

Lotis Blue Butterfly
(*Lycaeides argyrognomon lotis*)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Arcata Fish and Wildlife Office
Arcata, California

December 2011

5-YEAR REVIEW

Lotis Blue Butterfly (*Lycaeides argyrognomon lotis*)

I. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. Our original listing of a species as endangered or threatened is based on the existence of threats attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview:

As summarized from the Recovery Plan for this species (Service 1985), the lotis blue butterfly (*Lycaeides argyrognomon lotis*) is a small butterfly, with a wingspan averaging of about 1 inch (2.5 cm). The lotis blue is a rare and localized subspecies of a more widely-distributed species, the northern blue butterfly (*Lycaeides argyrognomon lotis*). The lotis blue butterfly historically was recorded from several coastal locations in Mendocino and northern Sonoma counties, California. From the mid-1970's to 1983, the lotis blue butterfly was known from only one location near the town of Mendocino, California, and the species has not been recorded at that site or elsewhere since 1983, despite multiple surveys of historic and potential habitat.

Because of its rarity, very little is known about the biology and ecology of the lotis blue butterfly. Based on the life history of other subspecies of the northern blue butterfly, the lotis blue probably has a single generation per year, with an adult flight period from about mid-April to early July. Larvae probably feed on native plants in the pea family (Fabaceae), with coast trefoil (*Lotus formosissimus*) the most likely candidate (Service 1985; Arnold 1993). The lotis blue butterfly likely inhabits wet meadows and possibly sphagnum bogs. The last known location of the lotis blue butterfly was a sphagnum bog surrounded by pygmy forest. However, this site has changed over the last half-century due to vegetation succession from open fields to forest, and as a result of vegetation clearing along the powerline corridor where the last known site was located. At this site, and elsewhere in the historic range, succession in the past century has likely reduced the amount and quality of habitat available to the lotis blue butterfly (Arnold 1993).

Methodology Used to Complete This Review:

This review was prepared by the Arcata Fish and Wildlife Office (AFWO), following the Region 8 guidance issued in March 2008. We used information from the Recovery Plan, survey information from experts who have been monitoring various localities of this species, and the California Natural Diversity Database (CNDDDB) maintained by the California Department of Fish and Game. The Recovery Plan and personal communications with experts were our primary sources of information used to update the species' status and threats. We received no information from the public in response to our Federal Notice initiating this 5-year review. This 5-year review contains updated information on the species' biology and threats, and an assessment of that information compared to that known at the time of listing or since the last 5-year review. We focus on current threats to the species that are attributable to the Act's five listing factors. The review synthesizes all this information to evaluate the listing status of the species and provide an indication of its progress towards recovery. Finally, based on this synthesis and the threats identified in the five-factor analysis, we recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

Contact Information:

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Federal Register (FR) Notice Citation Announcing Initiation of this Review: A notice announcing initiation of the 5-year review of this taxon and the opening of a 60-day period to receive information from the public was published in the Federal Register on May 25, 2011 (76 FR 30377). No information was received from the public in response to this notice.

Listing History:

Original Listing

FR Notice: 41 FR 22041

Date of Final Listing Rule: June 1, 1976

Entity Listed: Subspecies – Lotis Blue Butterfly (*Lycaeides argyrognomon lotis*)

Classification: Endangered

Associated Rulemakings: No associated rulemakings have been completed for this species.

Review History:

Five-year review: completed January 2008. The review recommended no change from the current classification.

Species' Recovery Priority Number at Start of 5-Year Review: The recovery priority number for lotis blue butterfly is 6C according to the Service's 2011 Recovery Data Call for the Arcata Fish and Wildlife Office, based on a 1-18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 FR 43098, September 21, 1983). This number indicates that the taxon is a subspecies that faces a high degree of threat and has a low potential for recovery. The "C" indicates conflict with construction or other development projects or other forms of economic activity.

