DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AB75

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Karner Blue Butterfly

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final Rule.

SUMMARY: The U.S. Fish and Wildlife Service determines the Karner blue butterfly (*Lycaeides melissa samuelis*) to be an endangered species pursuant to the Endangered Species Act of 1973 (Act), as amended. Historically, the Karner blue butterfly occurred in a rather narrow band extending from eastern Minnesota, across portions of Wisconsin, Illinois, Indiana, Michigan, Ohio, Canada (Ontario), Pennsylvania, New York, Massachusetts, and New Hampshire. It is now extirpated from Ohio, Pennsylvania, and Massachusetts, and is considered virtually extirpated from Ontario. This action is being taken because of constriction of the species' range and the declining size of remaining populations. The primary cause of past and threatened losses is habitat modification and destruction due to development, succession in the absence of natural disturbances, silviculture, and fragmentation of remaining habitat. This listing extends the Federal protection and recovery provisions afforded by the Act to *Lycaeides melissa samuelis*.

EFFECTIVE DATE: December 14, 1992.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the New York Field Office, U.S. Fish and Wildlife Service, 3817 Luker Road, Cortland, New York 13045.

FOR FURTHER INFORMATION CONTACT: Mark W. Clough at the above address, telephone (607) 753-9334.

SUPPLEMENTARY INFORMATION:

Background

The Karner blue butterfly has been known for more than a century. When W.H. Edwards first described this butterfly in 1861 in Karner, New York, it was considered to belong to the same species as the Scudder's blue. In the 1940's, Nabokov revised the taxonomy of the group and renamed the Karner blue as a subspecies of the more common Melissa blue. The current scientific name is *Lycaeides melissa samuelis*, Nabokov. Some lepidopterists consider the Karner blue butterfly to be a separate species (D. Schweitzer, The Nature Conservancy, *in litt.*, 1987). However, this change has not been published and the Karner blue butterfly will be considered a subspecies for the purposes of listing.

Karner blues have a wingspan of 22-32 mm (0.87-1.26 in). The dorsal side of the male is silvery blue or dark blue with narrow black margins. The females are grayish brown dorsally, with irregular bands of orange inside the narrow black border on the upper wings. Both sexes are slate gray on the ventral side with the orange bands showing more regularity, and black spots circled with white (Shull 1987).

The habitat of the Karner blue butterfly is characterized by the presence of wild lupine (*Lupinus perennis*), a member of the pea family. Wild lupine is the only known larval food plant for the Karner blue butterfly and is, therefore, closely tied to the butterfly's ecology and distribution. In eastern New York and New Hampshire, the habitat typically includes sandplain communities, and grassy openings within very dry, sandy pitch pine/scrub oak barrens. In the Midwest, the habitat is also dry and sandy, including oak savanna and jack pine areas, and dune/sandplain communities. It is believed that the Karner blue butterfly originally occurred as shifting clusters of populations, or metapopulations, across a vast fire-swept landscape covering thousands of acres. While the fires resulted in localized extirpation, post-fire vegetational succession promoted colonization and rapid population buildups (Schweitzer 1989). Periodic disturbance is necessary to maintain openings in the canopy for wild lupine to thrive. A variety of other understory plants associated with the habitat serve as nectar sources for the adult butterflies.

The Karner blue butterfly usually has two broods each year. Eggs that have overwintered from the previous year hatch in April. The larvae feed on wild lupine leaves and mature rapidly. Near the end of May, they pupate and adult butterflies emerge very late in May in most years. The adults are typically in flight for the first 10 to 15 days of June, when the wild lupine is in bloom. Females lay eggs on or near the wild lupine plants. The eggs hatch in about one week and the larvae feed for about three weeks. They then pupate and the second brood adults appear in the second or third week of July. This time, the eggs are laid among plant litter or on grass blades at the base of the lupines, or on lupine pods or stems. By early August, no adults remain, and these eggs do not hatch until the following spring (Schweitzer 1989, Dirig 1979).

The distribution of the Karner blue butterfly is very discontinuous and generally follows the northern limits of wild lupine. Eight major population clusters of the Karner blue butterfly were known historically from portions of Wisconsin, Michigan, Minnesota, Indiana, Illinois, Ohio, Massachusetts, New Hampshire, Pennsylvania, New York, and Ontario. Over the past 100 years, Karner blue butterfly numbers have apparently declined rangewide by 99 percent or more. Over 90 percent of the decline occurred in the last 10 to 15 years. It is now extirpated from Massachusetts, Pennsylvania, and Ohio (Schweitzer 1989; *in litt.*, 1990). Unconfirmed reports indicate that one or two Karner blues may have been sighted at an historic Ontario site in 1990 or 1991.

The New York Natural Heritage Program maintains a state list of approximately 50 individual Karner blue butterfly sites, comprising about ten site-clusters, all found in the area known as the Albany Pine Bush and at scattered locations extending about 40 miles to the north. Once the site of a massive Karner blue population, the Albany Pine Bush is the locality from which the Karner blue butterfly was first scientifically described. There are also unverified records of Karner blues in Manhattan and Brooklyn from the mid 1800's. Givnish *et al.* (1988) noted a decline of Karner blue butterflies in the Albany Pine Bush of 85 to 98 percent over the past decade, exclusive of one site that has remained stable. Givnish *et al.* (1988) and Schweitzer (1990) described the decline in the Pine Bush population as dropping from numbers of around 80,000 in 1979, to around 1,000 in 1987, to 100-200 in 1990. North of the Albany Pine Bush, one disturbed site located at an airport has persisted with numbers estimated around 14,000 in 1990. This population is several times larger than all the other New York sites combined (Schweitzer 1990). The majority of extant Karner blue sites in New York are in municipal and private ownership. Other landowners include a State Park, The Nature Conservancy, and Saratoga County.

