

Dudley Bluffs Bladderpod
(*Lesquerella congesta* or *Physaria congesta*)



And

Dudley Bluffs Twinpod (*Physaria obovata*)



5-Year Review
Summary and Evaluation

U.S. Fish and Wildlife Service
Western Colorado Field office
Grand Junction, Colorado

June 2008

5-YEAR REVIEW
Dudley Bluffs bladderpod (*Lesquerella congesta* or *Physaria congesta*)
and
Dudley Bluffs twinpod (*Physaria obcordata*)

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office: Mountain-Prairie Regional Office
Mike Stempel, ARD Fisheries - Ecological Services, 303/236-4510
Seth Willey, Regional Recovery Coordinator, 303/236-4257

Lead Field Office: Colorado Ecological Services Field Office
Al Pfister, Western Colorado Supervisor, 970/243-2778
Ellen Mayo, Botanist/Plant Ecologist, 970/243-2778

1.2 Methodology Used to Complete the Review

All information in this review pertains to both species unless one is specified.

The U.S. Fish and Wildlife Service (Service/USFWS) initiated a 5-year review of Dudley Bluffs species on September 20, 2006 (71 FR 55005). The review was conducted primarily by the lead endangered species botanist for the Dudley Bluffs species. Materials used as the basis for information contained in this review included occurrence records, monitoring data, maps and threats assessments provided by the Colorado Natural Heritage Program (CNHP), the Bureau of Land Management-White River Field Office (BLM-WRFO), the Colorado Natural Areas Program, and private consultants. Reviewers also used Biological Assessments from Section 7 energy consultations. A public comment period and request for information extended from September 20 to November 20, 2006. The Center for Native Ecosystems responded with 16 documents including 2 field reports and 14 comments previously submitted to BLM regarding oil and gas development projects within the range of the Dudley Bluffs species. The Service solicited peer review of the science relevant to the draft Dudley Bluffs bladderpod/Dudley Bluffs twinpod 5-year review, and our use of said science. Review packets were sent to four experts. Three of these reviewers responded. Suggestions were incorporated directly into the document. All peer reviews are available upon request.

1.3 Background

1.3.1 FR Notice Citation Announcing Initiation of This Review

71 FR 55005, September 20, 2006

1.3.2 Listing History

Original Listing

FR Notice: 55 FR 4152, February 6, 1990

Date Listed: March 8, 1990 (Both species were listed in the same FR)

Entities Listed: Species (Both are listed at the species level range-wide)

Classification: Threatened (Both)

1.3.3 Associated Rulemakings

Not Applicable

1.3.4 Review History

Since listing, one historic 5-year review was initiated by the USFWS Washington, D.C., office for all listed species (56 FR 56882, November 6, 1991). The species' status was also considered in the 1993 Dudley Bluffs bladderpod (*Lesquerella congesta*) and Dudley Bluffs twinpod (*Physaria obcordata*) Recovery Plan (Service 1993).

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

The recovery priority number for both the Dudley Bluffs bladderpod and Dudley Bluffs twinpod are 2c, indicating that (1) occurrences face a high degree of threat; (2) recovery potential is high; (3) the entities are listed at the species level; and (4) the species are in conflict with construction or other development projects or other forms of economic activity.

Degree of Threat	Recovery Potential	Taxonomy	Priority	Conflict	
High	High	Monotypic Genus	1	1C	
		Species	2	2C *	
		Subspecies/DPS	3	3C	
	Low	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	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	Low	Monotypic Genus	16	16C
			Species	17	17C
			Subspecies/DPS	18	18C

1.3.6 Current Recovery Plan

Name of Plan: Dudley Bluffs bladderpod (*Lesquerella congesta*) and Dudley Bluffs twinpod (*Physaria obcordata*) Recovery Plan

Date Issued: August 13, 1993

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment Policy

2.1.1 Is the species under review a vertebrate?

No, the species is a plant therefore the DPS policy is not applicable.

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

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?

Yes
 No – Recovery Plan failed to consider several factors that could impact the species' long-term conservation status including oil and gas extraction and associated impacts, secondary impacts associated with oil shale and tar sands development, adequate protection for pollinators, impacts of grazing and trampling, and climate change.

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

The following summary highlights the criteria, the specific tasks called for in the recovery plan, and the status of each task.

Criterion 1. Protect and/or enhance all known occurrences of *L. congesta*/*P. congesta* (bladderpod) and *P. obcordata* (twinpod) on public and private lands. Establish land management designations, and develop and implement habitat management programs.

Inventory Remaining Potential Habitat - Additional survey work has expanded the known distribution and abundance data for these species. Since 1993, bladderpod has been documented at two new occurrences on about 180 to 187 hectares (ha) (446 to 462 acres (ac)) (CNHP 2006b). During this same period, twinpod has been documented at five new occurrences on about 16 ha (40 ac) (CNHP 2006b, 2008). Most of the potential habitat on BLM land has been surveyed. Most of the potential habitat on private lands (primarily owned by energy companies) still needs to be surveyed.

Establish Land Management Designations on Federal Land - Four Areas of Critical Environmental Concern (ACECs) were designated to protect the plants including about 177 ha (438 ac) (CNHP 2006a; BLM-CO 2004), or about 64 percent of known occupied habitat for both species on BLM land. Estimated occupied habitat on BLM land not protected by ACECs is 101 ha (250 ac) (CNHP 2006b), or 36 percent of known occupied habitat for both species on BLM land. Permanent protective land management designations are necessary on all, or nearly all, occupied BLM land in order to fully achieve recovery.

