

Uncompahgre Fritillary Butterfly *(Boloria acrocnema)*

5-Year Review: Summary and Evaluation



Photo Credit: Creed Clayton, U.S. Fish and Wildlife Service, 2007

**U.S. Fish and Wildlife Service
Western Colorado Field Office
Grand Junction, CO**

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5-YEAR REVIEW
Uncompahgre Fritillary Butterfly (*Boloria acrocnema*)

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office: Mountain-Prairie Regional Office
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1.2 Methodology Used to Complete the Review

The 5-year review was conducted by Terry Ireland, the lead U.S. Fish and Wildlife Service (Service) biologist for the Uncompahgre fritillary butterfly (UFB). On April 18, 2007, we published an announcement initiating the 5-year review process and seeking new information on the UFB (72 FR 19549). Two documents were received and considered. One document was from the Center for Native Ecosystems, Xerces Society, Colorado Wild, and High Country Citizens' Alliance. The second document was from the Colorado Natural Areas Program. We also relied upon a population trend report (Alexander and Keck 2007) and information from the 2007 and 2008 field seasons (Alexander and Keck 2009; Alexander 2009) for this review.

1.3 Background

1.3.1 FR Notice Citation Announcing Initiation of This Review
72 FR 19549, April 18, 2007.

1.3.2 Listing History

Original Listing

FR notice: 56 FR 28712, June 24, 1991

Entity listed: Species

Classification: Endangered rangewide

1.3.3 Review History

The species' status was considered in the 1994 Recovery Plan (Service 1994).

1.34 Species' Recovery Priority Number at Start of 5-year Review

| Degree of Threat | Recovery Potential | Taxonomy | Priority | Conflict |
|---|--------------------|-----------------|----------|------------|
| High | High | Monotypic Genus | 1 | 1C |
| | | Species | 2 | 2C |
| | | Subspecies/DPS | 3 | 3C |
| | Low | Monotypic Genus | 4 | 4C |
| | | Species | 5 | 5C |
| | | Subspecies/DPS | 6 | 6C |
| Moderate | High | Monotypic Genus | 7 | 7C |
| | | Species | 8 | 8C* |
| | | Subspecies/DPS | 9 | 9C |
| | Low | Monotypic Genus | 10 | 10C |
| | | Species | 11 | 11C |
| | | Subspecies/DPS | 12 | 12C |
| Low | High | Monotypic Genus | 13 | 13C |
| | | Species | 14 | 14C |
| | | Subspecies/DPS | 15 | 15C |
| | Low | Monotypic Genus | 16 | 16C |
| | | Species | 17 | 17C |
| | | Subspecies/DPS | 18 | 18C |
| The above ranking system for determining Recovery Priority Numbers was established in a September 21, 1983 Federal Register notice (48 FR 43098). | | | | |

At the start of the 5-year review, the Recovery Priority Number for the UFB was 8C. This number indicated that: (1) populations faced a moderate degree of threat; (2) recovery potential was high; and (3) the UFB was listed at the species level. The “C” indicates conservation of the species was believed in conflict with development or other economic activities.

1.3.5 Recovery Plan

Name of plan: Uncompahgre Fritillary Butterfly Recovery Plan

Date approved: March 17, 1994

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment Policy

This section of the 5-year review is not applicable to UFB because the Endangered Species Act (ESA) precludes listing DPSs of invertebrates. For more information, see our 1996 DPS policy (61 FR 4722, February 7, 1996).

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes
 No

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

Yes
 No. We may wish to change the recovery criteria based on new information regarding genetics, population status, and climate change concerns. See Section 4 for more information on this option.

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)?

Yes
 No. While the downlisting criterion states that the threats to the species must be removed (at least at the first two known colonies), the criterion does not explicitly address each threat. The delisting criterion does not address threats because we believed the most substantial threats would be addressed before downlisting and stable or increasing populations (with no return of threats) would be required for delisting.

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

Downlisting Criterion: Downlisting may be considered if threats are removed and if adequate quality habitat exists to maintain stable colonies of butterflies for 10 consecutive years at Mt. Uncompahgre and Redcloud Peak.