Recovery Plan or Outline

Name of Plan or Outline: Recovery Plan for Lotis Blue Butterfly (*Lycaeides argyrognomon lotis*),

Date Issued: December 26, 1985

II. REVIEW ANALYSIS**Application of the 1996 Distinct Population Segment (DPS) policy**

The Endangered Species Act defines "species" as including any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate wildlife. This definition of species under the Act limits listing as distinct population segments to species of vertebrate fish or wildlife. Because the species under review is an invertebrate, the DPS policy is not applicable, and the application of the DPS policy to the species' listing is not addressed further in this review.

Information on the Species and its StatusSpecies Biology and Life History

Very little was known about the biology and life history of the lotis blue butterfly at the time of listing, and that remains true. The putative life history of the lotis blue butterfly, like so much about this butterfly, is based on the known life history of closely related subspecies of the northern blue butterfly. The lotis blue probably has a single generation per year, with a relatively long adult flight period, extending from mid-April to early July (Downey 1975). Eggs are likely laid during the adult flight season. Newly hatched larvae begin to feed immediately, then overwinter in dormancy (diapause) as small larvae, then resume feeding the next spring. The larvae (caterpillars) probably feed for about 4-6 weeks in the spring before pupating (Downey 1975). Lotis blue larvae have apparently not been observed; therefore we do not know what plants the larvae require for food. Based on closely related species, native plants in the pea family (Fabaceae) are likely candidates. The coast trefoil (also known as seaside bird's-foot

trefoil) (*Lotus formosissimus*) is thought to be a larval food plant (Service 1985; Pratt 2003, 2004). The coast trefoil is a small perennial plant that generally occurs in damp areas in meadows, roadside ditches, and forest edges and clearings. This plant grew at the last known lotis blue site, and a female lotis blue butterfly was observed showing egg-laying behavior on coast trefoil (Service 1985), although no eggs were observed. Other possible food plants include herbaceous species of lupine (Pratt 2004).

Spatial Distribution

Historically, the lotis blue butterfly was found at several coastal locations in California, primarily in Mendocino County between Point Arena and Fort Bragg. The species was also reported from northern Sonoma and possibly northern Marin County (Tilden 1965; Service 1985), but these records are not substantiated by specimens (Arnold 1993). Unfortunately, location information for most of the historical lotis blue butterfly sites is vague, and is based on specimens collected prior to the 1950s. The one exception is a population discovered in 1935, north of the town of Mendocino. Over the years, this site was visited by many lepidopterists and was the only certain location for the species from the 1950s until the last confirmed observation in 1983 (Pratt 2004; Arnold 1991). The subspecies has not been observed since 1983 (Arnold 1991, 2006; Pratt 2004), although the last known site was surveyed for adult lotis blue butterflies during at least seven years between 1990 and 2008 (Pratt 2004; Arnold 2008). A population formerly occurred near Point Arena, but at the time of listing had not been found there for more than 30 years (Service 1976).

Abundance

Only very limited information is available on population abundance or trends. The butterfly has not been observed since 1983, and no systematic population counts were conducted prior to that date. At the last known location, at least 26 adults were collected from this site in 2 days in 1953 (Arnold 1993), while only 16 adult butterflies were observed at this same location during 42 days of field work between 1977 and 1981 (Service 1985), and none after 1983, when 4 adults were observed during 14 days of observation (Arnold 1991).

Habitat or Ecosystem

The lotis blue butterfly likely inhabits wet meadows and sphagnum willow bogs. Without knowing the larval food plant with certainty, or more about the species' ecology in general, the specific habitat requirements for the species will remain something of a mystery (Arnold 1991, 1993; Pratt 2004). Other subspecies of the northern blue butterfly typically occur in wet meadows, bogs, seeps or springs, or in streamside areas (Arnold 1993). As noted above, the suspected food plant for larvae is the coast trefoil, which is relatively common along the Mendocino coast in damp coastal prairie. Although the last known location of the lotis blue butterfly was a sphagnum bog within pygmy forest, the coast trefoil is not normally found in bogs within the historical range of the lotis blue butterfly (Pratt 2004). The importance of bogs to lotis blue butterflies is unclear. The last known site for the species was located in a sphagnum bog surrounded by pygmy forest dominated by Bishop pine (*Pinus muricata*) with an understory of species in the heath family. This suggests that such bogs may be lotis blue habitat; although other habitat types may exist that are not bogs. A recent extensive survey for lotis blue butterflies found that pygmy forest bogs did not provide many potential larval food plants, and suggested that bogs may not be typical habitat for the lotis blue (Pratt 2004). Also, a powerline