In New Hampshire, the Concord Pine Barrens along the Merrimack River support the only remaining occurrence of the Karner blue butterfly in New England. The sole population is extremely low in numbers and occurs on a privately owned, two to three acre site within a power line right-of-way bordering an industrial park, and on the grounds of a nearby airport. The results

of 1990 surveys reported by The Nature Conservancy (1990) showed a decline in the population size from an estimated 2,000 to 3,000 individuals in 1983 to an estimated 250 to 400 individuals in 1990. During that survey, Karner blue butterflies were not found at two other sites in the Concord Pine Barrens where the subspecies had been documented in 1983.

In Wisconsin, 33 of 36 historical occurrence sites were surveyed during 1990. Survey results reported by Bleser (1990) revealed that Karner blue butterflies were found at only 11 of the 33 historical sites visited. Although 23 previously unknown populations were discovered, Bleser noted that numbers of Karner blue butterflies observed were very small at most sites. Only three sites had 50 or more individuals observed, with none greater than 100. While these surveys did not provide a basis for statements of actual population size, they all appeared to be small, and many might not be considered viable. Many of the remnant populations in Wisconsin are also widely scattered, occurring in isolated patches of habitat along roadsides, power line clearings, and on abandoned agricultural fields. Additional surveys conducted in 1991 revealed a total of 131 discrete lupine areas that support Karner blue butterflies (Besadny *in litt.*, 1992). During the 1991 surveys, ten or fewer adults were counted at 53 percent of the 131 discrete sites, 11–50 adults were counted at 29 percent of the sites, 51–100 adults were counted at 10 percent of the sites, 101–300 at only seven percent of the sites, and over 300 at just one percent of the sites. It should be noted that actual population sizes may be 3 to 6 times, or higher, than the numbers of butterflies counted on a given site visit. At least half of Wisconsin's remaining Karner blue butterfly populations are small, isolated, and cannot be considered secure or viable in the long term. However, "a very good number of quite sizable populations occur on publicly owned properties offering good opportunities for long-term protection and management" (Besadny *in litt.*, 1992). Over three fourths of the Wisconsin sites are on publicly administered lands, including Necedah National Wildlife Refuge, Department of Defense, Wisconsin Department of Natural Resources, and County Forest. Other sites are owned or partly owned by other state and county governmental agencies, private landowners, and utility companies.

The Karner blue butterfly has declined throughout its range in Michigan. It still occurs in six of seven counties from which it was known historically, but the existing populations are greatly reduced and have become highly fragmented within expanses of unsuitable habitat (Wilsmann 1990). The Michigan Natural Features Inventory includes over two dozen historical locations for the Karner blue butterfly. Five of these no longer support populations of Karner blue butterflies, and many of the remainder are ranked as poor quality sites. Considering the population dynamics of the species, it can be expected that many individual sites which once supported populations of Karner blue butterflies are no longer suitable. Although information on exact historical locations is lacking, many general areas reported to have Karner blue butterflies in the 1950's have become unsuitable due to succession or conversion to plantations (L. Wilsmann, Michigan Department of Natural Resources, pers. comm., 1991). In his critique of 1989 population studies done by W. S. Lawrence and A. C. Cook in the Allegan State Game Area, Michigan's only remaining sizable population, Schweitzer (*in litt.*, 1989) noted that the results indicate a decline to fragmented remnants with dangerously low numbers, which is characteristic of a collapsing Karner blue butterfly population. Other Michigan sites occur on the Manistee National Forest (intermixed with private inholdings), on power company rights-of-way, and on other private lands.

The results of surveys during 1990 in Indiana were summarized by C. Hedge (Indiana Department of Natural Resources, pers. comm., 1991). Karner blue butterflies were reconfirmed at one known site, and they were also rediscovered on three of seven historical sites. Searches at 27 sites identified as potentially suitable for the species yielded six new locations for the species. However, all extant sites in Indiana are in two population clusters within two counties. Six sites are located on Indiana Dunes National Lakeshore, and other landowners include a county park and recreation department, a school district, and The Nature Conservancy. Shull (1987) indicated eight Indiana counties in the historic range of the Karner blue, although some of these records are based on sightings that are not supported with voucher specimens. The species is no longer found at one area where Shull reported observing dozens of individuals in 1980.

Cuthrell (1990) reported the results of 1990 surveys conducted in Minnesota. During the 1990 surveys of 50 potentially suitable sites, two areas with Karner blue butterflies were located. Both sites are on a State Wildlife Management Area, in the vicinity of one of the historical locations. Karner blue butterflies were not found at the other historical site. Studies conducted during 1991 revealed three new sites within one half to three miles of the sites surveyed in 1990 (Lane 1992a). Lane reported low numbers of individuals observed at all five sites, with none greater than 14, indicating extremely small populations.

The Karner blue butterfly was presumed extirpated from Illinois until the species was relocated there in August 1992. A total of seven butterflies, including five males and two females, were reported from a lupine site in the northern part of the State (S. Lauzon, Illinois Endangered Species Protection Board, pers. comm., 1992). The Karner blue was previously known from one collection in Illinois. This record consists of two specimens from the Andreas Bolter collection, labelled "N. Ill." (Irwin and Downey 1973), which suggests that they were collected around or before 1900.