Mt. Uncompahgre and Redcloud Peak were the only two colonies known at the time of listing and recovery planning. Shortly after completion of the Recovery Plan, an additional colony was discovered. Eight other colonies were discovered in subsequent years. To take improvement of the species population status into account, the Recovery Plan stated that “if additional colonies are found, if the known population number

naturally increases, or if propagation coupled with augmentation or reintroduction is successful in increasing their numbers, the butterfly may be considered for downlisting or delisting.”

Population monitoring transects are installed at Mt. Uncompahgre, Redcloud Peak, and Colony C. A population trend report was developed for monitoring data collected through the 2006 field season to help address the “stability” portion of the criterion.

In terms of threats, actual or potential factors listed in the final listing rule (56 FR 28712, June 24, 1991) and the Recovery Plan include trampling of the UFB and its habitat by humans and livestock, collecting, lack of regulatory mechanisms, adverse climatic changes, small population size, and low genetic variability. Of these threats, no major, imminent threats remain. Trampling by hikers still occurs, but is considered a minor issue. Within the foreseeable future, the species still faces a number of issues which could threaten the species including continuing climate change and its impacts to the species’ habitat and range, as well as potential genetic issues. Each of these foreseeable issues requires further study. For a more detailed assessment of threats see section 2.3.2 below.

The only observable current threats are caused by relatively minor habitat degradation from hiking trails on the edge of colonies at Mt. Uncompahgre and Redcloud Peak, and short-term impacts from rapid sheep trailing/grazing through Mt. Uncompahgre. Consequently, we believe the threats to the UFB have been removed or reduced enough to satisfy the criterion. Although there is fluctuation in the colony numbers, we believe adequate quality habitat occurs at Mt. Uncompahgre and Redcloud Peak. The UFB has been consistently documented at those sites since the early 1990s when more intensive monitoring efforts were initiated. No habitat reduction has been observed.

Delisting Criterion: Delisting may be considered after stable colonies of butterflies exist for 10 consecutive years at a minimum of 10 sites. While the delisting criterion does not specifically mention threats, all substantial threats need to be addressed so stable (or increasing) populations are maintained.

Although three of the colonies have been monitored for population status for more than 10 years, the data are not currently sufficient for us to determine that the population has been stable or increasing during this time. Much of the data collected before 2003 was unreliable due to changes in transect methodology and missing data. We have concluded that we need an additional 5 years of population monitoring to ascertain a reliable population trend. Therefore, we do not consider the delisting criterion to be met. If, after an additional 5 years of monitoring, the

monitored colonies are found to be stable, a post-delisting management and monitoring plan is developed, and no new threats have been determined, delisting of the UFB may occur. Refer to Section 2.3.1 below for further biological information and section 4.0 for future recommended actions.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 Abundance, population trends (e.g., increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends: Currently, 11 known colonies exist--3 are quantitatively monitored with line transects, and the remaining 8 are monitored only for presence. Alexander and Keck (2007) conducted a population trend analysis using data from 1996-2006 for the three colonies that are quantitatively monitored. The two original sites, Redcloud Peak and Mt. Uncompahgre, have been monitored intermittently since their discoveries and more intensively since 1992. Due to changes in transect methodology and missing data in earlier years, data for these two sites are the most reliable during 2003-2006. The Mt. Uncompahgre data were unavailable for 1997, 1998, and 2000. The Redcloud Peak data were unusable for 1997, 1998, 2000, 2001, and 2002.

Three sub-colonies at Mt. Uncompahgre and two sub-colonies at Redcloud Peak are quantitatively monitored. One additional sub-colony at each location (both approximately 1.5 miles away) is not quantitatively monitored. Colony C consists of two sub-colonies, with information only available from 2003-2006 for one sub-colony, and from 2005-2006 for the other sub-colony. Therefore, a trend line was not produced.

Over 11 years of monitoring, the Mt. Uncompahgre colonies have been increasing in size, while the Redcloud Peak colonies have been slightly decreasing. However, these analyses have low reliability due to missing data and high variation in annual and biannual counts (Alexander and Keck 2007). The data from the seven intensely monitored sub-colonies show substantial variability in butterfly numbers from 2003-2006. Additionally, the UFB's biennial life cycle confounds the data. However, as Alexander and Keck (2007) discuss, the UFB populations could be considered relatively stable overall.