corridor ran through the last known lotis blue site, thus it may not have been a typical, natural bog. Also, recent conditions at this site may not be indicative of optimal habitat, as historic aerial photos of the site show that the site and surrounding area were much more open in 1942 and 1963, with less and sparser forest and other woody vegetation, and more open, meadow-like ground (Arnold 1991, 1993; G. Falxa, Service, pers. obs. 2002). Thus, habitat was different in the past, such as in 1953, when, as noted above, the species was more abundant at the site. One factor that likely contributed to succession at this site was that the utility company ceased vegetation maintenance of the powerline corridor at the site in 1976 due to concerns that maintenance activities might further endanger the species (de Becker *et al.* 1991). Maintenance was resumed in 1992 under an agreement between the Service and the utility that permitted maintenance while minimizing potential impacts to the lotis blue butterfly.

Changes in Taxonomic Classification or Nomenclature

The species *Lycaeides argyrognomon* (Lintner 1876), which includes the lotis blue butterfly and 12 other subspecies or forms, is also referred to *Lycaeides idas*, or *Plebejus argyrognomon*, and as the northern blue butterfly (dos Passos 1964; Downey 1975). The northern blue butterfly occurs across northern North America. The lotis blue subspecies occurs at the southwestern edge of the northern blue butterfly's range.

Genetics

No genetics data are available for the lotis blue butterfly.

Species-specific Research and/or Grant-supported Activities

The Service's AFWO funded a large-scale survey for the lotis blue butterfly, which covered historic and potential habitat areas in 2003 and 2004. No lotis blue were observed during this survey (Pratt 2003, 2004).

Five-Factor Analysis

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act.

FACTOR A: Present or Threatened Destruction, Modification or Curtailment of Habitat or Range

When the lotis blue butterfly was listed in 1976 (41 FR 22041), the only threat identified was loss of habitat through destruction or modification. Habitat modification remains a threat, although the habitat requirements are not well known given our limited knowledge of the lotis blue. The butterfly may have been naturally rare, and may have further declined due to natural factors such as a drying climate trend, or vegetation community changes over long time periods (Pratt 2004). Changes in land use and management in historical times have contributed to vegetation changes within the historical range of the subspecies, and may have affected the lotis blue. Suppression of fires and other changes that reduced natural disturbance regimes are suspected to have led to the transition of more open habitats, such as meadows, forest openings, and coastal prairie, to areas dominated by forest and other taller, denser vegetation, which are

less suitable for the species (de Becker *et al.* 1991; Arnold 1993; Pratt 2004). Development for housing and associated road-building has increased in recent decades, leading to loss and degradation of native habitats, and fragmentation of remaining habitat areas. Because the butterfly may be associated with bogs and other wetland habitats, actions which affect groundwater may also affect the habitat for the subspecies. No new information on this factor has become available since the previous five-year review.

FACTOR B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Butterfly collection continues to be a concern, as it was when the species was listed. There are accounts of collection (Arnold 1991, 1993; de Becker *et al.* 1991). We believe that the lotis blue is particularly vulnerable to the collection trade because of its endangered status, limited distribution, and presumed small population size, although overutilization for commercial, recreational, scientific, or education purposes was identified as a threat at the time of listing or during development of the Recovery Plan (41 FR 22041, U.S. Fish and Wildlife Service 1985). The lotis blue has not been observed since 1983 (Arnold 1991; Pratt 2004). Consequently, any specimens taken from the field that do not directly contribute towards conservation (*e.g.*, propagation) would only likely contribute towards the decline of the subspecies.

