DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AB52

Endangered and Threatened Wildlife and Plants; Determination of Endangered or Threatened Status for Five Aquatic Snails in South Central Idaho

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S Fish and Wildlife Service (Service) determines endangered status pursuant to the Endangered Species Act of 1973, as amended (Act), for four Snake River aquatic snails: The Idaho springsnail or Homedale Creek springsnail (*Pyrgulopsis* (—*Fontelicella*) *idahoensis*), the Utah valvata snail (*Valvata utahensis*), Snake River Physa snail (*Physa natricina*), and the undescribed Banbury Springs lanx or limpet in the genus *Lanx*. The Service also determines threatened status for one aquatic snail species, the Bliss Rapids snail (an undescribed monotypic genus in the family Hydrobiidae). With the exception of *Lanx*, four of the taxa have declined over all but a small fraction of their historical range. Today these five species are currently restricted to a few isolated free-flowing reaches or spring alcove habitats in the middle Snake River characterized by cold, well-oxygenated, unpolluted water. *Lanx* has remained relatively stable at three known locations since its discovery in 1988. However, because, *Lanx* is known only from three sites it is most vulnerable to habitat change. The free-flowing, cool water environments required by these species have been impacted by and are vulnerable to continued adverse habitat modification and deteriorating water quality from one or more of the following: hydroelectric development, peak-loading effects from existing hydroelectric project operations, water withdrawal and diversions, water pollution, and inadequate regulatory mechanisms. This is especially true for those species restricted to mainstem river environments, *Physa natricina* and *Pyrgulopsis idahoensis*, but also mainstem colonies of Bliss Rapids snails and *Valvata utahensis*. These mainstem populations or colonies may also be vulnerable to habitat competition from an exotic snail (*Potamopyrgus antipodarum*). With the exception of several spring habitats at a privately owned preserve in the Thousand Springs area, remaining pristine spring and spring stream complexes in the middle Snake River preferred by *Lanx*, Bliss Rapids snail and Utah valvata are not protected from all potential threats described above. This rule implements the protection and recovery provisions afforded by the Act for these aquatic snails.

EFFECTIVE DATE: January 13, 1993.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the Boise Field Office, U.S. Fish & Wildlife Service, 4696, Overland Road, Room 576, Boise, Idaho 83705.

FOR FURTHER INFORMATION CONTACT: Dr. Charles Lobdell at the above address (telephone 208/334–1931).

SUPPLEMENTARY INFORMATION:

Background

The Idaho (Homedale) Springsnail (*Pyrgulopsis-Fontelicella idahoensis*), Bliss Rapids snail (Family Hydrobiidae n. sp.), Banbury Springs lanx or limpet (*Lanx* n. sp.), Snake River Physa (*Physa natricina*), and Utah Valvata snail (*Valvata utahensis*) are part of the native mollusc fauna of the middle Snake River which characteristically require cold, fastwater or lotic habitats. These five species are part of the freshwater mollusc fauna of the middle Snake River comprising 37 native species including 22 taxa of snails in eight families and 15 clam species in three families (Frest *et al.* 1991). Although many of these 37 species display widespread geographic distribution and a greater tolerance for pollution, the five lotic species are limited geographically and generally intolerant of pollution. The "middle" Snake River is defined as extending from C.J. Strike Reservoir (river mile 517.6) upstream to Milner Dam (river mile 639.1). With few exceptions, extant populations of the five taxa are confined to this reach; although prior to river development and impoundment these and other native molluscs "extended beyond these artificial and manmade boundaries" (Frest *et al.* 1991).

The lotic fauna of the middle Snake River have been declining for several years due to fragmentation of remaining free-flowing habitats and deteriorating water quality. Hydroelectric development throughout the Snake River has directly impacted the candidate species through inundation of lotic habitats, isolating segmented populations, and impacting suitable shallow water shoreline habitat from project-caused flow fluctuations. Water quality continues to degrade in the middle Snake River from increased water use and withdrawal, aggravated by recent drought induced low flows. This 121 mile (195 kilometer) stretch of the Snake River is impacted by agricultural return flows; runoff from between 500 and 600 dairies and feedlots; effluent from over 140 private, state, and Federal fish culture facilities; and point source (e.g. municipal sewage) discharge (Idaho Department of Health and Welfare (IDHW) 1991a). These factors contribute to increased nutrient loads and concentrations which in turn adversely impact the lotic species. Nutrient loading contributes to dense blooms of free-living and attached

filamentous algae, which the species cannot utilize. This algae will often cover rock surfaces, effectively displacing suitable snail habitats and food resources. Stream sediments also become anoxic as high biochemical oxygen demand during the aquatic growing season and seasonal algae dieoffs occur.

The Bliss Rapids snail, Idaho springsnail, and Snake River Physa snail are "living fossils," in that they are relicts from ancient lakes. The Bliss Rapids snail and Idaho springsnail are survivors of the late Pliocene (Blancan) Lake Idaho, which covered much of southern Idaho. The Snake River Physa snail is a relict from Pleistocene lakes and rivers in the area (Taylor 1988). The Utah valvata snail survives only in the Snake River, Idaho, a fraction of its former range in Pliocene-Pleistocene lakes and rivers covering parts of California, Nevada, Idaho, Wyoming and Utah (Taylor 1985b). Fossil material of the Pliocene *Lanx* is needed to confirm the identity of the newly discovered species as being conspecific with the Lake Idaho *Lanx*, though this is a new species in any case.

The Bliss Rapids snail (Family Hydrobiidae, n. sp.) was first collected live and recognized as a new taxon in 1959 (Taylor 1982a), but has not yet been described in the literature. This snail is 2.0–2.5mm (0.8–.10 in) long, with three whorls, and is roughly ovoid in shape. There are two color variants or morphs in the Bliss Rapids snail, the colorless or "pale" form and the orange-red or "orange" form. The pale morph is slightly smaller with rounded whorls with more melanin pigment on the body (Frest and Johannes 1992a). This snail occurs on stable, cobble-boulder substratum only in flowing waters in the unimpounded reaches of mainstem Snake River and also in a few spring alcove habitats in the Hagerman Valley. The species does not burrow in sediments and normally avoids surfaces with attached plants. Known river populations (or colonies) of the Bliss Rapids snail occur only in areas associated with spring influences or rapids edge environments and tend to flank shorelines. They are found at varying depths if dissolved oxygen and temperature requirements persist and are found in shallow (<1cm (.4 in)) permanent cold springs (Frest and Johannes 1992a). The species is considered moderately photophobic and resides on the lateral sides and undersides of rocks during daylight (Bowler 1990). The snail will migrate to graze on aufwuchs (or perilithon) on the uppermost surfaces of rocks nocturnally. The species can be locally quite abundant, and it is especially abundant on smooth rock surfaces with common encrusting red algae. The largest known concentration of Bliss Rapids snails occurs at The Nature Conservancy's (Conservancy) Thousand Springs Preserve (Preserve) with an adult population estimated in the "low millions" (Frest and Johannes 1992a). Reproduction in the Bliss Rapids snail varies according to habitat, occurring October–February in mainstem Snake River colonies and February–May in large-spring colonies. Egg laying occurs within two months of reproduction and eggs appear to hatch within one month. Adult snails exhibit a strong seasonal die off after reproduction. Turnover appears more pronounced in mainstem river colonies, possibly due to environmental stress (Frest and Johannes 1992a). Prior to 1987, the Bliss Rapids snail was known primarily from the mainstem Snake River boulder bars above King Hill (approximately river mile 546) to lower Salmon Falls Dam (river mile 573) and upstream in Box Canyon Sprigs (river mile 588). Taylor (1982a) believed that "* * * prior to dam construction there was probably a single population throughout this range, and plausibly upstream as well." Subsequent mollusc surveys by Frest (1991b), Pentec (1991b) and Taylor (1987) found new subpopulations of the Bliss Rapids snail in the mainstem Snake River and adjacent spring habitats. Pentec (1991b) extended the present known range of the species upstream approximately 162 miles when it found specimens in spring habitats above American Falls at river mile 749.8. Based on live collections, the species currently exists as discontinuously distributed populations over 204 river miles within its historic range. These populations are primarily concentrated in the Hagerman reach in tailwaters of Bliss and Lower Salmon Dams and several unpolluted springs (i.e., Thousand Springs, Minnie Miller Springs, Banbury Springs, Niagara Springs, and Box Canyon Springs).