Since Alexander and Keck's (2007) trend analysis, additional population data is available through 2008 (Alexander and Keck 2009; Alexander 2009). Population estimates have not yet been calculated from the 2009 raw population data. Historically, the odd-year broods have had lower population numbers than the even-year broods. However, the population at all seven sub-colonies was the highest on record in 2007, returning to about average numbers during 2008 (Alexander and Keck 2009; Alexander 2009). Odd-year and even-year brood populations at Mt. Uncompahgre are consistent within those broods among sub-colonies, but population numbers are not consistent between even and odd years. Population numbers between odd-year and even-year broods are mixed among sub-colonies for both Redcloud Peak and Colony C. Population levels also appear quite different between odd-year and even-year broods for both Redcloud Peak and Colony C. Table 1 illustrates population estimates for each of the quantitatively monitored sub-colonies as far back as consistent and usable data is available.

Table 1. Population estimates of sub-colonies at Mt. Uncompahgre (UP), Redcloud Peak (Redcloud), and Colony C (Alexander and Keck 2007, 2009; Alexander 2009).

| Year | UP | | UP | Redcloud | | Colony C | |
|------|-------|--------|-------|----------|-------|----------|-------|
| | Lower | Middle | Upper | Lower | Upper | North | South |
| 2001 | 586 | | 777 | | | | |
| 2002 | 778 | | 5,798 | | | | |
| 2003 | 1,017 | 322 | 1,203 | 818 | 671 | 306 | |
| 2004 | 2,222 | 205 | 259 | 1,524 | 1,263 | 125 | |
| 2005 | 465 | 402 | 882 | 457 | 916 | 210 | 108 |
| 2006 | 2,976 | 1,755 | 1,812 | 1,395 | 3,152 | 97 | 938 |
| 2007 | 3,764 | 3,818 | 3,797 | 3,469 | 6,007 | 1,220 | 1,060 |
| 2008 | 1,856 | 1,396 | 1,352 | 915 | 2,470 | 516 | 524 |

As evidenced by genetic homogeneity between broods at the Redcloud Peak site, some caterpillars may take two summers to mature rather than three (Britten and Brussard 1992; Seidl 1995). Slowly developing caterpillars may take up to 4 years to mature. For example, if a UFB egg is laid in 2009, the individual would normally spend all of 2010 as a caterpillar, metamorphose into a butterfly and reproduce to complete the normal biennial lifecycle in 2011. Quickly developing caterpillars could hatch from an egg in 2009, and then metamorphose into an adult and reproduce in 2010. However, this pattern may be extended through 2011, and metamorphosing into an adult and reproducing in 2012. Very dry or very wet weather is suspected to be a factor in population changes, and may influence length of time to maturity, but no correlation to weather or other potential influences has been determined.

2.3.1.2 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.): Little genetic information is available on the UFB. Britten and Brussard (1992) compared the UFB at Redcloud Peak with other butterflies in the *B. improba* group in the Rocky Mountains north to the Yukon Territory. The UFB were genetically homogeneous between the 2 years, and the UFB was distinct from other closely related species (Britten and Brussard 1992). Currently, research is being performed to determine if there is genetic homogeneity between the 11 known colonies. Genetic samples were collected in 2008 and 2009, but have not yet been analyzed.

2.3.1.3 Taxonomic classification or changes in nomenclature: The UFB was discovered and described as a species by Gall and Sperling (1980) based on phenotypic appearance. Our determination that the UFB was a listable entity for the purposes of our final listing rule was based primarily on Gall and Sperling (1980). Genetic data from Britten and Brussard (1992) that suggested genetic differentiation also was considered in the final listing rule. Britten and Brussard (1992) suggested that the UFB was different genetically from species in the *B. improba* group further north, but additional analyses with more modern techniques will provide more insight into differences or similarities.