FACTOR C: Disease or Predation

We do not know what effect, if any, disease and predation may have on the lotis blue butterfly's range-wide population, or on isolated metapopulations. Birds and other predators likely consume individual butterflies on an opportunistic basis; however, because lotis blue butterfly populations appear to be low, it is difficult to determine if predation is limiting the range-wide population or site-specific metapopulations. Disease or predation was not identified as a threat in the listing or Recovery Plan (41 FR 22041, U.S. Fish and Wildlife Service 1985).

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

There has been no change in the imminence of this threat factor since listing. The inadequacy of existing regulatory mechanisms was not identified as a threat during listing, during development of the Recovery Plan (41 FR 22041, U.S. Fish and Wildlife Service 1985), or during the Service's 2008 five-year review.

State Protections

California Environmental Quality Act (CEQA): The CEQA requires review of any project that is undertaken, funded, or permitted by the State or a local governmental agency. If significant effects are identified, the lead agency has the option of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

California Coastal Act: The California Coastal Commission considers the presence of listed species in determining environmentally sensitive habitat lands subject to section 30240 of the California Coastal Act of 1976, which requires their protection. Certain local jurisdictions have developed their own Local Coastal Programs or Land Use Plans that have been approved by the Coastal Commission. Some of the major accomplishments of this act include reduction in overall development, the acquisition of prime habitat along the coast, restoration of coastal streams and rivers, and a reduction in the rate of wetland loss. However, the act does not address the injury or death of butterflies, and only reduces loss or degradation of habitat.

Federal Protections

National Environmental Policy Act (NEPA): NEPA (42 U.S.C. 4371 *et seq.*) provides some protection for listed species that may be affected by activities undertaken, authorized, or funded by Federal agencies. Prior to implementation of such projects with a Federal nexus, NEPA requires the agency to analyze the project for potential impacts to the human environment, including natural resources. In cases where that analysis reveals significant environmental effects, the Federal agency must propose mitigation alternatives that would offset those effects (40 C.F.R. 1502.16). These mitigations usually provide some protection for listed species. However, NEPA does not require that adverse impacts be fully mitigated, only that impacts be assessed and the analysis disclosed to the public.

In summary, the Endangered Species Act is the primary Federal law that provides protection for this species since its listing as endangered in 1976. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the Act. Therefore, we continue to believe other laws and regulations have limited ability to protect the species in absence of the Endangered Species Act.

FACTOR E: Other Natural or Manmade Factors Affecting Its Continued Existence

There are no other known factors that affect the continued existence of the butterfly. Although this factor was not identified as a threat in the listing or during development of the Recovery Plan (41 FR 22041, U.S. Fish and Wildlife Service 1985), the potential for climate change to affect the lotis blue's distribution exists. However, very little information regarding the butterfly's historical range and current habitat exists, making an analysis difficult.

Impacts to the species under predicted future climate change are unclear. The most recent literature on climate change includes predictions of hydrological changes, higher temperatures, and expansion of drought areas, resulting in a northward and/or upward elevation shift in range for many species (IPCC 2007). For the coastal zone that the species inhabits, some studies have predicted increases in coastal upwelling and associated coastal fog frequency in the region (Bakun 1990; Snyder *et al.* 2003). However, a more recent evaluation of historic climate data from coastal northern California found that summer conditions have become warmer and drier, with less fog, since the early 20th century, suggesting increased drought stress for vegetation (Johnstone and Dawson 2010). While it appears reasonable to assume that the lotis blue

butterfly may be affected by such changes, we lack sufficient certainty on knowing the extent to which climate change will affect particular species at this time.

III. RECOVERY CRITERIA

A recovery plan for the lotis blue butterfly was finalized and approved December 26, 1985. Recovery plans provide guidance to the Service, States, and other partners and interested parties on ways to minimize threats to listed species, and on criteria that may be used to determine when recovery goals are achieved. There are many paths to accomplishing the recovery of a species and recovery may be achieved without fully meeting all recovery plan criteria. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished. In that instance, we may determine that, overall, the threats have been minimized sufficiently, and the species is robust enough, to downlist or delist the species. In other cases, new recovery approaches and/or opportunities unknown at the time the recovery plan was finalized may be more appropriate ways to achieve recovery. Likewise, new information may change the extent that criteria need to be met for recognizing recovery of the species. Overall, recovery is a dynamic process requiring adaptive management, and assessing a species' degree of recovery is likewise an adaptive process that may, or may not, fully follow the guidance provided in a recovery plan. We focus our evaluation of species status in this 5-year review on progress that has been made toward recovery since the species was listed (or since the most recent 5-year review) by eliminating or reducing the threats discussed in the five-factor analysis. In that context, progress towards fulfilling recovery criteria serves to indicate the extent to which threat factors have been reduced or eliminated.