Call (1884) described the Utah valvata snail (*Valvata utahensis*) from Utah Lake, Utah, as *Valvata sincera* var. *utahensis*. Walker (1902) revised the genus *Valvata* and determined *V. utahensis* to be a species. The Utah valvata snail is 4.5mm (.2 in) long, the shell is turbinate (about equally high and wide) with up to four whorls. In the Snake River, *V. utahensis* lives in deep pools adjacent to rapids or in perennial flowing waters associated with large spring complexes. The species avoids areas with heavy currents or rapids. The snail prefers well-oxygenated areas of non-reducing calcareous mud or mud-sand substrate among beds of submergent aquatic vegetation. The species is absent from pure gravel-boulder bottoms. *Chara*, which concentrates both calcium carbonate ($CaCO_3$) and silicon oxide (SiO_2), is a common associate. The Utah valvata snail is primarily a detritivore, grazing along the mud surface ingesting diatoms or powdery plant debris. In habitats with boulders on mud, the snail has been observed grazing diatoms and other perilithon on rocky surfaces and macrophytes. The Utah valvata snail historically occurred from river mile 492 (near Grandview) to river mile 585 just above Thousand Springs with a disjunct population in the American Falls Dam tailwater near Eagle Rock damsite at river mile 709. The taxa was known historically from northern Utah, although recent mollusc surveys throughout the State revealed no live sites and the species is believed extirpated there (Clarke 1991). At present this species occurs in a few springs and mainstem Snake River sites in the Hagerman Valley and at a few sites below American Falls Dam downstream to Burley (Beak 1987; Taylor 1987). Recent surveys at the Conservancy's Preserve revealed declines in numbers and areal extent of Utah valvata over a four year period (Frest and Johannes 1929a). Live colonies of this snail persist in only two areas at the Preserve with a total population at each colony estimated not to exceed 6000 individuals. Density varied but averaged six live individuals counted per quarter meter square within each colony.

The Snake River Physa snail was named *Physa natricina* and described by Taylor in 1988. Fossil records of the species occur in deposits from Pleistocene-Holocene lakes and rivers from southeastern Idaho and northern Utah. The type locality is the Snake River, Gooding County, Idaho. The shells of adult Snake River Physa snails are about 5–7mm (.2–.3 in) long with 3–3.5 whorls. Fresh shells are amber to brown in color. The species occurs on the undersides of gravel to boulder substratum in swift current in the mainstem Snake River. Living specimens have been found on boulders in the deepest accessible part of the river at the margins of rapids. Taylor (1982c) believed much of the habitat for this species was in deep water beyond the range of routine sampling. Taylor (1988) cites collections of this species from 1956 through 1985 and considered its "modern" range in the Snake River to extend from Grandview (based on

empty shells) upstream through the Hagerman Reach (river mile 573).

Taylor also believes that the Grandview subpopulation has become extinct since the early 1980's ". . . as the native bottom fauna has been virtually eliminated in this segment of the Snake River." Live specimens of the Snake River Physa were recorded near river mile 675 in 1987 (Beak 1987). Pentec (1991b) also reported single live animals at river miles 740.2 and 749.1, although Frest (1991b) believes these may be immature *Physella integra* or *Physella gyrina* and identification needs confirmation. Recent comprehensive snail surveys in southeastern Idaho and northern Utah (Frest *et al.* 1991) and in a free-flowing reach near Buhl (Frest and Johannes 1992a) failed to find live specimens. At present, *Physa natricina* remains at only a few locations in the Hagerman and King Hill reaches, with a disjunct population near Minidoka Dam (river mile 675). Live Snake River Physa snails are always rare at collection sites; it is believed that fewer than 50 live Snake River Physa have been collected in the middle Snake River (Frest *et al.* 1991).

Using material collected near Homedale, Idaho by H.M. Tucker in 1930, H.A. Pilsbry described the Idaho (Homedale) springsnail as *Amnicola idahoensis* (Pilsbry 1933). Gregg and Taylor (1965) established the new genus *Fontelicella* and placed *F. idahoensis* in the proposed new subgenus *Natricola*. Hershler and Thompson (1987), in a recent re-evaluation of North American hydrobiidae systematics, revised the genus and assigned *Fontelicella* to the genus *Pyrgulopsis*.

The Idaho springsnail has a narrowly elongate shell reaching a length of 5–7mm (.2–.3 in), with up to 5.5–6 whorls. This species is found only in permanent, flowing waters of the mainstem Snake River; the snail is not found in any of the Snake River tributaries or in marginal springs (Taylor 1982d). The species occurs on mud or sand associated with gravel to boulder size substratum. It is often attached to vegetation (e.g. *Potamogeton*) in riffles. Very little is known of the life history. The Idaho springsnail is a Lake Idaho endemic, and in fossil form has the same potential relic range as the Bliss Rapids snail (Frest 1991c). Historically, the Idaho springsnail was found from river mile 415 (Homedale) to river mile 553 and has been collected at 10 locales. It is currently discontinuously distributed in the mainstem Snake River at a few sites from the headwaters of C.J. Strike Reservoir at river mile 518 upstream to approximately river mile 553 (Bancroft Springs), a reduction of nearly 80 percent from its historic range. Based on repetitive visits to previous sampling sites, the species has declined and populations are small.

The Banbury Springs lanx or limpet (*Lanx* n. sp.) is a member of the Lancidae, a small family of pulmonates endemic to western North America. The species was first discovered by Terrence J. Frest in Banbury Springs Creek in 1988 and has not yet been formally described. The species is distinguished with a shell of uniform red cinnamon color, a subcentral apex, with its length and height exceeding its width. The species has been found only in spring run habitats with well oxygenated, clear, cold (15–16°C) waters on boulder or cobble substratum. All known locations have relatively swift currents. They are found most often on smooth basalt and avoid surfaces with large aquatic macrophytes or filamentous green algae. Beak Consultants, Inc. (Beak) (1989) reported the species (specimens originally identified as *Fisherola nuttalli*) at depths ranging from 30 to 75 cm (11.8–29.5 in) on boulder substratum. Frest and Johannes (1992a) found the species in water as shallow as 5 cm (2 in), but depths up to 15 cm (6 in) were more typical. All lancids are susceptible to dissolved oxygen fluctuations since respiration is accomplished only through the mantle; lungs, gills, and other specialized respiratory structures are lacking (Frest and Johannes 1992a). Common mollusc associates of this species include the Bliss Rapids snail and vagrant pebblesnail (*Fluminicola hindsi*).

This limpet was first discovered in 1988 at Banbury Springs (river mile 589) with a second population found in nearby Box Canyon Springs in 1989 (river mile 588). During 1991, a mollusc survey at the TNC's Preserve revealed a third population in the outflows of Minnie Miller Springs (river mile 584.6) (Pentec 1991b). Subsequent to this discovery, a more detailed investigation at the Preserve revealed that the single colony was sporadically distributed within an area of only 12–14 m^2 (Frest and Johannes (1992a). Population density was in the range of 4–48 per m^2. The total adult population at the Preserve was estimated at between 600 to 1,200 individuals. It should be noted that all three populations of *Lanx* were found in alcove spring complexes previously surveyed. These spring complexes contain large areas of adjacent presumably identical habitat not occupied by the species. At present the Banbury Springs lanx is known to occur only in the largest, least disturbed spring habitats at Banbury Springs, Box Canyon Springs, and Thousand Springs between river miles 584.8 and 589.4. Today, these three locations are variously affected by ongoing water withdrawal and agricultural return flows.

Based on the fossil record, the five candidate snails are endemics originating in the area within Pliocene Lake Idaho and its Pleistocene successors (Taylor 1986). In general, the fossil record shows a larger past than current distribution, with past populations considered continuous throughout their range. An exception is the case of obligate spring species such as the Banbury Springs lanx; each geographically isolated spring could be considered a different population (Frest 1991c).