Karner blues frequently occur with other rare butterfly species such as the persius duskywing (*Erynnis persius*) and the frosted elfin (*Incisalia irus*), which are being listed by states where they occur (D. Schweitzer, pers. comm., 1991). Wild lupine is also the host plant for these species in parts of their range.

The Karner blue butterfly was first recognized by the Federal government in the **Federal Register** Notice of Review published on May 22, 1984 (49 FR 21664). That notice, which covered invertebrate wildlife under consideration for endangered or threatened status, included the Karner blue butterfly as a Category 2 species. Category 2 includes those taxa for which proposing to list as endangered or threatened is possibly appropriate, but for which substantial data on biological vulnerability and threats are not currently available to support proposed rules. In the **Federal Register** Animal Notice of Review published on January 6, 1989 (54 FR 554), the Karner blue butterfly was retained as a Category 2 species. Although the decline of the Karner blue butterfly in the Northeast was documented during the 1980's, it was believed that populations in the Midwest were relatively secure, particularly in Wisconsin and Michigan. Surveys conducted during 1989 and 1990 in the Midwest revealed that the butterfly is in decline there also. The Animal Notice of Review published in the November 21, 1991 **Federal Register** included the Karner blue butterfly as a Category 1 species, indicating that the

Service possessed sufficient information to support a proposal to list this butterfly. On January 21, 1992 (57 FR 2241), the Service published a proposed rule to list the Karner blue butterfly as an endangered species.

Summary of Comments and Recommendations

In the January 21, 1992, proposed rule and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. Appropriate State agencies, county governments, Federal agencies, scientific organizations, major landowners, and other interested parties were contacted and requested to comment. Notices were published in newspapers of general circulation in each area where the Karner blue butterfly is known to occur. On March 4, 1992, the Service received a request for a public hearing from Dr. Wilmer Pautz of the University of Wisconsin-Eau Claire. Accordingly, on June 8, 1992, the Service published a notice in the **Federal Register** extending the comment period to July 6, 1992, and announcing a public hearing to be held in Eau Claire, Wisconsin on June 25, 1992. At the hearing the public was invited to present oral or written information to be entered into the record, on factors pertinent to the proposed listing of the Karner blue butterfly. Mrs. Maud Kelley, a local resident, and Dr. Wilmer Pautz, representing various citizens in Eau Clair County, presented the only oral statements, and no additional written statements were submitted at the public hearing.

A total of 112 written comments on the proposed listing were received by the Service. Comments supporting the listing were received from the Ohio, Indiana, Wisconsin, and Minnesota Departments of Natural Resources, the New Hampshire Fish and Game Department, and the New York State Department of Environmental Conservation. Comments supporting the listing were also received from six professional or amateur lepidopterists and butterfly researchers, and eight private conservation organizations. A total of 91 comment letters were received from private citizens; 87, including 66 from elementary school students, expressed support for listing the Karner blue butterfly. The remaining four comments from private citizens include the comment letter from Dr. Pautz requesting the public hearing and also requesting that listing be delayed for three years, two commenters that did not take a position on the listing, and one commenter who expressed opposition to proposed listing. A comment letter from the Newaygo County, Michigan Board of Commissioners expressed conditional support for the listing, if it would not interfere with the gypsy moth eradication program.

Many of the commenters provided general information or observations about the Karner blue butterfly, and additional scientific or factual information. Several commenters offered suggestions or recommendations for future protection, research, management, and recovery efforts, or offered to assist the Service in these areas. The Service will consider those suggestions and recommendations, and will continue to work with all interested parties in future efforts to protect and recover this species. Comments updating the data presented in the "Background" or "Summary of Factors Affecting the Species" are incorporated in those sections of this final rule. The Service's responses to the comments and issues raised at the public hearing and in the written comments follow.

Issue 1. The one comment received that opposed the listing of the Karner blue butterfly stated that development might be impacted, forests would be destroyed, and questioned the Karner blue butterfly's contribution to society.

The Service responds that under section 4(b)(1)(A) of the Act, a listing determination must be based solely on the best scientific and commercial data available. The first decision to list a species is based on biological criteria defined in five specific factors as discussed in the "Summary of Factors Affecting the Species" section of this rule. As discussed in that section of this rule, development has been a contributing factor in the destruction, modification, and fragmentation of the habitat of the Karner blue butterfly. The Service believes that additional protection and management of habitat for the Karner blue butterfly is essential for its survival. Management of habitat for the Karner blue butterfly requires maintaining openings in pine barrens, oak savanna, and sandplain habitat, particularly where natural processes have been curtailed, in order to allow the growth of the plant species wild lupine, upon which the Karner blue butterfly depends. Broad-scale conversion of forests to create Karner blue butterfly habitat would not be appropriate or necessary for proper management of this species. There may be many opinions as to a particular species' contribution to society including its aesthetic, scientific, ecological, or other significance, however this contribution of a species to society is not among the five factors upon which a listing determination is based.

Issue 2. Both commenters at the public hearing favored protection of the Karner blue butterfly and its habitat, and in particular, a specific area in the city of Altoona, Wisconsin. Mrs. Kelley commented on the potential of this area to provide habitat for the Karner blue butterfly. Dr. Pautz's statement pointed out the existence of suitable habitat in the Altoona area, and provided additional information on other sites in Wisconsin. Dr. Pautz's original comments requesting the hearing and his statement at the hearing contended there was a need for additional studies to determine the extent of Karner blue populations and habitat in the Altoona area prior to listing, and that Karner blue butterflies were found in more abundance in Wisconsin than indicated in the proposed rule.