The Recovery Plan does not contain downlisting and delisting criteria. The recovery strategy was designed to address habitat loss and modification. The plan also recommends improving landowner and public awareness, thereby potentially reducing overutilization related to commercial, recreational, scientific, and educational purposes.

Landowners, and public utility companies, have been made aware of the lotis blue's last known site and endangered status. The lotis blue has not been observed since 1983 (Pratt 2004, Arnold. 1991). The Pacific Gas and Electric Company monitored the last known site relative to their adjacent powerline maintenance (Arnold 1991). The AFWO contracted multiple-year surveys within the suspected range of the subspecies (Pratt. 2004). However, neither Arnold nor Pratt observed lotis blue butterflies or larvae (Arnold 1991; Pratt 2004). Landowners adjacent to the last known site have been contacted regarding projects on their land that could potentially affect lotis blue habitat, and for the purpose of surveying their property for butterflies and for potential habitat. The Mendocino County planning department has also been contacted by the AFWO and made aware of the lotis blue's last known location, and their review and permitting of projects within potential lotis blue habitat. As a result of these contacts, the Mendocino County planning department routinely refers projects from the coastal area to the AFWO for input and review, for potential effects to the lotis blue butterfly and other listed species.

The recovery strategy in the Recovery Plan is as follows:

- a. Preserve and protect the known lotis blue butterfly populations and any newly discovered and/or reestablished sites.
- b. Establish three new, self-sustaining, viable populations each on at least 2 hectares of suitable, secure habitat.
- c. Conduct ecological studies to develop additional management recommendations and to determine criteria for reclassification and delisting.
- d. Develop public awareness of the lotis blue butterfly.
- e. Utilize existing laws and regulations protecting the lotis blue butterfly.

This strategy remains sound, although implementation is hampered by the lack of any known extant populations. The first item in the strategy is being implemented on an ongoing basis by the Service working with land managers and owners of the last known lotis blue butterfly site. This includes working with the manager (Pacific Gas and Electric Company [PG&E]) of the powerline right-of-way which contains the last known site, to manage right-of-way vegetation in a way that minimizes potential impacts to lotis blue butterfly habitat and maintain suitable, more-open habitat conditions. The Service has also worked with the Mendocino County Planning Department and owners of the parcel where the lotis blue butterfly was last detected, to avoid development impacts to potential habitat in and adjacent to the site.

The second and third items in the strategy are not implementable in the absence of a known population. Some progress has been made on the fourth item in the recovery strategy, particularly through outreach to public land managers and the Mendocino County Planning Department. For the last item, most development activities near the last known site and potential habitat in the historic range comes under the purview of local or State planning processes, as most potential habitat is either on private or State Park land, as little Federal land exists in this area. Potential habitat does occur on the Stornetta Public Lands near Point Arena, which came into Federal ownership in 2004 and is now managed by the Bureau of Land Management. As already noted, the Service has worked with the Mendocino County Planning Department, as well as with California State Parks.