Ecologically, these five species share many habitat characteristics, and in some locations two or more are sympatric. Basically, they require cold, clean, well-oxygenated flowing water of low turbidity. All the species except the Utah valvata, and possibly the Idaho springsnail prefer gravel to boulder size substratum. Despite these affinities, each of the five species have slightly different habitat preferences. The Idaho springsnail and Snake River Physa are found only in the free-flowing mainstem Snake River while the remaining three candidates are usually associated with spring or spring-like river habitats. For example, the Bliss Rapids snail can be found in both small, shallow spring or large, deep spring outflows, while the Banbury Springs lanx is known only in large spring outflows. The Utah valvata snail is able to tolerate slower flowing environments with silty vegetated substrate better than the rest, although it cannot tolerate true impoundment or reservoir conditions (Frest 1989b). In the mainstem river, they are found in areas of the river not subject to daily or seasonal fluctuations. None of the species tolerate whitewater areas with rapid flow. The species also share similar life history characteristics related to longevity. With the possible exception of Snake River Physa and Utah valvata, the species are considered annual species with an average longevity of one year. Bliss Rapids snail and Banbury Springs lanx experience a dieoff of older adults during the late winter-early spring season following reproduction, although for the Bliss Rapids snail the dieoff is less pronounced in large-spring colonies (Frest and Johannes 1992a). Utah valvata are believed to have a maximum longevity of two years, although a majority only survive a single year. Although little is known of general life history for Snake River Physa, longevity

likely coincides with related *Physa* sp. and other pulmonates, averaging two years. Implications to survival of the candidate species is that annual species with localized distribution and small populations become vulnerable to extirpation from stochastic and/or catastrophic changes in environmental events. The remaining free-flowing river and spring/spring outflow habitats for these species has been fragmented between several impounded reaches of the Snake River in southern Idaho. The Swan Falls, C. J. Strike, Bliss, Lower Salmon Falls, and Upper Salmon Falls Dams on the mainstem Snake River inundated free-flowing habitat and have extirpated populations of these species. Past diversion of large spring outflows for hydroelectric and agricultural purposes have destroyed habitat for Bliss Rapids and Utah valvata snails in Box Canyon (Taylor 1985a) and Thousand Springs. Another more recent threat is the discovery of the New Zealand mudsnail (*Potamopyrgus antipodarum*) in the middle Snake River. The eurytopic mudsnail is experiencing explosive growth in the river and shows a wide range of tolerance for water fluctuations, velocity, temperature and turbidity. The species seems to prefer warmer, polluted waters over pristine cold spring environments. At present, it is not abundant in habitats preferred by Banbury Springs lanx, Bliss Rapids snail, or the Utah valvata. However, the species does compete directly for habitats of the Snake River Physa and Idaho springsnail in the mainstem Snake River. Today these endemic species remain only in a few isolated free-flowing segments between the dams and for some species, a few spring tributaries of the Snake River (Taylor 1982a, b, c, and d, Frest 1989a).

The bed of the Snake River is held in Public Trust by the State of Idaho. Snake River water flowing over the bed is subject to State and Federal water law and water can be appropriated for beneficial uses. Water in Box Canyon Springs Creek is also subject to appropriation. Land in the upper half of Box Canyon Springs Creek is privately owned and developed by Earl M. Hardy. Land in the lower end of Box Canyon Springs Creek is managed by the Bureau of Land Management (Taylor 1985a). Much of the remaining free flowing spring habitat at Thousand Springs is owned by The Nature Conservancy; jointly purchased by the Conservancy and Idaho Power Company in 1986.

This purchase provided protection for the nearly four miles of spring outflows and Minnie Miller Lake from further appropriation and development. However, there are indications that water quality in some of the spring outflows is impacted by irrigation and aquaculture return flows initiating outside the Preserve's boundaries (Frest and Johannes 1992a).

Listing the subject species will result in increased protection of remaining free-flowing river and large spring habitat required by these and other sensitive native species such as the shortface lanx or giant Columbia River limpet (*Fisherola nuttalli*) (Taylor 1982a,b,c and d) and the Shoshone sculpin (*Cottus greenei*). These areas contain some of the last mainstem Snake River habitats with the full range of native molluscan species present, and thus represent a unique aquatic community.

Federal action on these five mollusks began in part as a result of several petitions submitted under section 4(b)(3) of the Act. Dr. Peter Bowler submitted a petition to list the Snake River Physa snail and the undescribed Bliss Rapids snail as endangered on February 7, 1980. A finding that this petition presented substantial information that the requested action may be warranted was published on April 23, 1980 (45 FR 27723). The Idaho springsnail was the subject of a petition submitted on November 12, 1987, by Dr. Bowler. The Service published on December 29, 1988, a finding that the petition to list the Idaho springsnail presented substantial information that listing may be warranted for this species. The Service initiated status reviews on these three species.

Section 4(b)(3)(B) of the Act requires the Service to make a finding within 1-year of the date a petition is received as to whether or not the requested action is warranted. If the Service finds that the requested action is warranted, but precluded by other pending proposals of higher priority, the Service must reevaluate the petition annually and make findings on whether or not the requested action is warranted. In the case of the Snake River Physa and Bliss Rapids snails, the first 12-month finding was published in the **Federal Register** on January 20, 1984 (49 FR 2485). Annual warranted, but precluded, findings were in effect from 1984 through publication of the proposed rule on December 18, 1990 (55 FR 51931).

Randall Morgan and others petitioned the Service to list an undescribed species in the genus *Lanx*, the Banbury Springs lanx, as endangered using the emergency provisions of the Act on November 13, 1989. Whereas the Service's status review did not disclose the existence of an emergency within the meaning of section 4(b)(7) of the Act, it did indicate that proposing the *Lanx* for listing under the normal procedures of section 4 is warranted.

All of the subject species except the Banbury Springs lanx have been included as candidate species on the Service's notices of review. The Snake River Physa snail and the Bliss Rapids snail were first included as category 1 candidates in the 1984 Review of Invertebrate Wildlife (49 FR 21664); they retained this status in the January 6, 1989 Animal Notice of Review (54 FR 554). Category 1 candidates are those taxa for which the Service has on file enough substantial information on biological vulnerability and threats to support proposals to list them as endangered or threatened species. The Utah valvata snail appeared on the 1984 Review of Invertebrate Wildlife as a category 2 candidate, and remained as such on the 1989 Animal Notice of Review. The Idaho springsnail was first included as a category 2 candidate on the 1989 Animal Notice of Review. Category 2 candidates are taxa for which information now in possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive date on biological vulnerability and threat are not currently available to support proposed rules. The November 21, 1991 Animal Notice of Review (56 FR 58804), reflecting the proposed status of these taxa, included all five snails as "PE" (proposed for listing as endangered).

Based upon the petitions, status surveys, and other information on file, the Service published a proposed rule on December 18, 1990 (55 FR 51931) to list as endangered five aquatic snails: the Bliss Rapids snail, Snake River Physa snail, Idaho Springsnail, Utah valvata snail and the Banbury Springs lanx or limpet. The proposed rule included information provided by Taylor (1982 a, c, d, and 1988) and Frest (1989b) on the Bliss Rapids, Idaho spring, and Snake River Physa snails, by Taylor (1982b) for the Utah valvata snail, and by Frest (1989a) and the Service for the Banbury Springs lanx.

The Service now determines the Idaho springsnail, the Utah valvata snail, Snake River Physa snail, and Banbury Springs lanx to be endangered species and the Bliss Rapids snail to be a threatened species with publication of this rule.

Summary of Comments and Recommendations

In the December 18, 1990 proposed rule, all interested parties were requested to submit comments or

information that might contribute to the development of a final determination. The public comment period ended on February 19, 1991. On March 18, 1991, the Service published a Federal Register notice announcing public hearings and reopening and extension of the comment period through April 30, 1991 (56 FR 11401). Announcements of the proposed rule and the upcoming hearings were also published in two newspapers on March 18, 1991: the Idaho Statesman and the Twin Falls Times-News. Public hearings were held from 7 to 10 p.m. on April 3, 1991 in Boise, Idaho, and from 2 to 4 p.m. and 7 to 9 p.m. on April 4, 1991 in Hagerman, Idaho. Thirty-two commenters presented oral testimony. On June 4, 1991, the Service requested that C. Michael Falter, University of Idaho, assemble a panel of experts to review and summarize the existing technical knowledge on the status of the five snail species. To accommodate the technical review meeting and receive additional comments, the Service published a third notice, on October 7, 1991, reopening the comment period through October 31, 1991 (56 FR 50550). The technical review meeting was held on October 21–22, 1991, in Boise, Idaho with six participants. Three additional mollusc experts were invited but did not attend. However, these individuals did participate in a later review of the meeting summary and submitted detailed review comments and additional substantive information. The final Summary Report of the Technical Review Meeting was received by the Boise Field Office on March 26, 1992 (Falter 1992).