Karner blue surveys were conducted in 1992 in the Altoona area in conjunction with review of a proposed highway project. Several sites that appeared to furnish suitable habitat were located during first flight period surveys in early June. However, resurvey of these areas during the second flight by a University of Minnesota graduate student who is conducting research on this species failed to locate any Karner blues at four sites and found only seven butterflies at a fifth site (Lane 1992b).

The text of this rule has been updated to reflect the most recent available data on the Karner blue butterfly's status in Wisconsin. As discussed in response to Issue 4, below, the Service believes that this butterfly warrants endangered status due to the danger of extinction in all or a significant portion of its range. The Service is confident that recent surveys have located most large Karner blue populations in Wisconsin. Furthermore, even relatively large extant populations cannot be considered secure unless threats from succession have been alleviated.

Issue 3. Dr. Pautz's statement expressed concern that the Service had proposed a finding that critical habitat determination for the Karner blue butterfly is presently not determinable. He recommended that the Service develop a description of critical habitat elements, and that studies should be conducted in the Altoona area so that critical habitat could be designated at the time of listing. In addition, 17 written comments were received that expressed concern that critical habitat was not being designated at the time of listing, suggested specific locations for

designation provided information on potential areas and habitat characteristics, or offered assistance in critical habitat designation.

The Service responds that the rationale for not designating critical habitat at the time of listing is detailed in the "Critical Habitat" Sections of the proposed rule and this final rule. The Service concluded that designation of critical habitat is not presently determinable as defined under implementing regulations at 50 CFR 424.12(a)(2). As discussed in the "Critical Habitat" section of this document, the Service is working with interested parties throughout the Karner blue butterfly's range to obtain necessary information to define the primary constituent elements of critical habitat, identify and map areas that should be designated, and ascertain the economic impacts of designation. The Service will consider information provided by commenters during formulation of the critical habitat proposal.

When a finding is made that critical habitat is not determinable at the time of listing, the regulations at 50 CFR 424.17(b)(2) provide that the designation of critical habitat be completed to the maximum extent prudent within two years from the date of publication of the proposed rule to list the species. Any proposal to designate critical habitat will be published in the **Federal Register** including maps and legal descriptions of all areas included in the proposal, and public comments will be solicited. The potential economic impacts of the critical habitat designation will be evaluated during the preparation of the required economic analysis.

Issue 4. The Wisconsin Department of Natural Resources noted that Wisconsin still supports a relatively large number of populations of Karner blue butterflies, that some are "quite sizable" with seemingly good potential for long-term viability with favorable management, and recommended that the Karner blue butterfly be designated threatened, rather than endangered. A professional lepidopterist also expressed the opinion that designation as threatened would be appropriate.

The Service responds that endangered status is warranted in situations where the species is in danger of extinction throughout all or a significant portion of its range. The Service recognizes that a few sizable populations with potential for long-term viability, are still extant; however, immediate protection and habitat management are deemed crucial to short- and long-term viability of Karner blue populations, even at these larger sites. The viability of many smaller sites, some of which may be very important to the recovery of the species, is even less certain. As discussed in the "Summary of Factors Affecting the Species" section, the fragility of remaining populations is exemplified by the recent loss of the population in Ontario due to adverse weather conditions. Major habitat restoration efforts were underway, and managers believed that this population of about 1000 second-brood adults was secure for the short- to medium-term. The collapse of the Albany Pine Bush population in New York, from around 80,000 butterflies in 1979 to 100–200 butterflies only eleven years later also illustrates the extreme vulnerability of this species. Considering the severity of decline the Karner blue butterfly has undergone in the past 10 to 15 years, the magnitude and imminence of the threats, and the vulnerability of existing populations, the Service concludes that the Karner blue butterfly is in danger of extinction without immediate and continuing protection and habitat management, and therefore, classification as endangered is warranted.

Issue 5. One commenter pointed out that evaluation of the Karner blue butterfly's relative status among the states must take into account the method of data collection and how the results were calculated. Some of the data were obtained through transect surveys and others from mark-release-recapture (MRR) methods, and the two methods are not directly comparable.

The Service recognizes that direct comparison of data collected using different methods or under different circumstances is inappropriate. The presentation of status information in this document is not intended to provide a direct comparison of population sizes among the states, rather it is presented on a state-by-state basis as an indicator of the decline that the Karner blue butterfly has undergone throughout its range. Recovery planning for this species will involve continued monitoring of its status, and the Service will be working with those involved in monitoring to develop appropriate and consistent survey methods.

Issue 6. Two commenters stated the need to clarify how prohibitions against "take" would be applied, particularly regarding research and management activities. One commenter suggested that taking of one or two voucher specimens be allowed to assure adequate documentation of new sites. Another commenter expressed concern about mark-release-recapture (MRR) work with Karner blue butterflies and its potential to cause injury or mortality.

The Service responds that "take" as defined in Section 3(18) of the Act means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct, and the prohibitions against "take" are applicable to any person subject to the jurisdiction of the United States. Regulations at 50 CFR 17.3 define "harm" as an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Since some form of the Karner blue butterfly (eggs, larvae, or adults) is present at all times in habitat where it occurs, prohibitions against "take" would apply to activities involving both the butterflies or the occupied habitat. As discussed in the "Available Conservation Measures" section of this document, permits can be issued for activities to enhance the propagation or survival of listed species. The procedures for obtaining such permits for activities involving endangered species are found in the regulations at 50 CFR 17.22. The Service recognizes the need to conduct various research and management activities for this species that will require permits, and will work closely with those involved to authorize appropriate activities. The potential effects of MRR work on Karner blue butterflies will be carefully considered by the Service in the issuance of any such permits, and during the planning of recovery activities for this species.