Additional samples collected in 2008 and 2009 may be analyzed to determine if the UFB is a separate species or a subspecies of *B. improba*. The *B. i. harryi* samples from Wyoming (the UFB's nearest relative) may be collected in 2009 or future years to determine if the UFB is genetically distinct from *B. i. harryi*. If it is determined that the UFB is distinct from *B. i. harryi*, it is highly unlikely that the UFB would be found to be a part of other *B. improba* subspecies occurring further north in Wyoming and north through Alaska. Even if the UFB is determined to be a subspecies of *B. improba*, it would have little practical impact to the listing, as subspecies also are listable entities under the ESA. Only administrative changes noting a change to a subspecies versus species level would need to be made.

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range: The Final Rule largely dismisses threats under Factor A from mining, grazing, hiking, and trampling. However, the Recovery Plan includes research into the effects of grazing on the UFB as a recovery task, due to new information obtained after the Final Rule regarding sheep grazing at

Mt. Uncompahgre. There also were concerns that sheep may graze at newly discovered colonies. Sheep are the most common domesticated animal that graze in UFB habitat. Instances of cattle or horse grazing are rare. In recognition of this potential threat, the U.S. Forest Service (USFS) avoids sheep grazing within UFB colonies altogether, or allows only trailing through the colonies and suitable habitat, but not bedding or long-term grazing. The only colony with sheep trailing through the colony on a reoccurring (but inconsistent) basis has been Mt. Uncompahgre. We determined in a December 16, 2008, informal section 7 consultation with USFS that occasional sheep trailing through Mt. Uncompahgre may affect, but is not likely to adversely affect the UFB colony (Service 2008).

Sheep grazing used to occur on Redcloud Peak, but the Silver Creek drainage has been unavailable to grazing for several years (Bureau of Land Management (BLM) 1993) with the exception of one small sub-colony. The UFBs have been observed at this colony most of the last several years, with no observation of domestic sheep grazing (Kevin Alexander, Western State College, pers. comm. 2009). Redcloud Peak is the only BLM-managed land where the butterfly is known to occur. The BLM will consult with the Service should UFB colonies be found on other BLM land with grazing or other management activities that could impact the UFB.

We do not believe that sheep grazing or other domestic animal grazing has been or will be a threat to the UFB. The USFS and BLM avoid most colonies and suitable habitat. At most, the USFS and BLM allow only sheep trailing through UFB habitat, but do not allow them to bed or graze for long periods.

The only activity that has had noticeable impacts to UFB habitat has been hiking trail erosion, widening, and braiding on Mt. Uncompahgre. Given the abundant to medium population levels over the last 3 years, the hiking trail does not appear to cause a population-level effect to the UFB. Trails on both Mt. Uncompahgre and Redcloud were moved several years ago to minimize hiking through the colonies, but portions of the trails skirt the edges of both colonies. Descending hikers have crossed the colonies at Redcloud Peak, but no trails have been formed from this activity (Alexander and Keck 2009). Thus it remains a potential impact. Since the UFB was listed and the Recovery Plan written there have been no other activities that have resulted in destruction, modification, or curtailment of the UFB's habitat at known colony sites.

In conclusion, since listing, no on-the-ground activities have impacted known UFB colonies other than minor habitat modification (and a minor chance of trampling) from hiking at Mt. Uncompahgre and Redcloud Peak. Sheep trailing could trample some adult or larval UFBs, but sheep trampling has never been observed and habitat impacts from sheep and other livestock have been negligible. It does not appear that the present or threatened destruction, modification, or curtailment of its habitat or range is currently threatening the UFB or affecting recovery.

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes: Collecting was the primary reason stated in the Final Rule for listing the UFB under the ESA. There were only two known locations and apparently small numbers of UFBs documented prior to listing in 1991. Known UFB collection took place a few years prior to listing when the USFS had a Special Order Closure (USFS 1984) to butterfly collecting around Mt. Uncompahgre. The person responsible for the collecting was found in violation of the USFS closure and illegal collecting of other butterflies under the ESA and other laws (U.S. Department of Justice 1993). No illegal UFB collecting is known to have occurred since listing of the UFB.

The possibility of researchers impacting the UFB was mentioned in the Final Rule listing the UFB. To date, no habitat impacts, even on permanent population monitoring transects, have been noted and no trampling has ever been documented by researchers. Some incidental taking occurred during genetic sample collection in 2008, but the take was 0.5 percent or less of monitored populations. No incidental take occurred during 2009 genetic sampling.