Ninety-eight written comments were received on the proposed rule. The Service considered all comments received, including oral testimony from two public hearings on the proposal to list the five aquatic snails. A majority of comments (n=60) supported the proposed rule. Opposition to the proposed rule was based on several factors, including the assertion that the proposed rule was based upon incomplete sources of knowledge on the true distribution and abundance of the snails. Five written comments opposed the proposed listing and eight letters requested a public hearing. In addition, three Idaho State agencies provided written comments. The Idaho Department of Parks and Recreation wrote in support of the listing, while the Idaho Department of Water Resources expressed interest in the listing proposal and requested the Service undertake an ". . . analysis of the constraints a listing would have on existing and proposed projects in the designated reach . . ." The Idaho Division of Environmental Quality also submitted water quality study information for the Snake River. Several commenters provided new and substantive biological information applicable to the listing decision. Other comments provided information pertaining to further research needs and recovery planning. Such information will be useful in the development of a recovery plan. Comments of a similar nature or point are grouped for consideration and response. A summary of these issues and the Service's response to each, are discussed below.

Issue 1: One respondent believed that ". . . from taxonomic and morphological perspective, four of the species identified in the proposals are snails while the fifth is a limpet. Therefore the Service should substitute the term mollusks for snails in the title."

Service response: Limpet is the common and standardized term used by malacologists when referring to snails with low conical or cap shaped shells that have lost their coiled character. Specifically, the work was first applied to marine snails (gastropods=molluscs) with a non-coiled shell having an imperforate apex. This shell form is believed to have evolved separately in many different snail lineages to provide a more hydrodynamic contour in heavy currents. The Service considers use of the term "snails" to describe the subject species in the final rule both appropriate and proper.

Issue 2: Several comments addressed the question of the Banbury Springs lanx or limpet (*Lanx sp.*) status as a separate taxon. This species shows gross morphological similarity to another candidate Snake River lancid, the shortface or giant Columbia River limpet (*Fisherola nuttali*). One commenter believed that further taxonomic corroboration is needed for discriminating *Lanx* vs. *Fisherola* ". . . before a "new" genus-species is recommended for endangered status." Some commenters also maintain that there has been some confusion regarding misidentifications of the Banbury Springs and *F. nuttali* from specimens collected in Box Canyon Springs (Beak 1989). Specifically, they refer to differences in species identification by Dwight Taylor and Terrence Frest for several lancid specimens from the same vial provided by Richard Konopacky.

Service response: The Service has considered available scientific evidence and concludes that the Banbury Springs lanx (*Lanx sp.*) and *F. nuttali* are distinct taxa and spatially segregated. Shell features are the primary morphological discriminants distinguishing the Banbury Springs lanx and *F. nuttali*. These features include shell apex location and orientation, shape of the posterior and anterior side, color, maximum dimensions, and ratios of standard shell measurements (Frest 1991d). The two species are also segregated ecologically. The Banbury Springs limpet has been collected only from spring habitats at three locations and there is no evidence of its occurrence in the mainstem Snake River. *Fisherola*, on the other hand, is known to occur only in the mainstem middle Snake River and other mainstem Columbia basin rivers and has not been found in springs. Regarding the conflicting identification by Taylor and Frest of some lancid specimens collected from Box Canyon Springs, the Service notes that the differences were most likely due to confusion from using unlabeled vials. Frest (1991a) recently collected and examined several lancids from Box Canyon and also examined collections by Taylor (dead) and Konopacky (specimens in question); he concludes that only one lancid species is present, the Banbury Springs lanx.

Issue 3: Several commenters contend that the Service failed to evaluate and incorporate information in their possession prior to publication of the proposed rule. They believed that this information indicated the candidate species are more widely distributed and abundant than indicated in the Service's proposed rule and therefore the species should not be listed.

Service response: The information in question was unpublished data on snail range and distributions in the mid-Snake river collected in a study by Beak Consultants, Incorporated during 1987. Snail field data and locations for the species of interest were submitted to the Boise Field Office on February 19, 1990. According to the author of the proposed rule (Jay Gore, U.S. Forest Service, formerly Fish and Wildlife Service, pers. comm.), the information was in draft or field note form and was not easily interpretable. The Service is requested that the information be resubmitted in a form that was more easily interpretable during the open comment period following publication of the proposed rule. This information has been evaluated and incorporated into the final rulemaking process.

Issue 4: Several commenters requested that the Service delay or preclude listing the five aquatic snails because too little is known regarding their present status. They believed there was inadequate and insufficient sampling in past mollusc surveys to

describe overall distribution and abundance. For example, statements to the effect that: (1) Less than 1 percent of the middle Snake River has been sampled; (2) the proposed rule is based on earlier surveys that failed to adequately sample deepwater and other "hard to sample" habitats; and (3) recent limited surveys have located new populations, which greatly expand the "present range" of some of these species; these facts ". . . suggest that even very limited additional efforts will uncover new populations and that all representative habitat has not been examined." Several commenters argued against the listing asserting that sampling for molluscs exhibiting localized and discontinuous distribution using non-randomized, biased sampling (or sampling "where their previous experience and prior knowledge dictate"—Steinhorst 1992) will likely miss existing populations; therefore conclusions regarding current distribution in previous studies were not statistically valid. They also contend that failure to locate populations of molluscs exhibiting discontinuous distribution should be expected when using this type of "flawed" sampling. Several respondents also suggested that the Service initiate a comprehensive, statistically-based studies program for these species to develop additional data on spatial distribution and habitat requirements prior to any final listing decision.

Service response: The listing process includes an opportunity for the public to provide input and new information is evaluated and considered before a final determination is made. Aside from previously cited studies and reports in the proposed rule, the Service has reviewed and considered new information regarding distribution and general life history for the five candidate species for eight recent mollusc surveys in the Snake River basin. The Service used information only from sites where "live" specimens were found to evaluate and establish current geographic range. The use of dead specimens or shells to establish current range can be misleading since identification for some species may be difficult and shells are easily transported downstream. Because dead shells may persist for several years and for some taxa it is difficult to distinguish recently dead versus fossilized shells, conclusions regarding recent habitation are purely speculative. Four of the surveys examined a larger geographical area than previous studies cited in the proposed rule and only in a few instances were additional new "live sites" found. The study by Beak (1987; referred to in Issue #3) reported a single live Snake River Physa below Minidoka dam at river mile 675 and two new live sites for the Idaho springsnail (within the historic range cited in the proposed rule). Frest (1991b) surveyed nearly 500 sites for candidate molluscs from 1988–91 throughout the Snake River and Columbia River basins, including 51 sites in the middle Snake River. Although Frest collected Bliss rapids snail, Idaho springsnail and Utah valvata snails, none of the collections were considered new live sites and none of the candidates were reported outside the middle Snake River drainage. Frest (1991d) reported evidence of recent range reduction for the candidate species based on failure to find live specimens during surveys by Beak (1987) at some of Taylor's earlier sites. Pentec (1991b) reported a new "live" population of Bliss rapids snail in the Snake River associated with spring outflows above American Falls reservoir at river mile 749.8. The report states that this ". . . collection of live animals (Bliss Rapids snails) increased the present range of the species upstream by 162 miles or by 486 percent relative to the present range stated in the USFWS proposal . . ." These types of range descriptions and comparisons are valid only when species distribution is 'continuous' and not fragmented or discontinuously distributed as is the situation for these species. In any event, new live sites reported for the Bliss Rapids snail are within the historic range cited in the proposed rule, and are subject to similar habitat threats as the previously cited sites. Pentec also reported the third "new" population of Banbury Springs lanx discovered in a large spring-run at the Preserve (river mile 584.6). More recently, a limited study on the effects of reservoir drawdown on molluscs in the lower Snake River below Hells Canyon reported the absence of the five candidate species in this reach (Frest and Johannes 1992b). The authors of this study also noted the absence of other expected mollusc endemics, even the eurytopic and widespread species, from exposed shorelines in deepwater habitats in impounded reaches. In summary, no new significant distributional information affecting the status of the five taxa were reported by any respondent, and in most instances the candidate species were not collected at most sites sampled in each survey. Moreover, with the exception of *Lanx*, the surveys substantiate conclusions in the proposed rule that the candidate species are found only in the Snake River and have declined to the point where they are now absent from vast reaches of the Snake River. Regarding the argument that the proposed listing is based on inadequate and biased sampling, the Service concurs with Falter's (1992) following summary and analysis:

