitia) natricina*) at the time of listing (1993), 2014 5-year status review, and 2018 5-year status review.

Threats	Listing Factor	1993 (Time of Listing)	2014 5-Year Status Review	2018 5-Year Status Review	Summary
Construction of new hydropower dams	A	X			Determined not a current threat in 2014 or 2018 Snake River physa (SRP) 5-year status reviews - no significant change in information.
Operation of existing dams	A	X	X	X	Continued threat – no significant change in the operation of existing dams since 2014 SRP 5-year status review.
Water quality degradation	A	X	X	X	Continued threat – no significant change in water quality degradation information since 2014 SRP 5-year status review.
Water diversions and groundwater withdrawal for agriculture and aquaculture	A	X			Determined not a current threat in 2014 and 2018 SRP 5-year status reviews - no significant change in information.
Small hydropower development	A	X			Determined not a current threat in 2014 and 2018 SRP 5-year status review – no significant change in information.
Climate Change	A		X	X	Continued threat - no significant change in climate change information since 2014 SRP 5-year status review.
Pollution control regulations	D	X	X	X	Continued threat – no significant change in pollution control regulations since 2014 SRP 5-year status review.
Lack of State invertebrate species regulations	D	X	X	X	Continued threat – no significant change in state of Idaho regulations since 2014 SRP 5-year status review.
Competition with New Zealand Mudsnails	E	X			Determined not a current threat in 2014 and 2018 SRP 5-year status reviews – no significant change in information.
Small population size, habitat fragmentation, and loss of connectivity	E			X	Analyzed in 2014 SRP 5-year status review, but determined not a threat at that time. Data since then indicates it is an increasing threat in 2018 5-year status review.

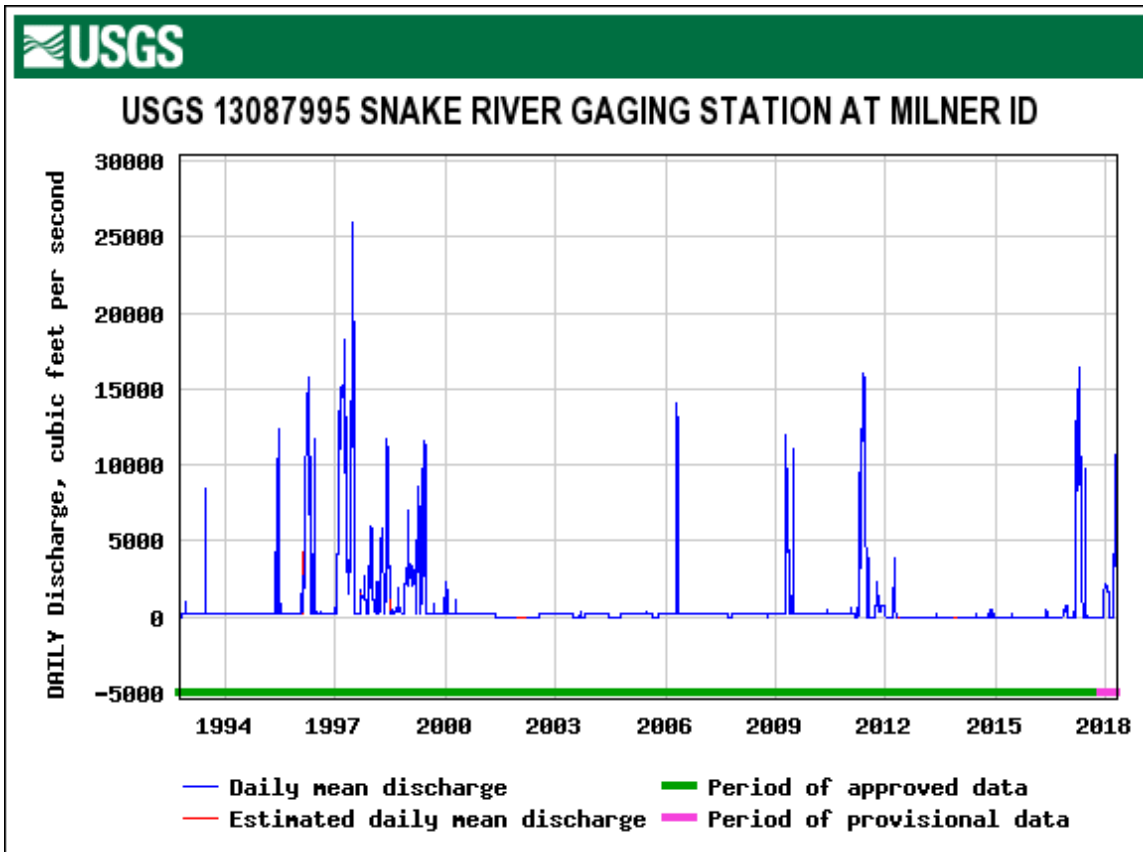


Figure 1: Snake River Flows at Milner Dam from October 1, 1992 (time of listing) through April 30, 2018.