In conclusion, overutilization for commercial, recreational, scientific, or educational purposes has not occurred since listing or finalization of the Recovery Plan to the extent that it has affected recovery. However, in the absence of the butterfly having protection by listed status, collection could once again become a threat. This issue requires long-term management, as outlined in Section 4.0 below, before ESA protections could be considered for removal.

2.3.2.3 Disease or predation: The Final Rule stated that there are no known diseases to the UFB and predation by birds has rarely been observed (Wilcove 1980). There has been no evidence in the intervening years to the contrary. Consequently, neither disease nor predation appears to be a threat to the UFB, and is not affecting recovery.

2.4.2.4 Inadequacy of existing regulatory mechanisms: The Final Rule stated that collecting and grazing protections afforded to the UFB by the USFS and by the BLM were commendable, but because of their discretionary nature could be withdrawn or lapse in effectiveness. Consequently, listing provides a greater level of protection.

In 1993, the BLM issued the Gunnison Resource Area Resource Management Plan (RMP) which provided a directive on protection of the Redcloud Peak UFB colony (BLM 1993). The RMP established an Area of Critical Environmental Concern (ACEC) around Redcloud Peak. Management direction under the ACEC included: collection only through Service and BLM authorization; grazing exclusion in the Silver Creek basin; restriction of motor vehicles to designated routes (although no routes exist in the ACEC); and avoidance of placement of rights-of-way in the ACEC. The ACEC did allow Federal oil, gas, and geothermal leasing, but with a controlled surface use stipulation and avoidance of mineral material disposal. No oil, gas, or geothermal development has occurred to date and given the ruggedness of the location it is unlikely to occur.

As mentioned previously, the USFS closed all butterfly collecting around Mt. Uncompahgre (USFS 1984) prior to listing and have consulted on actions that could impact the UFB. Other areas that contain UFBs do not have butterfly collecting closures that would protect the species in the absence of listing under the ESA. Before we were to find that adequate regulatory mechanisms existed that would protect the species upon delisting, the USFS and BLM would need to place additional closures around sites or agree to regulate collecting through special use permit issuance.

While the UFB is still listed, activities on USFS or BLM lands require section 7 consultation and preparation of a National Environmental Policy Act (NEPA) document, both of which can stipulate measures to avoid and minimize impacts to the UFB. After delisting, activities on USFS or BLM lands will continue to require preparation of a NEPA document. The NEPA is a disclosure statute only and does not require minimization of impacts to sensitive species such as the UFB. Any measures to avoid and minimize impacts to the UFB would be voluntary. The ACEC designation could be removed through revision of the RMP. Therefore, we have determined that a management plan signed by the USFS and BLM that addresses grazing, collecting, recreation and other on-the-ground threats will be necessary in order to remove the threat of inadequate regulatory mechanisms.

In conclusion, the current regulatory mechanisms that exist are not adequate to protect the UFB were the species to be delisted. We find that a management and monitoring plan that provides protection to the species and its habitat will be necessary in order to delist the species.

2.3.2.5 Other natural or manmade factors affecting its continued

existence: The Final Rule and UFB Recovery Plan state that adverse climate changes could become a potential threat to the UFB as well as small population size, and limited genetic variability. Since the Final Rule and Recovery Plan were written, there has been increasing information on climate change. According to the Intergovernmental Panel on Climate Change (IPCC 2007) “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.” Average Northern Hemisphere temperatures during the second half of the 20th century were very likely higher than during any other 50-year period in the last 500 years and likely the highest in at least the past 1,300 years (IPCC 2007). It is very likely that over the past 50 years cold days, cold nights, and frosts have become less frequent over most land areas, and hot days and hot nights have become more frequent (IPCC 2007). It is likely that heat waves have become more frequent over most land areas, and the frequency of heavy precipitation events has increased over most areas (IPCC 2007). To date, these changes do not appear to have had a negative impact on the UFB.