"• • • non-randomized, purposeful sampling may well miss existing populations", therefore ". . . given suitable habitat, additional populations of these taxa might be found with more orderly, non-purposeful sampling. Statistical considerations alone do not fully answer that possibility. The sampling issue is but part of the question of whether one would expect to find additional populations of any one of these taxa. The suitability of the habitat to support the species must also be considered, *i.e.*, unacceptable habitat renders moot the question of whether non-sampling of river habitats judged to be ecologically unacceptable for a species indicates possibility of additional habitat where the taxa might be found. The stenotopic environmental requirements of all of these taxa first delimits possible habitat for a species. Secondly, one addresses the question of adequate sampling of the potential habitat, not of all the water environment in the river, irregardless [sic] of the degree of matching organism requirements with the environment. Ecological judgement sets the bounds; statistical judgement then considers adequacy of sampling that potential habitat. The panel had no deepwater sampling data to review but the findings of recent water quality studies of absolute environmental unsuitability offered by these habitats justifies the conclusion that Gastropods, especially taxa only found in habitats very different than those presently offered by the deepwater habitats are unlikely to be found . . ." Falter goes on to state ". . . The bulk of the remaining, poorly sampled Snake River does not now offer those habitat conditions" (needed by the taxa), ". . . so it is not potential habitat. Reasonable ecological inference correctly stratifies those latter areas out of consideration as potential habitat."

These considerations also rule out deepwater habitat by these taxa since water quality declines with depth in the middle Snake River. The Service does believe that future mollusc surveys and studies may reveal a few additional locations with live populations or colonies of the candidate species, especially in shallow, littoral areas influenced by springflows. However, it is likely that these newly discovered populations will be threatened by the same activities affecting the existing populations. The Service maintains that this final rule is based on the best information available. The Service also believes that sufficient information is provided on these five species to warrant making a determination on their status at this time.

Issue 5: Many comment letters expressed concerns with the potential economic impacts to agriculture and community development along the Snake River plain in south central Idaho from listing the five snails under the Act. For example, several commenters were concerned with the potential impacts to future hydroelectric development along the middle Snake River and constraints to existing project operations. Another respondent requested that the Service designate ". . . mitigation measures that would permit normal agricultural practices while still protecting the species . . .".

Service response: Under section 4(b)(1)(A) of the Act, listing determinations are based solely on the best scientific and commercial information available and economic considerations are not applicable. The legislative history of the provisions clearly states the intent of Congress to "ensure" that listing decisions are "based solely on biological criteria and to prevent non-biological considerations from affecting such decisions." H.R. Rep. No. 97–835, 97th Congress 2nd Session 19 (1982). Because the Service is specifically precluded from considering economic impacts in the final rulemaking process, the Service has not addressed such impacts in this final rule.

Issue 6: One commenter was concerned with the impacts to agriculture from designating critical habitat. They requested the Service designate critical habitat during the final rulemaking process ". . . to avoid too large an area being designated."

Service response: Under section 4(a)(3)(A) of the Act, the Secretary must designate critical habitat to the maximum extent prudent and determinable at the time a species is determined to be threatened or endangered. In the proposed rule, the Service found that determination of critical habitat was not prudent for these species. As discussed under the "Critical Habitat" section below, the Service continues to find that designation of critical habitat for these aquatic snails is not prudent at this time. Because many of the remaining populations for these species are in localized springs, the Service believes such designation might increase the degree of collecting, vandalism, and other human activities, thus further threatening these five snails. Protection of these species' habitats will be addressed through the recovery process, and through the section 7 consultation process.

Issue 7: One respondent maintained that this issue should be decided by the State of Idaho and not through the Federal listing process. The Service should delay listing at this time "* * * because the legislature and Water Resources Board have extended protection to the Middle Snake for a number of years and there is no reason that this water quality and everything can't be taken care of on a state level."

Service response: In recent years, several programs to address deteriorating water quality in the Snake River have been initiated by various State of Idaho regulatory agencies with permitting and enforcement authority (IDHW 1991 a and b). One of the first of these programs was a water quality monitoring study launched in 1990 by the Division of Environmental Quality (DEQ). That same year the Snake River from Shoshone Falls downstream to Lower Salmon Falls Reservoir was listed as "water quality limited." This determination requires that DEQ develop a Total Maximum Daily Load (TMDL) for the river which quantifies pollutant sources and allocates nutrient loads. In a related matter, the DEQ recently denied certification for a National Pollution Discharge Elimination System (NPDES) permit for a new fish rearing facility in the middle Snake River area. The decision was based on DEQ's interim policy of no net increase in total nutrients discharged into the Snake River prior to development of the TMDL. Passage of the Nutrient Management Act passed by the Idaho Legislature in 1989 requires the DEQ to complete a nutrient management plan for the Snake River by 1993. The Idaho Department of Water Resources is involved in planning efforts which could result in State "protected" status for all or portions of this stretch of river. Such designation would protect "outstanding fish and wildlife, recreational, aesthetic, historical, cultural, natural or geological values * * * for the public benefit and enjoyment" from certain activities and could preclude further hydro development. At present, the stretch from below Milner Dam downstream to King Hill is under interim protected status through 1993. Despite these and other programs initiated to halt the deterioration of the middle Snake River, most are in the early stages, and it is unlikely these programs will reverse the trend any time soon. In any event, regulations that provide protection for invertebrate species equivalent to provisions of the Federal Endangered Species Act do not currently exist in Idaho. The Idaho Department of Fish and Game does maintain a list of wildlife classified as Threatened and Endangered and/or Protected Nongame species that prohibits take or possession. However this protection does not extend to any non-vertebrate species. See the discussion under Factor D in "Summary of Factors Affecting the Species" for a complete discussion on the inadequacy of existing regulatory mechanisms for the Idaho springsnail, Utah valvata snail, Snake River Physa, Banbury Springs lanx and Bliss rapids snail.

Issue 8: One commenter requested that the Service prepare as part of the final rule a Takings Implications Assessment under Executive Order 12630 to evaluate the risk and strategies for the avoidance of the taking of private property.

Service response: Concerning Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights" (March 15, 1988), the Attorney General has issued guidelines on implementation of the Executive Order. Under the supplemental guidelines for the Department of the Interior, a "special situations" rule applies when an agency is expressly required to take an action, making a finding, or give consultation based solely upon specified criteria that leave the agency no discretion; such as the criteria outlined in the Endangered Species Act (Act) for the listing of species. The Attorney General's supplemental guidelines state that Taking Implication Assessments (TIA) shall be prepared after, rather than before, the agency makes the decision upon which its discretion is restricted. The purpose of TIAs in these special circumstances is to inform policymakers of areas where unavoidable taking exposures exist. Such TIAs shall not be considered in the making of administrative decisions that must, by law, be made without regard to their economic impact. Provisions of the Act require the Service to list species based solely on the best scientific and commercial information indicating whether or not they are in danger of extinction. The Service may not consider economic impacts in making a listing decision. The listing process is also subject to strict timetables and failure to comply may subject the agency to legal action. The provisions of the supplemental guidelines relating to non-discretionary actions are applicable to the determination of threatened and endangered status for the five snail species that are subject of this final rule.

Issue 9: Two respondents claim that the Service has "overstated" the threats to the species from various activities. Specifically, assertions in the proposed

rule that describe adverse impacts to the subject species such as "The species are threatened by proposed large hydroelectric dam developments, current peak-loading operations of existing hydroelectric water projects, water pollution, reduction in oxygen concentration, and possibly competition from a recently introduced hydrobiid snail" are ". . . conclusory, giving no evidence or analysis or citation for support."