Issue 7. One commenter recommended that the Karner blue butterfly be listed as an endangered species, and with it, wild lupine, the only known larval food plant for this species.

The Service responds that although wild lupine has declined within the range of the Karner blue butterfly, this plant species has a wider distribution than the Karner blue butterfly, and lupine is more abundant in other parts of its range. Lupine also persists in some areas within the Karner blue range where the butterflies are no longer found. Information available to the Service does not suggest that lupine warrants consideration for Federal listing.

Issue 8. The Newaygo County Board of Commissioners in Michigan expressed conditional support for listing the Karner blue butterfly, provided the listing does not affect spraying in

connection with the gypsy moth eradication program.

The Service responds that as a result of cooperation between the Service, the Michigan Department of Natural Resources, the Michigan Department of Agriculture, and the U.S. Forest Service (Forest Service) regarding the 1992 Forest Service Gypsy Moth Suppression Program in Michigan, a plan was developed to address protection of natural resources of concern, including the Karner blue butterfly. The plan included establishing no-spray areas and buffer zones around occupied habitat. The Service recognizes there are potential conflicts with protection of the Karner blue butterfly in implementing both Federal and non-Federal spraying programs. The Service will continue working with the Forest Service in reviewing future spraying plans, and will be working with non-Federal programs and examining additional alternatives, such as ground spraying in certain areas and timing of application, in order to allow suppression programs to proceed. Federal listing will extend the protection against taking under Section 9 of the Act, and will require Federal agencies to consult with the Service on activities affecting the Karner blue butterfly under Section 7 of the Act. However, the Karner blue butterfly has been listed as a threatened species by the State of Michigan and, therefore, it presently receives some protection from take under State law. The Service anticipates continuing coordination and cooperation among all those involved regarding this issue.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the Karner blue butterfly (*Lycaeides melissa samuelis*) should be classified as an endangered species. Procedures found at Section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. 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 Karner blue butterfly (*Lycaeides melissa samuelis*) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* Throughout its range, changes in the habitat occupied by the Karner blue butterfly resulting from silviculture, urbanization, and the declining frequency of wildfires are largely the reasons for its decline (D. Schweitzer, *in litt.*, 1991). Modification and destruction of habitat and fragmentation of remaining areas are continuing threats to the survival of this butterfly. In addition to direct destruction of suitable habitat, urbanization has led to fire suppression on interspersed habitat; in the absence of fire, vegetational succession has made this habitat unsuitable. The threats due to fire suppression are discussed in more detail under Factor E.

In New York, the decline of the Karner blue butterfly resulting from loss and alteration of habitat is largely due to industrial, commercial, and residential development; fire suppression; vegetational succession; and habitat fragmentation. Although very little of the species' decline in the Albany Pine Bush since 1979 can be attributed to overt habitat loss from development, prior to then over 90 percent of the Pine Bush was destroyed over a period of perhaps 250 years (Schweitzer, *in litt.*, 1992). The Albany Pine Bush, which once covered at least 25,000 acres, has been reduced to about 2,500 acres (Givnish *et al.*, 1988). The recent decline in the Albany Pine Bush population can be attributed largely to improper or absent habitat management. Zaremba (1991) noted that in addition to habitat loss, dissection of metapopulations by development such as buildings and roads is a major threat to the Karner blue butterfly in New York, along with detrimental management of lupine stands and habitat disturbance due to off-road vehicles and horseback riding.

Habitat fragmentation and loss of habitat through development, combined with the extremely small size of the remaining population (discussed under Factor E), are the greatest threats to the Karner blue butterfly's continued existence in New England. The pine barrens in New Hampshire have largely been destroyed as a result of industrial, commercial, and residential development; road and airport construction; and gravel and sand mining. A major retail mall, recently completed on the outer edges of Concord's pine barrens, will encourage additional commercial development and further encroachments into pine barren habitat. Remaining fragments of this natural community are threatened by continued development pressures, vegetational succession in the absence of periodic fires, airport expansion, and degradation due to off-road vehicular use. Sperduto (New Hampshire Natural Heritage Inventory, pers. comm., 1991) estimated that 90 to 95+ percent of the historic pine barrens in the Merrimack system have disappeared.

Wisconsin's native savanna or pine and oak barrens community, which historically was quite prevalent throughout central and northwestern Wisconsin, and which very likely once supported many large metapopulations of this taxon, has declined severely. The Wisconsin Department of Natural Resources also reports that very few large contiguous barrens tracts remain in Wisconsin and cite the following threats to Karner blue habitat: fire suppression and succession, conversion to agriculture and pine or Christmas tree plantations, and other development. The Department states: "These threats remain paramount, and in fact are intensified, today (Besadny, *in litt.*, 1992)." Wisconsin still harbors some relatively large Karner blue populations and there are opportunities for long-term management and protection, but a significant long-term habitat management effort will be required if this potential is to be realized. Many other remnant populations of the Karner blue butterfly in Wisconsin are small and widely scattered, occurring in isolated patches of habitat along roadsides, power line clearings, and on abandoned agricultural fields (Bleser 1990).