New Management Actions:

The USFWS recently collaborated with the Idaho Power Company and U.S. Bureau of Reclamation on development of an environmental DNA (eDNA) marker to be utilized for future Snake River physa presence/absence surveys (Young in litt. 2018). eDNA is DNA that has separated from an organism into their surrounding environment. Water that may contain an organism’s DNA can be collected and analyzed to determine if the species is present nearby. Preliminary results indicate this new approach to surveying for the Snake River physa holds promise (Young in litt. 2018) and could ultimately expand survey efforts beyond the time consuming method typically utilized to survey for the species; suction dredging the river bottom (via scuba diving off a boat), sorting material, and identifying individual Snake River physa via morphological or standard DNA testing.

Synthesis:

The Snake River physa does not appear as widespread or abundant outside of the Minidoka reach as previously believed in our 2014 5-year status review. Even though data indicates the species has been historically found in 494 RKM (307 RM) of the Snake River in southern Idaho, surveys outside of the Minidoka reach (96 percent of its range), many targeting suitable habitat in locations previously occupied between 1998 and 2002, have continually failed to find the species alive. In our 2014 5-year status review (which

utilized data from 2012 and prior within the Minidoka reach and 2010 and prior outside the Minidoka reach), we concluded that surveys outside the Minidoka reach may have been inadequate to detect the species. Therefore, we recommended additional survey effort for the species to help further refine the species' known distribution and population status (USFWS 2014, pp. 8, 32-33). Since 2010, numerous additional follow-up surveys have occurred outside of the Minidoka reach by experienced professionals, often targeting sites previously occupied by the species and/or in suitable habitat. These survey results, which were available to us for this 2018 5-year status review, have all failed to find the species again. This strongly suggests that the species may have been extirpated from this area, is extremely rare and occurs at low-enough densities to make its detection extremely difficult, or has been reduced to very low densities due to ongoing threats to its habitat. As already described, with the exception of two shells putatively identified as Snake River physa at the Bayha Island Research Project site in 2014, there is no indication of the presence of Snake River physa outside of the Minidoka reach since last collected live in 2002.

In our 2014 5-year review, the USFWS concluded that the Snake River physa be considered for down listing to threatened. This was based on findings that the species had been found in areas of the Snake River encompassing 473 km (294 mi) downstream of the existing Minidoka reach population as recently as 2002. However, and as stated above, since 2002, no additional live Snake River physa have been collected or identified outside of the Minidoka reach despite extensive, targeted surveys in suitable habitat and at locations where the species had been collected prior to 2002. Within the 18.5-km (11.5 RM) Minidoka reach, Snake River physa continue to be found on an annual basis, though densities fluctuate between years.

The information we have gathered in the last 4 years leads us to revise our previous recommendation of down-listing the species to threatened. The species can still be reliably found within the Minidoka reach, though this is considered one population within an extremely small portion of its historic range (4 percent). The Minidoka reach population is largely isolated from areas downstream due to the operation of Milner Dam and other hydroelectric dams or diversions. Therefore, this one, isolated population lacks the redundancy needed to withstand catastrophic and stochastic events it may encounter, and on-going threats remain substantial in this area. Therefore, we recommend that the Snake River physa remain classified as endangered at this time.

Recommendations for Future Actions:

1. Continue monitoring Snake River physa within the Minidoka reach to further track population trends of this important population.
2. Continue targeted surveys outside of the Minidoka reach to further inform our understanding of the species current range.
3. Finalize development of the eDNA marker for the Snake River physa with intention to utilize it as soon as possible.
4. Apply eDNA survey method outside the Minidoka reach, where it has been difficult to confirm species presence, to enhance current distribution information.
5. Investigate possible habitat conditions, or other factors, limiting Snake River physa occupancy outside of the Minidoka reach. Based on those results, reevaluate recovery actions to address those threats.