Service response: Despite the above claims, no new information was provided to contradict the Service's contention that the five species are threatened by deteriorating water quality and other threats present in the middle Snake River (see Factor A in "Summary of Factors Affecting the Species"). New information submitted during the comment period reaffirmed that the snails are coldwater stenotopic species restricted to the middle Snake River with localized distribution, and absent from impounded reaches. Most of this information was found in eight mollusc surveys undertaken from 1987–1992 at various locations throughout the Snake River Basin (Beak 1987, Beak 1989, Frest 1991b, Frest and Johannes 1991, Frest and Johannes 1992a, Frest and Johannes 1992b, Pentec 1991b, and Taylor 1987). Although range extensions were noted for Utah valvata and Bliss Rapids snails in some of the surveys, sites where these and the remaining three species were collected occurred only in 'preferred or usable' habitat types. In fact, snails were absent from most sites and locations sampled in each survey. Frest and Johannes (1992a) noted declines in abundance and distribution of Utah valvata in the Conservancy's Preserve, a "protected area", due to water quality problems attributed to agricultural and aquaculture return flows initiated outside the Preserve's boundaries. Taylor (1985a) stated that diversion of a portion of Box Canyon Creek to the Clear Springs Trout Hatchery in the fall of 1973 "substantially impacted populations of Bliss Rapids snails" downstream in the Bureau of Land Management's Box Canyon Area of Critical Environmental Concern. He also noted that the diversion possibly enhanced habitat for Utah valvata snails through flow velocity reduction. Since the stenotopic environmental requirements of these species defines suitable habitat, most malacologists agree that impounding remaining free-flowing reaches would be devastating to four of the five species. Impoundment would inundate existing habitat, reduce vital shallow shoreline habitats in tailwater areas due to operating flow fluctuations, elevate water temperatures, reduce dissolved oxygen levels in sediments, modify the rivers ability to assimulate point and non-point source pollution, and further fragment remaining populations. Frest and Johannes (1991) acknowledged that proposed construction of diversion dams for power production at Kanaka, Empire, and Boulder Rapids, river miles 592.2, 594.5, and 597.5, respectively, would not impact Utah valvata or any other candidate species because the taxa no longer occur in that river reach. The authors attributed the snails absence to deteriorating water quality and emphasized that this stretch of the river was becoming marginal mollusc habitat for the remaining native species. In addition, the recent low flows associated with the prolonged drought in southeast Idaho have contributed to continuing water quality problems throughout the Snake River basin. The Service, however, does believe that *Physa* and Bliss Rapids snail would benefit from stabilized, non-fluctuating water levels in the Lower Salmon Falls and Bliss Dam tailwater reaches. As discussed in detail in the "Summary of Factors Affecting the Species" section, the Service concludes that nearly all of the remaining populations of the five snails are at risk.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the Idaho springsnail (*Pyrgulopsis idahoensis*), Utah valvata snail (*Valvata utahensis*), Snake River Physa snail (*Physa natricina*), and Banbury Springs lanx (*Lanx* n. sp.) should be classified as endangered species and the Bliss Rapids snail (Family Hydrobiidae, n. sp.) should be listed as a threatened species. Procedures required by section 4 of the Act and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. Under the Act, a species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Idaho springsnail, Utah valvata snail, Snake River Physa snail, Bliss Rapids snail, and the Banbury Springs lanx are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* Activities that could further threaten the continued existence of the Bliss Rapids snail, Utah valvata snail, Idaho springsnail, Banbury Springs lanx, or Snake River Physa snail include proposed large hydroelectric dam developments, peak-loading operations of existing hydroelectric water projects, water pollution, diversion of water for irrigation and aquaculture and small hydroelectric development.

Six proposed hydroelectric projects, including two high dam facilities, would alter free flowing river reaches within the existing range of these snails. Dam construction threatens the five taxa through direct habitat modification and moderates the Snake River's ability to assimilate point and non-point pollution. Further hydroelectric development along the Snake River would inundate existing mollusc habitats through impoundment, reduce critical shallow, littoral shoreline habitats in tailwater areas due to operating water fluctuations, elevate water temperatures, reduce desolved oxygen levels in impounded sediments, and further fragment remaining mainstem populations or colonies of these snails.

The Idaho Power Company studied the feasibility of additional hydro development in the area during the early 1980's, and the Federal Energy Regulatory Commission (Commission) denied the Company's license requests when a mid-1980's power supply needs analysis revealed that the Northwest United States would have a power surplus into the early 1990's. However, the rapidly growing Northwest region is forecasting power shortages by the late 1990's and interest in developing potential hydro sites on the Snake River is on the rise.

Currently, Idaho Power Company has received a preliminary permit to evaluate the development and operation of the A.J. Wiley hydropower project (Federal Energy Regulatory Commission No. 11020) at river mile 565 on the lower Salmon Falls Dam tailwater. The reservoir created by this project would extend approximately six river miles to the tailwaters of the existing lower Salmon hydroproject and impound approximately 625 surface acres. This impoundment would inundate and destroy mainstem river habitats for existing populations of Snake River Physa and Bliss Rapids snail. Dike Hydroelectric Partners, (Federal Energy Regulatory Commission No. 10691) is currently evaluating another location, the Bliss Dam tailwaters at river mile 552, for hydropower development. This project would include construction of a large compacted concrete dam creating a 560-acre reservoir. This development would inundate existing habitat and populations of the Idaho springsnail, the Bliss Rapids snail, and the Snake River

Physa snail that occur near Bancroft Springs. Construction of these two proposed dams would inundate four mainstem sites that are currently supporting populations of the Bliss Rapid snail; both of the two known sites that are currently supporting populations of the Snake River Physa snail, and at least one known population of the Idaho springsnail. These two proposed dams would not inundate habitat for the Utah valvata snail since this snail is well upstream. The Banbury Springs lanx occurs in three tributary springs that flow into the Snake River and these would likely not be impacted by the two dams. The remaining four proposed hydro projects are diversion or run-of-river developments (without reservoirs) that would alter the flow regime and minimize annual flows in the bypass reaches at the four Snake River sites. Frest and Johannes (1991) believe that proposed construction and operation of three of these projects for power production, Kanaka, Empire and Boulder Rapids would not adversely impact the Utah valvata or any other candidate, so long as efforts to control sedimentation during construction are implemented. Deteriorating water quality is most likely the primary factor limiting the native molluscs in this reach. Even with improvements in water quality in this reach of the Snake River, construction of these projects would affect recovery efforts since otherwise suitable free-flowing habitats would be impacted.

Peak-loading, the practice of artificially raising and lowering river levels to meet short-term electrical needs by local run-of-the-river hydroelectric projects also threatens these species. Peak-loading is a frequent and sporadic practice that results in dewatering mollusc habitats in shallow, littoral shoreline areas. With the exception of the Banbury Springs lanx and possibly Snake River physa, these diurnal water fluctuations prevent the candidate species from occupying the most favorable habitats. The Bliss Dam is approximately six miles above Bancroft Springs and may adversely affect three known populations of the Idaho springsnail, two populations of the Bliss Rapids snail, and a population of the Snake River Physa snail, by restricting littoral habitat during the late summer peak-loading operation. Peak-loading operation of the lower Salmon Falls Power Plant may harm three mainstem Snake River populations of the Bliss Rapids snail, and a population of the Snake River Physa snail. The combined peak-loading effects from proposed A.J. Wiley and Dike hydroelectric projects would also impact known populations of the Idaho springsnail, most of the extant colonies of the Bliss Rapids snail, and both of the Snake River Physa snail populations in the Hagerman and King Hill reaches. The recently discovered population of Bliss Rapids snail above American Falls (river mile 749.8) is also subject to the effects of water fluctuations from operation of the Shelley hydroelectric project at river mile 783.

Based on limited sampling, these snails have not been found between Milner Dam (river mile 639.1) and Shoshone Falls (river mile 614.8). This reach of the Snake River is essentially dewatered during the irrigation season and remaining low flows have poor water quality. It is unlikely that these species could exist in this river stretch. During the irrigation season water quality and quantity below Shoshone Falls is poor, though both are gradually improved by inflow from Snake River Plain Spring tributaries through the Hagerman Reach.