IV. SYNTHESIS

As stated in the recovery plan, the lotis blue butterfly appears to be a naturally rare insect with low population densities, and the reasons for its decline are largely speculative (Service 1985). However, changes in vegetation, perhaps exacerbated by drought or vulnerability due to small population sizes, are the prime suspects in the decline (Service 1985). The probable larval food plant is more abundant in open and disturbed areas (Service 1985). Land management practices and fire suppression have likely resulted in reduced disturbance in some areas, allowing succession from more open habitats to dense shrub and trees; this change has clearly occurred at the last known historic site. At the last known site for the lotis blue butterfly, this succession has certainly occurred. We also know that habitat management at the last known site has changed under PG&E's management since listing, partly at the request and guidance of the Service (Arnold 1991; de Becker, *et al.* 1991). Subsequent surveys have not detected the lotis blue's

presence at the PG&E site since 1983 (Arnold 1991, 2006, 2008; Pratt 2004; R. Arnold, Entomological Consulting Services, pers. comm. 2011). Pratt (2004) conducted extensive surveys for lotis blue under contract from the AFWO; however, no butterflies, eggs, or larvae were detected. During at least 6 years between 1990 and 2008, Arnold surveyed the lotis blue's last known remaining site under contract with PG&E, and in 2006 looked for lotis blue where appropriate habitat overlapped with the Behrens' silverspot butterfly (Arnold 2006). No lotis blue butterflies, eggs, or larvae were detected.

While these surveys covered a large area of potential habitat over many sites, most survey effort has been limited to State-owned lands where permission to access the sites was more easily obtained. Large areas within the species' historic range are in private ownership, including moist coastal prairie and other potential habitats for the species. The status of the species on private lands is unknown, as most sites on private property where suitable habitat might be found have not been surveyed (Pratt 2004; Arnold 2006). Since the existence of this subspecies is in question, it will be critical to determine the species' status on private lands within the historic range, prior to making a recommendation to delist the species due to extinction. A clear need, therefore, is to access all, or at least a large representative sample, of suitable and potentially suitable habitats on private lands to adequately assess the status of the lotis blue butterfly. Determining the species' status is also hampered by the lack of certainty about its preferred habitat, but the best available information indicates that habitats containing the coast trefoil should be a primary focus of surveys.

In summary, based on the available information, we conclude that the lotis blue butterfly continues to meet the Act's definition of endangered, and we recommend no status change at this time.

V. RESULTS

Recommended Listing Action:

- Downlist to Threatened
- Uplist to Endangered
- Delist (indicate reason for delisting according to 50 CFR 424.11):
 - Extinction*
 - Recovery*
 - Original data for classification in error*
- No Change

New Recovery Priority Number and Brief Rationale: 6C (no change)

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

Recovery criteria for the lotis blue butterfly (*Lycaeides argyrognomon lotis*) contain generalized goals with respect to habitat conservation and needed research. The highest priority action that

can be taken in the next 5 years is to conduct additional surveys to assess the status on private lands, and if appropriate to initiate conservation planning and implement recovery actions. Additional survey effort is also warranted for the Stornetta Public Lands near Point Arena where a brief survey noted extensive areas of the coast trefoil (Pratt 2004).

Should one or more populations be located, the following recovery actions should be initiated:

- 1) Take actions to preserve and protect the newly discovered sites;
- 2) Conduct ecological studies to better understand the species habitat requirements, including larval and nectar host plants, and to develop additional management recommendations;
- 3) Conduct monitoring to determine the size of the population and/or metapopulations, and to identify site-specific threats;
- 4) Planning should stress management actions that increase or sustain butterfly populations, and remove threats that may limit population expansion or recovery;
- 5) Evaluate whether a captive propagation or augmentation program would be appropriate.

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**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW**

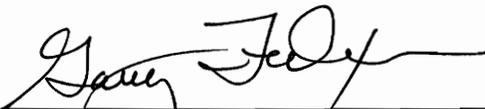
Lotis Blue Butterfly (*Lycaeides argyrognomon lotis*)

Current Classification: Endangered

Recommendation Resulting from the 5-Year Review:

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

Review Conducted By:

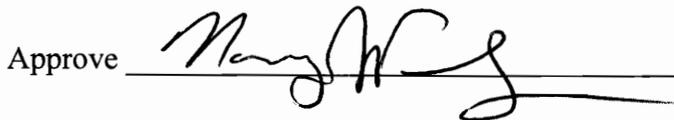


Gary Falxa, Fish and Wildlife Biologist

FIELD OFFICE APPROVAL:

Lead Field Supervisor, U.S. Fish and Wildlife Service

Approve



Date

12-16-11