In Michigan, the major cause for the butterfly's decline has been the degradation and loss of habitat as a result of succession and development. The habitat has been affected by fire suppression, agriculture, silviculture, and off-road vehicles. Remaining Karner blue butterfly populations continue to be threatened by the decline and loss of wild lupine populations resulting from these factors (Wilsmann 1990).

The two major threats in Indiana identified by C. Hedge (pers. comm., 1991) are destruction of habitat by development, and succession resulting from fire suppression.

Cuthrell (1990) identified fire suppression, development, and other human disturbance as causes for the loss of Karner blue butterfly habitat in Minnesota. The major threat to the extant sites is succession, but potential logging of the oak savannas also poses a threat (R. Baker, Minnesota Department of Natural Resources, pers. comm., 1991).

Irwin and Downey (1979) discussed the Karner blue butterfly as "another species that may have become extinct in Illinois . . . as a possible result of ecological change."

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* There have been large scientific collections of Karner blues in

the past (R. Zaremba, The Nature Conservancy, pers. comm., 1991), although past collecting is not considered to have been a significant factor in the butterfly's decline to its present condition. However, the Karner blue butterfly's rarity and distinctively beautiful coloration may make it a desirable addition to private collections. Because the Karner blue butterfly's numbers are so low throughout its range, additional taking or collecting for any purpose other than part of a carefully planned recovery action may eliminate some populations and hamper recovery efforts.

C. *Disease or predation.* Disease and predation have not been documented as factors in the decline of this species.

D. *The inadequacy of existing regulatory mechanisms.* The Karner blue butterfly is listed as endangered or threatened by several states:

In New York, the Karner blue butterfly is listed as endangered, and the animals and parts thereof, including eggs and larvae, are protected from unauthorized take, import, transport, possession, or sale.

The State of Minnesota lists the Karner blue butterfly as a threatened species. Minnesota law protects state listed animals from take, import, transport, or sale.

In New Hampshire, the Karner blue butterfly is listed as endangered and is protected from unauthorized taking. While New Hampshire law directs other State agencies to avoid funding, carrying out, or authorizing actions that result in the destruction of essential habitat, it has not prevented the loss of habitat through development of private property. Wild lupine is listed by New Hampshire as an endangered plant species. It is protected by the New Hampshire Native Plant Protection Act of 1987, which is implemented by the New Hampshire Natural Heritage Inventory within the Department of Resources and Economic Development. However, this legislation does not prevent alteration of wild lupine habitat on private land with the landowner's permission.

In Wisconsin, the Karner blue butterfly has been recommended for addition to the State list as threatened, and the Department of Natural Resources reports that it hopes to formally propose the listing during 1992 (Besadny *in litt.*, 1992). In addition to protection from take at occupied sites, Wisconsin law provides for protection and management of habitat of State listed species on public lands, where a significant proportion of Wisconsin Karner blue occurrences are found.

In Michigan, the Karner blue butterfly is listed as a threatened species. Michigan law prevents taking of listed animals and protects occupied habitat, and would thereby afford protection for eggs and larvae at known sites.

The State of Indiana currently does not have an official State list for insects.

The Karner blue butterfly has not been listed by the State of Illinois due to the fact that it was believed extirpated in that State. With the recent rediscovery of a population, Illinois is likely to list the Karner blue as endangered, although Federal listing will automatically place the species on the Illinois endangered species list (S. Lauzon, pers. comm., 1992). Under Illinois State law, all life forms of listed species are protected from take, and therefore, known occupied habitat would also receive some protection. Some additional habitat protection is also provided to listed species through a provision requiring a consultation process to assess the impacts or actions authorized, funded, or carried out by State or local governments (S. Lauzon, *in litt.*, 1992).

While most states with extant Karner blue butterfly populations have legislation which protects the animals, provisions for protection and management of the habitat are incomplete to non-existent. Destruction and alteration of habitat are major reasons for the butterfly's decline.

Some populations of Karner blue butterflies occur on Federal, State, or privately owned parks, wildlife refuges, or preserves and are thereby recognized and protected. However, this protection has not prevented the range-wide declines of the Karner blue and its habitat due to the reasons discussed in Section A above, and Section E below.

The pine barrens and oak savannas where the Karner blue butterfly occurs are uplands underlain by extremely well-drained sandy soils and are thus afforded no protection by Federal or State wetland regulations. Upon Federal listing of the Karner blue butterfly, there will be additional protection provided from take or transport of the species, and from habitat alteration carried out, funded, or authorized by Federal agencies. The Endangered Species Act also provides for needed habitat management through the recovery process.

E. *Other natural or manmade factors affecting its continued existence.* The presence of wild lupine is essential to the occurrence and survival of the Karner blue butterfly. Unaltered by humans, a pine barren ecosystem is likely to be a mosaic of interspersed woody vegetation, such as pitch pine (*Pinus rigida*) and scrub oak (*Quercus ilicifolia*) and more open areas characterized by wild lupine, grasses, and other plants such as spreading dogbane (*Apocynum androsaemifolium*) and New Jersey tea (*Ceanothus americanus*) which serve as nectar sources for adult butterflies (The Nature Conservancy 1990).

Historically, the pine barren and oak savanna communities were maintained by naturally occurring, periodic fires that released nutrients and created openings favorable for wild lupine and other low growing plants. Residential and commercial development in and adjacent to these areas has lead to fire suppression. Without fire, vegetational succession to unsuitable habitat occurs on interspersed undeveloped areas. In the absence of fire, many areas once dotted with openings and wild lupine are now dominated by forest, with little or no understory. Fire suppression has affected habitat throughout the range of the Karner blue butterfly.