The quality of water in these habitats has a direct effect on the species survival. The species require cold, well-oxygenated unpolluted water for survival. Any factor that leads to a deterioration in water quality would likely extirpate these taxa. For example, the Banbury Springs lanx lacks either lungs or gills and respires through unusually heavy vascularized mantles. This species cannot withstand temporary episodes of poor water quality conditions. Because of its stringent oxygen requirements, any factor that reduces dissolved oxygen contact for even a few days would very likely prove fatal to most or all of the populations. Factors that would degrade water quality include reduction in flow rate, warming, and increases in the concentration of fertilizers, herbicides or pesticides from irrigation waste water return. The middle Snake River is impacted by return flows from irrigated agriculture, runoff from feedlots and dairies, hatchery effluent, municipal sewage effluent, and other point and non-point discharges. During the irrigation season, 13 perennial streams and more than 50 agricultural drains contribute irrigation tailwater to the Snake River (IDHW, 1991b). In addition, more than 140 commercial, State and Federal fish culture facilities discharge wastewater into the Snake River and its tributaries. These factors, coupled with drought-induced low flows, contribute to the increased eutrophication and general decline of the coldwater lotic molluscs of the middle Snake River. Water quality in the alcove springs and tributary spring streams in the Hagerman Reach have also been somewhat impacted, though not as severely as the mainstem river has. The Hagerman Reach receives massive cold water recharge from the Snake River Plain Aquifer. Several of these springs and spring tributaries have been diverted for hatchery water supplies with return flows to the Snake River enriched with nutrients. At the Conservancy's Preserve at Thousand Springs, there is evidence that colonies of Utah valvata and Bliss Rapids snail have recently declined or been eliminated at several sites from changes in water quality due to agricultural and aquaculture wastewater originating outside the area (Frest and Johannes 1992a).

Four tributary springs or spring streams of the Hagerman area of the Snake River—Banbury Springs, Box Canyon Springs, Thousand Springs and Sand Springs Creek—contain populations of two or more of the taxa described in this rule. The Banbury Springs lanx is found in only three of these tributary springs: Banbury, Box Canyon and Thousand Springs. The Utah valvata and Bliss Rapids snail occur in Box Canyon, Thousand Springs and the mainstem Snake River. Banbury Springs has no known threats, but Box Canyon Springs is threatened by a small hydroelectric project at the upper end of Box Canyon and a water diversion dam at the lower end of Box Canyon. The upper two-thirds of Box Canyon, including the water diversion is privately owned. The stream and associated area below the diversion is owned by the Bureau of Land Management (BLM) and was designated an Area of Critical Environmental Concern (ACEC) in 1986. The ACEC was established to manage habitats for three candidate molluscs, the Bliss Rapids snail, Utah valvata, and *Fisherola nuttalli*, and the Shoshone sculpin (*Cottus greenei*). *Lanx* (Banbury Springs lanx) was added to the list of sensitive species under ACEC management with the discovery of the second of three populations of this species in the Sculpin Pool at Box Canyon in 1989 (Beak 1989). Construction of a diversion dam for a trout culture facility in upper Box Canyon in 1973 eliminated habitat of the Bliss Rapids snail, though Taylor (1985a) reported that sediment produced as a result of constructions enhanced habitat for Utah valvata downstream in the natural pool on BLM lands. Ground water mining or withdrawal may also impact spring stream habitats of the "new" Bliss Rapids snail population above

American Falls Reservoir at river mile 749.8. Biologists of the Shoshone Bannock Tribal Reservation have observed water fluctuations and seasonal declines in spring flows along this stretch of the Snake River concurrent with the irrigation season (Doug Takai, biologist, Shoshone Bannock Tribal Reservation, pers. comm.). Though not fully documented, these seasonal declines in spring flows seem more pronounced in recent years due to ongoing drought conditions.

Winter cattle grazing and recreational access may also be impacting spring habitats of the Bliss Rapids snail on the Shoshone Bannock Reservation. Although access is controlled, waterfowl hunters, and to some extent fishermen, utilize these spring areas throughout the Fall and early Winter. The Service believes trampling by cattle and people will likely produce minimal impacts to spring habitats.

In summary, the cumulative effects of these factors combined with extreme low flows throughout much of the Snake River from over five years of drought, continue to threaten the remaining habitats and increasingly fragmented populations of these five species. This is especially true for habitats and extant populations in the mainstem Snake River.

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* Not known to be applicable. However, due to their rarity, some of these taxa may have been subject to past overutilization for scientific purposes. For example, of the less than fifty live Snake River Physa snails collected in the middle Snake River, nearly all were preserved or killed for scientific purposes. In other instances, some molluscs have become vulnerable to illegal collection for scientific purposes following listing under the Act.

C. *Disease or predation.* Changes in the fish fauna of the middle Snake River have been suggested as potentially threatening to some or all of the candidate taxa. However, no data to support this suggestion exists. Fish predation was not considered a "major problem" for these taxa in a recent mollusc survey at The Nature Conservancy's Preserve (Frest and Johannes 1992a).

D. *The inadequacy of existing regulatory mechanisms.* The Idaho Department of Water Resources regulates water development in the Snake River basin. At present, there is no specific allocation of water on the mainstem middle Snake River for fish and wildlife, although maintenance flows for fish and wildlife on several tributary streams to the Snake River have been established. Without Federal protection under the Act, present management regulations are inadequate to curb further water withdrawal from groundwater spring outflows or tributary spring streams.

Changes in the use of stored water in the Snake River basin to assist recovery efforts for other threatened and endangered species may also impact these species and their habitats. For example, the Bonneville Power Administration, State of Idaho, and Idaho Power Company are exploring alternatives to assist outmigrating endangered Snake River sockeye salmon (*Oncorhynchus nerka*) and threatened spring and summer chinook (*Oncorhynchus tshawystscha*) from utilizing water from the upper Snake River basin.

The Idaho Department of Health and Welfare, Division of Environmental Quality, under authority of the State Nutrient Management Act, is coordinating efforts to identify and implement preventative actions which will reduce nutrient loading to the middle Snake River below Milner Dam (IDHW 1991b). These efforts will address pollution control strategies for this stretch of river through several of the following program areas: State Agricultural Water Quality Program, NPDES permits, 401 Certification, Bureau of Land Management land management plans, the State Water Plan and local ordinances. Despite these efforts to better comprehend and halt the deterioration of the middle Snake River, it is unlikely these programs will reverse the trend any time soon, since it will be several years before any recommendations to improve water quality outlined in comprehensive resource management plans for the Snake River are fully implemented.

There are at least two State agencies that have as part of their goals and objectives the identification and protection of rare taxa and their habitats. The Idaho Parks and Recreation has authority under *Idaho Code* section 18–3913, 1967, to protect only plants, with animals not given special protection on Idaho lands. The Department of Fish and Game, under *Idaho Code* section 36–103, is mandated to preserve, protect, perpetuate, and manage all wildlife. However, these mandates do not extend protection to invertebrate species.

The Federal Energy Regulatory Commission (Commission) is the agency responsible for issuing licenses for hydroelectric projects. The Commission solicits input from the Service regarding environmental impacts that may result from proposed projects. The Service's comments regarding impacts to "candidate" only species, such as the five aquatic snails, are advisory in nature. The Commission relies upon the developer and the Service to resolve issues with respect to candidate species. Without listing, it is unlikely that the Commission would require a project proponent to mitigate for impacts to these species unless the developer did so voluntarily. Consequently, the Commission's review of projects does not provide protection to the five taxa covered in this rule.

The U.S. Army Corps of Engineers (Corps) is also involved in the permitting of projects on the Snake River through their authority under section 404 of the Clean Water Act. The Corps issues individual and nationwide permits for projects that would result in the fill of waters of the United States. Nationwide permits are often issued for relatively small projects (hydroelectric projects producing less than 5 megawatts and some bridge crossings) that presumably have minimal environmental impacts. Projects requiring individual permits undergo more extensive environmental review and the permits often include conditions that require avoidance or mitigation for environmental impacts. Virtually any project within the range of these molluscs would require an individual permit as described in section 404 of the Clean Water Act. The Corps does solicit input from the Service regarding impacts to wildlife resources. The Corps gives full consideration to the Service's comments on permits. However, the Service's comments regarding candidate species are advisory. In practice, the Corps does not give any special consideration to the five invertebrates considered herein.

With the listing of these species as threatened or endangered, the Corps and the Commission will be required to initiate formal consultation pursuant to section 7 of the Act on any project that may affect one or more of these species. Such consultation would result in a Biological Opinion on whether or not the project proposed to be authorized is likely to jeopardize the continued existence of the species. With listing, both the Commission and Corps will be required to insure that any project they authorize will not be likely to jeopardize the continued existence of these species. Conditions that would provide protection to the species could be incorporated into permits or licenses issued. The provisions of section 7 of the Act are more fully discussed later in this proposed rule.