The IPCC (2007) predicts that changes in the global climate system during the 21st century are very likely to be larger than those observed during the 20th century. For the next two decades, a warming of about 0.4°F per decade is projected (IPCC 2007). Afterwards, temperature projections increasingly depend on specific emission scenarios (IPCC 2007). The IPCC (2007) has predicted global average surface warming during the 21st century between 2.0 and 11.5°F, depending on the emissions scenario. Within the range of the UFB, the U.S. Global Change Research Program projects temperature increases of 4 to 7°F under a lower emissions scenario and 7 to 11°F under a higher emissions scenario by the end of the century (Karl et al. 2009). Summers are projected to warm more than winters (Ray et al. 2008). Projections suggest that by mid-century, typical summer monthly temperatures will be as warm or warmer than the hottest 10 percent of summers that occurred in last half of the 20th century (Ray et al. 2008). By

the end of the century, a 1-in-20-year extreme heat event may occur every couple of years under a high emissions scenario (Karl et al. 2009).

In terms of precipitation, the U.S. Global Change Research Program projects drier spring, summer, and fall in this area, but slightly wetter winters (Karl et al. 2009). That said, model projections for precipitation are less reliable than model projections for temperature, especially in mountainous terrain such as the range of UFB (Ray et al. 2008). Efforts to improve climate modeling, including finer spatial resolution, should improve these projections in future years.

Increasing temperature and soil moisture changes may shift mountain habitats toward higher elevation (Ray et al. 2008). Because the UFB is restricted to a range of 12,100 to 13,500 feet (Ellingson 2003), climate change could restrict the UFB's habitat to a zone so narrow that the species would be unable to survive. Britten and Brussard (1992) believe that the UFB is a "glacial relict," or a species that was more widespread during or shortly after the last glacial period, but with temperature increase since the last glacial period the range has been restricted to isolated mountain tops. Naturally, this would lead one to believe that increasing temperatures would further compress the UFB's range. However, to date there is no indication that this is happening, and it has not been possible to correlate climatic conditions to increase or decrease in UFB numbers.

Four colonies have not been detected in different years since 2003, but the butterflies have been detected at each of those colonies the following year(s) and all colonies were detected in 2008 (Kevin Alexander, Western State College, pers. comm., 2009). No colonies have shown lengthy disappearances, and even the lowest population transects on quantitatively monitored colonies have not revealed disappearances of the UFB or its habitat. In fact, in 2007 UFB numbers were very high, especially for an odd-year brood (Alexander and Keck 2009; Alexander 2009).

Small population numbers could affect the UFB, but as with many insect populations, the UFB appears to experience population fluctuations of up to 10 times over a period of years without recognizable effects to the species (Alexander and Keck 2007; Alexander and Keck 2009; Alexander 2009). Additionally, despite lapses in detection of the UFB at some colonies during some years, low levels of UFBs must remain present to repopulate the colony in subsequent brood years. Alternatively, there may be enough

non-biennially developing caterpillars to repopulate both even- and odd-year broods, since all known colonies and sub-colonies have been detected in years subsequent to their apparent disappearances.

Low genetic variability could possibly cause problems, but based on population estimates from the last few years this has not caused a problem as of yet. Low genetic variability has likely existed for hundreds if not thousands of years since the UFB's mountaintop habitat has become isolated.

In conclusion, climate change and its resulting influence on the topographical extent of habitat and habitat isolation as well as population size and genetic variability could affect recovery of the UFB, but empirical evidence to date has not detected any effects to the UFB's continued existence.

2.4 Synthesis

Since listing and the completion of the Recovery Plan, the number of confirmed UFB colonies has increased from 2 to 11. Population estimates have increased from about 1,000 to somewhere between 3,400 and 23,000 at the 3 currently monitored colonies. Similarly, the other eight qualitatively monitored populations have persisted despite four of the colonies apparently having no UFBs during one or two surveys in different years since 2001.

Some threats have been addressed. The primary threat of collecting appears to have been forestalled by maintenance of UFB collecting closures around the two well-known colonies, regular researcher presence, irregular law enforcement visits, and through prohibition of collection by the ESA. However, these protections will need to be extended into the future by some sort of regulatory mechanism before we can find that factor D has been sufficiently addressed.

The only observable current impacts are caused by relatively minor habitat degradation from hiking trails on the edge of colonies at Mt. Uncompahgre and Redcloud Peak and short-term impacts from rapid sheep trailing/grazing through Mt. Uncompahgre. Neither of these actions occur at a level to be considered a threat to the species.