Since no life stage of the Karner blue butterfly is completely resistant to fire, recently burned lupine sites must be colonized by Karner blue butterflies from nearby unburned sites (Schweitzer 1989, Givnish *et al.* 1988). Maintenance of the Karner blue butterfly depends on its ability to disperse to newly expanded wild lupine sites (Zaremba 1991, Givnish *et al.* 1988, Schweitzer 1989). Fragmentation of remaining habitat prevents dispersal and results in small isolated populations.

With small, isolated, and declining populations, the subspecies is highly vulnerable to extinction. Extreme isolation, whether by geographic distance, ecological factors, or reproductive strategy, will prevent the influx of new genetic material and can result in a highly inbred population with low viability and/or fecundity (Chesser 1983). Natural fluctuations in rainfall, host plant vigor, or predation may weaken a population to such an extent that recovery to a viable level would be impossible. Isolation prevents recolonization by butterflies from other metapopulations, resulting in extinction.

Small remnant populations are highly vulnerable to a variety of factors. Weather events can eliminate such populations, as exemplified by the failure of the Ontario, Canada remnant to survive the impacts of drought in 1988, followed by unusually cold weather in May and June of 1989 (D. Schweitzer, *in litt.*, 1991). This population was estimated by Schweitzer to be around 1000 adults in July 1984, which is better than all but a few of the populations remaining today. Its demise occurred within five or six years, despite habitat acquisition and protection. Weather events can affect the species and its habitat throughout its range, pointing out the fragility of the many small, and even the larger, remaining remnant populations. Improper management of existing wild lupine habitat, including untimely mowing, the improper use of herbicides along highways and power line rights-of-way, and poorly timed and/or configured burns, also threaten remnant populations (D. Schweitzer, *in litt.*, 1991, Bleser 1990, Zaremba 1991).

Browsing of wild lupine by deer, rabbits, and/or woodchucks also poses a threat (D. Sperduto, pers. comm., 1991; D. Schweitzer and D. Savignano, 1992, in Givnish *et al.* 1988). A relationship between the scarcity of adult nectar sources and Karner blue butterfly abundance has also been observed (Bleser 1990; D. Sperduto, pers. comm., 1991). Flowering of nectar plants like New Jersey tea (*Ceanothus americanus*) can get out of synchrony with the adult butterflies; therefore, lack of diverse nectar plants may contribute to Karner blue population declines, especially in the western part of its range (D. Schweitzer, *in litt.*, 1992).

The Service has carefully assessed the best scientific information available regarding the past, present, and future threats faced by this subspecies in determining to finalize this rule. Based on this evaluation, the preferred action is to list the Karner blue butterfly as endangered. It has been extirpated from three states in the U.S., is virtually extirpated from Canada, and has undergone significant decline in all six states with remaining populations. Due to the magnitude of the range-wide decline of the Karner blue butterfly, particularly within the past decade, and the continuing threats from destruction, succession, and fragmentation of its habitat, this butterfly is in need of Federal protection if it is to survive. These factors support listing the Karner blue butterfly as an endangered species.

Critical Habitat

Section 4(a)(3) of the Act is amended, requires that, to the maximum extent prudent and determinable, the Secretary propose critical habitat at the time the species is proposed for listing as endangered or threatened. Section 3 of the Act defines critical habitat as, "(i) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection, and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon determination that such areas are essential for the conservation of the species." Designation of critical habitat is prudent unless: (1) the species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species (50 CFR 424.12(a)(1)). Designation of critical habitat is determinable unless: (1) Information sufficient to perform the required analyses of the impacts of the designation is lacking, or (2) the biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat (50 CFR 424.12(a)(2)).

The Service finds that designation of critical habitat for the Karner blue butterfly is not presently determinable. Most existing populations of this butterfly are located on highly fragmented habitat of declining suitability. The size, spatial configuration, and juxtaposition of habitat areas required to provide for the long-term survival of existing populations have not been identified. Range-wide conservation of the Karner blue butterfly may also require protection and/or restoration of habitat in areas where the species is now extirpated. In addition, information needed to analyze the impacts of critical habitat designation is unavailable at this time.

Since publication of the proposed rule, the Service has initiated efforts to obtain the information needed to determine critical habitat for the Karner blue butterfly. A population and habitat viability analysis (PHVA) workshop was conducted by the IUCN/SSC Captive Breeding Specialist Group and a symposium on the Karner blue butterfly was held during April 1992. Researchers, species experts, agency representatives, and interested individuals from across the Karner blue butterfly's range participated in the workshop and symposium. Information from the symposium and the forthcoming report on the results of the PHVA will be used in determining critical habitat for the Karner blue butterfly.

When the Service finds that critical habitat is not determinable at the time of listing, regulations (50 CFR 424.17(b)(2)) provide that the designation of critical habitat be completed within two years of the date of the proposed rule to list the species. A proposed rule for critical habitat designation must be published in the **Federal Register**, and the notification process and public comment provisions parallel those for a species listing. In addition, the Service will evaluate the economic and other relevant impacts of the critical habitat designation, as required under Section 4(b)(2) of the Act.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all species. The protection 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 that is proposed or listed as endangered or threatened and with respect to 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)(2) requires Federal agencies to ensure 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 involvement under section 7 is expected for management and other land use activities on Federal lands with Karner blue butterfly populations. The Fish and Wildlife Service and the National Park Service are currently conferring about the effects of proposed prescribed burning of Karner blue habitat at Indiana Dunes National Lakeshore. Other Federally-administered locations include U.S. Forest Service lands in Michigan, lands in New Hampshire for which the U.S. Fish and Wildlife Service holds conservation easements, and U.S. Fish and Wildlife Service National Wildlife Refuge lands and Department of Defense lands in Wisconsin. Activities which are funded, regulated, or carried out by the Federal Aviation Administration involving the airport lands in New York and New Hampshire where Karner blue butterflies occur will require section 7 consultation. Some development projects involving Karner blue butterfly sites could require authorization from the U.S. Army Corps of Engineers (Corps) for certain project related activities in regulated waters or wetlands of the United States. The Corps is reviewing a permit application for a proposed marina that may adversely affect the newly rediscovered Illinois population.