E. *Other natural or manmade factors affecting their continued existence.*

Although not fully understood, an introduced hydrobiid snail, the New Zealand mudsnail (*Potamapyrgus antipodarum* (=*P. jenkinsi*)) may complicate survival for these native species. This non-native species occurs throughout the range of the five species included in this rule (Bowler 1989a, 1989b, 1990). This hydrobiid snail is native to New Zealand and has also spread to Europe and Australia. *Potamopyrgus antipodarum* was first reported in the middle Snake River in 1987, when Taylor found the species had invaded several alcove spring habitats at The Nature Conservancy's Preserve. This exotic taxa may have been inadvertently introduced by the private aquaculture industry in this area. By December, 1988, *P. antipodarum* was the dominant taxa in the free-flowing habitats of the Hagerman Reach below Bliss Dam (Bowler 1990). It formed dark mats of individuals in habitat formerly preferred by native species including the Bliss Rapids snails and Snake River Physa. The species has been observed at densities of nearly 400 individuals per square inch. *Potamopyrgus* is parthenogenic and ovoviparous, which contributes to the ability to build large populations rapidly and recover from population crashes. The species is eurytopic and shows very little preference for substrate type or size. The mudsnail is much more abundant in the mainstem Snake River than in cold spring environments; it is uncommon or absent in both unimpacted, pristine or stagnent, highly polluted environments (Frest and Johannes 1992a). At present, *Potamopyrgus* is not abundant in large springs inhabited by *Lanx n. sp.* and in cold springflows with colonies of Bliss Rapids snail and Utah valvata. The species does, however, compete for habitat with Snake River Physa and Idaho springsnail and mainstem colonies of Bliss Rapids snail and Utah valvata. *Potamopyrgus* is abundant in the Snake River below Bliss Dam to C.J. Strike Reservoir and inhabits the same littoral sand/silt substrate as the Idaho springsnail (Bowler 1990). In addition, the species forms "thick mats" of individuals at mainstem locations with Snake River Physa and Bliss Rapids snails. Potential threats to the subject species and other native molluscs include crowding and competition for preferred habitat for mainstem populations, and possible attraction and support of molluscivorous fish and avian predators (Bowler 1990). Although no information exists regarding foraging, it is possible that competition for forage may occur in areas where preferred habitats are limiting *i.e.*, boulder substrate is limited. In summary, *Potamopyrgus* appears to impact most directly mainstem populations of the candidate taxa. At present, it does not appear to threaten spring populations of *Lanx n. sp.*, Bliss Rapids snail and Utah valvata. The New Zealand mudsnail is still expanding its range and population in the Snake River. Further research on *Potamopyrgus* is required to monitor its expansion and to fully comprehend its full impact to the native molluscs and the overall ecology of the Snake River.

Determination

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by these species in determining to issue this rule. Based on this evaluation, the preferred action is to list the Idaho springsnail (*Pyrgulopsis idahoensis*), Utah valvata snail (*Valvata utahensis*), Snake River Physa snail (*Physa natricina*), and the Banbury Springs lanx (*Lanx* n. sp.) as endangered and the Bliss Rapids snail as threatened. With the exception of *Lanx*, four of the taxa have declined over all but a small fraction of their historical range. Today these species generally persist in a few isolated free-flowing reaches or spring alcove habitats in the middle Snake River characterized by cold well-oxygenated unpolluted water. *Lanx* has remained relatively stable within its three known locations since its discovery in 1988. However, because *Lanx* is known only from three locations it is most vulnerable to habitat change. The free-flowing, cool water environments required by these species have been impacted by and are vulnerable to continued adverse habitat modification and deteriorating water quality. This is especially true for those species restricted to mainstem river environments, the Snake River Physa and Idaho springsnail, but also mainstem colonies of Bliss Rapid snails and Utah valvata. These mainstem species may also be vulnerable to habitat competition from an exotic snail. With the exception of spring habitats at The Nature Conservancy's Preserve, remaining pristine spring and spring stream complexes preferred by *Lanx*, Bliss Rapids snail and Utah valvata are not protected from all threats previously discussed. Existing regulations do not provide adequate protection to prevent further direct and indirect habitat losses. Because the Idaho springsnail, Utah valvata, Snake River Physa, and Banbury Springs lanx are in danger of extinction throughout all or a significant portion of their ranges, they fit the definition of endangered as defined in the Act.

The Bliss Rapids snail is the most widespread of the five taxa, with new live populations recently reported above American Falls reservoir in springflow habitats. It is most abundant in several cold springs in the Hagerman Reach, and enjoys some degree of protection in several unpolluted springs on The Nature Conservancy's Preserve at Thousand Springs. The number of extant populations, including those on the Preserve, provides greater flexibility in recovery and reduces the likelihood that the Bliss Rapids snail will go extinct in the immediate future. However, remaining mainstem populations are variously threatened. Because of the limited threats facing the Preserve colonies of Bliss Rapids snails and the likelihood that limited additional populations may be found in spring habitats, this species is not now in immediate danger of extinction throughout all or a significant portion of its range. However, the Bliss Rapids snail is likely to become in danger of extinction in the near future. As a result, the Bliss Rapids snail fits the definition of threatened species as defined in the Act.

For reasons discussed below, critical habitat is not being proposed at this time.

Critical Habitat

Section 4(a)(3) of the Act requires, to the maximum extent prudent and determinable, that the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service has determined that critical habitat designation for these species is not presently prudent. Some populations are in localized springs and over-collecting by malacologists or vandalism could occur if their whereabouts were widely known. Regulations implementing section 4 of the Act provide that a designation of critical habitat is not prudent when a species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat (50 CFR 424.12). Protection of these species' habitat will be addressed through the recovery process and through the section 7 consultation process. The Service believes that Federal involvement in the areas where these snails persist can be identified without the designation of critical habitat. Therefore, it would not now be prudent to determine critical habitat for these species.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups and individuals. The Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protections required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a threatened or endangered species or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

Federal actions that may be affected by this final rule include the granting of licenses by the Commission for hydroelectric/power dam development and the issuing of permits under section 404 of the Clean Water Act by the Corps. The Commission will likely be required to consult with the Service on the previously mentioned hydroelectric/power dam proposals (A.J. Wiley, Idaho Power Company and Dike Hydroelectric Company). The Corps and Bureau of Land Management will likely be required to consult with the Service on the Box Canyon water diversion dam. In addition, joint consultation by the Corps and the Commission with the Service may be necessary if any of the projects under licensing consideration by the Commission include plans for filling. Federal or federally assisted programs affecting potential Snake River Plain Aquifer recharge programs and the Environmental Protection Agency's NPDES program would also be subject to consultation under section 7(a)(2).

The Act and implementing regulations found at 50 CFR 17.21 and 17.31 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife, and to all threatened wildlife not covered by a special rule. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (including harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or attempt any such conduct), import or export, transport in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any endangered species, or any threatened species not covered by a special rule. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered or threatened wildlife species under certain circumstances. Regulations governing endangered species permits are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. Regulations governing permits for threatened species are at 50 CFR 17.32. Unless otherwise provided by a special rule, such permits are available for scientific purposes, to enhance the propagation or survival of the species, for economic hardship, zoological exhibition, educational purposes, special purposes consistent with the Act, and/or for incidental take in connection with otherwise lawful activities.

National Environmental Policy Act

The Service has determined that an Environmental Assessment, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

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Author

The primary author of this final rule is Stephen D. Duke, Boise Field Office (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Regulation(s) Promulgation

PART 17—[AMENDED]

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Public Law 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.11(h) by adding the following, in alphabetical order under Snails to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
• •	• •	•	•		•		
Snails							
• •	• •	•	•		•		
Limpet, Banbury Springs	*Lanx* n. sp.	U.S.A. (ID)	NA	E	485	NA	NA
• •	• •	•	•		•		
Snail, Bliss Rapids	Family Hydrobiidae n. sp.	U.S.A. (ID)	NA	T	485	NA	NA
• •	• •	•	•		•		
Snail, Snake River Physa	*Physa natricina*	U.S.A. (ID)	NA	E	485	NA	NA
• •	• •	•	•		•		
Snail, Utah valvata	*Valvata utahensis*	U.S.A. (ID)	NA	E	485	NA	NA
• •	• •	•	•		•		
Springsnail, Idaho	*Pyrgulopsis idahoensis*	U.S.A. (ID)	NA	E	485	NA	NA
• •	• •	•	•		•		

Dated: November 25, 1992.

Richard N. Smith,

Acting Director, U.S. Fish and Wildlife Service.

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