References:

- Frest, T.J. and E. Johannes. 2004. Survey of selected Snake River sites for *Haitia natricina* (Taylor, 1988). Report prepared by Deixis Consultants for Idaho Fish and Wildlife Service. April 2004. 15 pp.
- Gates, K.K., and B.L. Kerans. 2010. Snake River physa, *Physa (Haitia) natricina*, survey and study: Final Report. Department of Ecology, Montana State University, Reclamation Agreement 1425-06FC1S202, Bozeman, Montana.
- Keebaugh, J. 2009. Idaho Power Company Physidae 1995-2003. Review Notes. Orma J. Smith Museum of Natural History, The College of Idaho. May. 126 pp.
- Keebaugh, J. 2014. Upper Snake River Snail Collection Review; Presence/Absence of Snake River physa (*Physa (Haitia) natricina*): Phase 2 and Project Final Report. 130 pp.
- Lysne, S. J. and M. Pollock. 2016. J.R. Simplot Company, Smith Farms Pump Station Replacement Project, Snake River Physa Snail Assessment. Power Engineers. 9 pp.
- Smith, J. and J. Keebaugh. 2014. Snail Survey Results, Snake River Bridge, Marsing, Canyon and Owyhee Counties, Project No. A013 (387), Key No. 13387. T - O Engineers, Inc. 17 pp.

- Stephenson, M., B. Bean, and D. Bates. 2015. 2014 Endangered Species Act Section 10 Report, Annual Report, Section 10 Permit #799558-9. Idaho Power Company. 504 pp.
- Taylor, D.W. 1988. New Species of Physa (Gastropoda: Hygrophila) from the western United States. *Malacological Review* 21: 43-79.
- U.S. Bureau of Reclamation (USBOR). 2014. ESA Section 10 Annual Report for Water Year 2013 – Monitoring and Distribution Surveys for Snake River Physa (*Physa natricina*) Snails Protected Under the Endangered Species Act in the Minidoka reach of the Snake River, Idaho. U.S. Department of Interior, Bureau of Reclamation, Pacific Northwest Region, Snake River Area Office, Boise, Idaho. 36 pp.
- U.S. Bureau of Reclamation (USBOR). 2015. ESA Section 10 Annual Report for Water Year 2014 – Monitoring and Distribution Surveys for Snake River Physa (*Physa natricina*) Snails Protected Under the Endangered Species Act in the Minidoka reach of the Snake River, Idaho. U.S. Department of Interior, Bureau of Reclamation, Pacific Northwest Region, Snake River Area Office, Boise, Idaho. 17 pp.
- U.S. Bureau of Reclamation (USBOR). 2016. 2015 Annual Report. Bureau of Reclamation Report on Monitoring and Implementation Activities Associated with the USFWS 2005 Biological Opinion for Operation and Maintenance of the Bureau of Reclamation Projects in the Snake River Basin above Brownlee Reservoir. U.S. Department of Interior, Bureau of Reclamation, Pacific Northwest Region, Snake River Area Office, Boise, Idaho. 54 pp.
- U.S. Bureau of Reclamation (USBOR). 2017. 2016 Annual Report. Bureau of Reclamation Report on Monitoring and Implementation Activities Associated with the USFWS 2005 Biological Opinion for Operation and Maintenance of the Bureau of Reclamation Projects in the Snake River Basin above Brownlee Reservoir. U.S. Department of Interior, Bureau of Reclamation, Pacific Northwest Region, Snake River Area Office, Boise, Idaho. 56 pp.
- U.S. Bureau of Reclamation (USBOR). 2018. 2017 Annual Report. Bureau of Reclamation Report on Monitoring and Implementation Activities Associated with the USFWS 2005 Biological Opinion for Operation and Maintenance of the Bureau of Reclamation Projects in the Snake River Basin above Brownlee Reservoir. U.S. Department of Interior, Bureau of Reclamation, Pacific Northwest Region, Snake River Area Office, Boise, Idaho. 52 pp.
- U.S. Fish and Wildlife Service (USFWS). 2005. Biological Opinion for Bureau of Reclamation operations and maintenance in the Snake River basin above Brownlee Reservoir. U.S. Fish and Wildlife Service, Snake River Fish and Wildlife Office, Boise, Idaho. pp. 342.

U.S. Fish and Wildlife Service (USFWS). 2014. 5-Year Status Review for Snake River
physa (*Physa (Haitia) natricina*). U.S. Fish and Wildlife Service, Region 1,
Idaho Fish and Wildlife Office, Boise, ID. 45 pp.

In litt.

Idaho Power Company. 2018. *Physa natricina*, Comments on the 5-year Status Review. March, 2018. 7 pp.

Kerans, B. and K. Gates. 2006. Snake River Physa *Physa natricina* Sampling Below Minidoka Dam. 2006 Interim Report. 20 pp.

Young, M. 2018. Email to Greg Burak, Subject: eDNA results for Physa Snail work. Sent April 27, 2018. 14 pp.

**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Snake River Physa***

Current Classification: Endangered

Recommendation resulting from the 5-Year Review:

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

Appropriate Listing/Reclassification Priority Number, if applicable: N/A

Review Conducted By: Greg Burak and Dave Hopper

FIELD OFFICE APPROVAL:

State Supervisor, Idaho Fish and Wildlife Office

Approve  Date 9/5/18