Listing the Karner blue butterfly will encourage additional research and provide for the development of needed habitat protection and management strategies through the recovery process. Additional information is needed on specific habitat characteristics such as plant community species and structure, soil dryness, shading, and other factors that may affect the suitability of the habitat for Karner blue butterflies. Likely recovery activities would also include continued monitoring, evaluation of habitat management techniques, development of site-specific protection and management plans, and investigations into re-establishing populations.

The Act and implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take, import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. 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 wildlife species under certain circumstances. Regulations governing 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.

National Environmental Policy Act

The Fish and Wildlife 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).

References Cited

Bleser, C. A. 1990. The Wisconsin 1990 status survey for the Karner blue butterfly (*Lycaeides melissa samuelis*). Final report submitted to the U.S. Fish and Wildlife Service by the Natural Heritage Inventory Program, Bureau of Endangered Resources, Wisconsin Dept. of Natural Resources, 27 pp.

Chesser, R. K. 1983. Isolation by distance: relationship to the management of genetic resources. pp. 66–77 *in* Schonewald-Cox, S. M. Chambers, B. MacBryde and L. Thomas (ed.), Genetics in Conservation: A Reference for Managing Wild Animal and Plant Populations. The Benjamin/Cummings Pub. Co., Inc.

Cuthrell, D. L. 1990. Status of the Karner blue butterfly, *Lycaeides melissa samuelis* Nabokov, in Minnesota 1990. Report submitted to the Minnesota Nongame Wildlife Program, 44 pp.

Dirig, R. 1979. Occasional Publication Number 2. Pine Bush Historic Preservation Project, Inc., Albany, NY, 1 p.

Givnish, T. J., E. S. Menges, and D. F. Schweitzer. 1988. Minimum area requirements for long-term conservation of the Albany Pine Bush and Karner blue butterfly: an assessment. (Vol. IV, Appendix T) Report to the City of Albany from Malcolm Pirnie, Inc., Albany, NY, 95 pp. + figures.

Irwin, R. R., and J. C. Downey. 1973. Annotated checklist of the butterflies of Illinois. Illinois Natural History Survey, Biological Notes No. 81, Urbana, IL, 60 pp.

Lane, C. P. 1992a. The status of the Karner blue butterfly (*Lycaeides melissa samuelis*: Lycaenidae) and its associated plant resources in Minnesota, 1991. Final report to the U.S. Fish and Wildlife Service, Minnesota Department of Natural Resources, and The Nature Conservancy, 36 pp.

Lane, C. P. 1992b. Results of Karner blue survey for U.S. Highway 53 IH94 to USH 53/STH 121 Interchange, Eau Claire to Chippewa Counties. Wisconsin Department of Transportation Project 1199–04–00. August 1, 1992.

Schweitzer, D. F. 1989. Fact sheet for the Karner blue butterfly with special reference to New York. The Nature Conservancy, internal document, 7 pp.

Schweitzer, D.F. 1990. The status of selected Karner blue remnants in Saratoga and Albany Counties, New York with a discussion of monitoring methods. Report prepared for the New York State Department of Environmental Conservation, Endangered Species Unit, 23 pp.

Shull, E.M. 1987. The Butterflies of Indiana. Indiana Press, Bloomington & Indianapolis, pp. 163–164.

The Nature Conservancy. 1990. Final status survey report: habitat assessment of Karner blue butterfly (*Lycaeides melissa samuelis*). Report submitted to the U.S. Fish and Wildlife Service by the New Hampshire Natural Heritage Inventory, 13 pp.

Wilsmann, L. 1990. Karner blue (draft species abstract). Michigan Department of Natural Resources Wildlife Division, 7 pp. in prep.

Zaremba, R.E. 1991. Chapter 23: The management of Karner blue butterfly habitat in a suburban landscape. *In* Challenges in the Conservation of Biological Resources. (D.J. Decker, M.E. Krasny, G.R. Goff, C.R. Smith, D.W. Gross; eds.) Westview Press, Boulder, CO.

Author

The primary author of this final rule is Mark W. Clough (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

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

Regulation 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; Pub. L. 99–625, 100 Stat. 3500, unless otherwise noted.

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

§ 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						

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
* * *	* * *	*		*		*	
INSECTS							
* * *	* * *	*		*		*	
Butterfly, Karner blue	*Lycaeides melissa samuelis* U.S.A. (IL, IN, MA, MI, MN, NH, NY, OH, PA, WI, Canada (Ont.).	NA	E	484	NA	NA.	
* * *	* * *	*		*		*	

Dated: November 27, 1992.

Bruce Blanchard,

Acting Director, Fish and Wildlife Service.

[FR Doc. 92-30173 Filed 12-11-92; 8:45 am]

BILLING CODE 4310-55-M

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