Climate change has not been an observable threat to either the UFB or its habitat to date, but is a potential future threat that should be monitored (see Recommendations for Future Actions below). Genetic influences related to population size and isolation are uncertain, but are being researched.

Although there is fluctuation in the colony population numbers, it does not appear that the UFB is in danger of extinction. Adequate quality habitat has existed for over 10 years at Mt. Uncompahgre and Redcloud Peak producing what appears

(non-statistically) to be stable, albeit fluctuating population numbers, and immediate on-the-ground threats have ceased, moderated, or have been determined to be minor impacts (collecting, recreational impacts, and grazing). Consequently, the Service believes the downlisting criterion has been adequately met.

3.0 RESULTS

3.1 Recommended Classification:

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

3.2 New Recovery Priority Number: Change to 14.

Brief Rationale: The UFB has been ranked an 8c since it was listed. The “c” for “conflict” designation was in expectation of grazing and possibly development issues (such as trail construction, ski area development, road access, or mining). However, over the intervening years, there has been no grazing or development conflict. Informal consultation on trail placement, ski area activities, private land access, and grazing has taken place, but none have resulted in development or economic conflict. No formal consultations have occurred for any project since the UFB was listed, an indication that no projects have been proposed which would have resulted in take of the species. Furthermore, 11 persistent colonies are known, which exceeds the minimum delisting goal of 10. We do not have 10 years of comparable quantitative population monitoring at 10 colony sites; however, that would be necessary to meet delisting criteria.

Immediate threats to the species stated in the listing rule and Recovery Plan have been ameliorated or have not surfaced as more than minor threats. However, until a management plan has been finalized that would result in the continued protection of the species, we find that the threat of inadequate regulatory mechanisms has not been sufficiently removed. Consequently, despite the need for a post-listing management plan, the threats to the UFB have shifted from moderate to low, the recovery potential is still high, and the UFB is still classified as a full species. These ranking factors place the UFB recovery priority at 14.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Prepare a downlisting package when sufficient resources (funding and personnel) are available.
- Develop a management plan with the USFS and BLM to ensure grazing, collecting, recreation, and other on-the-ground threats remain low or are eliminated.
- Retain the USFS and BLM butterfly collecting closures around Mt. Uncompahgre and Redcloud Peak and place closures around other colonies or issue collecting on a permit-only basis to control collection of the UFB after delisting.
- Continue quantitative population monitoring to improve trend analyses and support decisions on eventual delisting.
- Discuss whether development of a monitoring scheme is necessary to quantitatively monitor populations at the eight sites that have not received quantitative monitoring to date.
- Develop long-term climate change monitoring processes specific for the UFB, or determine if existing climate change monitoring plans in the San Juan Mountains or other resources can be used to identify the effects of climate change to the UFB and its habitat.
- Conduct genetic analyses and literature review to determine if gene flow between colonies is, or will, pose a threat to the UFB.
- Develop a genetics management and monitoring plan if genetic problems are determined to exist.
- Revise recovery criteria and recovery actions if necessary to address the current status and threats to the UFB as genetic information is analyzed and more information on climate change impacts is available.
- Use results of a taxonomic study to determine if the UFB should be reclassified as a subspecies under the *B. improba* group or remain a separate species as Gall and Sperling (1980) recommend and Brussard and Britten (1992) suggest.
- Create a post-delisting monitoring plan, as required by Section 4(g) of the Act, either separately or in combination with a post-delisting management plan.

5.0 REFERENCES

- Alexander, K. 2009. Unpublished data submitted via electronic-mail to Terry Ireland on 2008 and prior year UFB calculated abundance. February 18, 2009. 1 p.
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**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW
of the Uncompahgre fritillary butterfly
(*Boloria acrocnema*)**

Current Classification: Endangered range-wide

Recommendation resulting from the 5-Year Review:

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

Review Conducted By: Terry Ireland, Western Colorado Ecological Services Office

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve 
Field Supervisor, Colorado Ecological Services Office

Date 12/22/09

REGIONAL OFFICE APPROVAL:

Lead Regional Director, Fish and Wildlife Service

Approve 
Regional Director, Region 6

Date 1/5/10