Protect Habitat on Private and State Land – Ownership of one bladderpod occurrence at Duck Creek was transferred from State Division of Wildlife to a private energy company. A permanent conservation management and monitoring plan Memorandum of Agreement for the plants was attached to the land exchange. Similar agreements are needed for occurrences on other private parcels.

Create Habitat Management Plans - Habitat management plans have not been developed for either species.

Apply No Surface Occupancy Stipulations on Federal Land - No Surface Occupancy stipulations are applied to the four ACECs and to all known and potential habitat under BLM jurisdiction for endangered, threatened, and candidate plant species. Exceptions are allowed if surveys show there would be no *direct* impact or effects to the plants. Under this policy, developments including pipelines, roads and well pads have been approved by BLM within all four ACECs. In some cases, ground disturbance occurs within 30 meters (m) (98 feet (ft)) of plant habitat. No monitoring results are available to measure the effects of these actions on the plants. BLM is currently working with the Service to determine appropriate buffer distances to protect the plants and their habitat from direct and indirect effects of oil and gas development activities. The Service currently recommends a 200-m (656-ft) buffer to avoid adverse

effects to plants and habitat for these listed plants. Implementation of buffers is an ongoing effort for BLM and the Service.

Review Mining Claims – The Service has not reviewed plot records to determine the extent of historic mining claims, if any. Future claims require a plan of development and environmental analysis for mining. Current land management designations close all known and potential habitat to surface mineral materials development.

Establish Off-highway Vehicle Designations – Within the ACECs, motorized vehicle travel is limited to designated roads and trails (BLM-WRFO 1997). The maps show about 26 segments of road that remain open within the ACECs, and about 19 that are closed. Off-highway vehicles on BLM land not in ACECs are limited to existing routes in areas with potential habitat for the plants. Additional fencing, signage, enforcement and education is needed to ensure compliance with existing road closures.

Transfer Privately Owned Occurrences to BLM - Exchanges of private land into BLM management as recommended in the Recovery Plan have not occurred. Shell Oil acquired land in an exchange with the Colorado Division of Wildlife (CDOW) that includes approximately 28 ha (70 ac) of occupied bladderpod habitat adjacent to the Duck Creek ACEC and Natural Area. CDOW consulted with the Service and the Colorado Natural Areas Program to develop a Memorandum of Agreement that will protect the plant habitat acquired by Shell (CDOW 2007). The Memorandum of Agreement provided the basis for concurrence by the Service that the land exchange was not likely to adversely affect the species.

Criterion 2. Protect both species from impacts via consultation under Section 7 and protection under Section 9 of the Endangered Species Act (ESA).

Process Project Clearances - BLM has ongoing informal Section 7 consultations with the Service regarding multiple gas pipelines, seismic survey projects, a large oil and gas Piceance Development Plan that covers an area including two of the ACECs, and five Oil Shale Research Development and Demonstration projects. The Service also is reviewing proposed oil shale lease areas described in the Draft Oil Shale and Tar Sands Resource Management Plan (RMP) Amendments Programmatic Environmental Impact Statement (BLM 2007).

CDOW has informally consulted with the Service to avoid impacts to plant habitat on several projects involving gas pipelines, processing facilities and land exchanges.

While Section 7 consultations are not considered recovery actions, they are the primary tool for implementing conservation measures to avoid or minimize disturbance of the habitat for both species.

Criterion 3. Minimum viable populations are defined and documented as being maintained for both species.

Conduct Soil Analyses, Life History Analyses and Monitoring - Detailed descriptions of the Thirteenmile Creek Tongue, the Parachute Creek Member, and the Garden Gulch Member of the Green River Formation are available, but the lack of finely mapped geology is still a limiting factor in modeling suitable habitat (Decker et al. 2006).

Resources have not been available to conduct life history analyses.

A minimum viable population analysis has not been performed. Because the habitat is limited and imminent threats encompass the entire range of both species (see five factor analysis, section 2.3.2, below), we are assuming that most, if not, all suitable habitat and occurrences are essential to the survival of the species.

BLM has conducted sporadic monitoring on the ACEC occurrences of both species from 1985 to 2007. The Colorado Natural Areas Program and BLM have been monitoring the bladderpod at two locations on the Duck Creek ACEC and Colorado Natural Area for 10 years (Rickey and Kurzel 2007). One site for each species has been monitored on the Dudley Bluffs ACEC (Kurzel 2006). Results are described below in section 2.3.1.2.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 Information on the Species' Biology and Life History

Pollinators: Field research by Tepedino (2005) shows that the twinpod is an obligate outcrosser that requires pollinators. The observed pollinators are generalized foraging bees of the genera *Halictus*, *Lasioglossum*, *Dialictus* and six species of *Andrena*. The only species present at both sites were *Andrena hicksi*, which may be a mustard family pollen-collecting specialist (Tepedino 2005) and an unidentified species of *Dialictus*.

Pollinators reported for the bladderpod are *Andrena hicksii* and two other unidentified species of *Andrena*. These are native,

solitary bees that nest in ground holes or in dead wood. The nesting material varies from species to species and may be quite specific. For example, for certain species, the ground must have a certain slope or soil moisture content or texture. Bees provision these nests with pollen and nectar molded into a loaf for the young to eat. Adults also eat nectar and pollen while foraging. In addition, bees may forage for water or other extraneous materials needed to construct the nest, such as leaf pieces, resin, or mud. Adult females must launch many foraging expeditions from their nest-sites to obtain these resources. Frequently, the best nesting substrate is not in the same area as food or other necessities, and bees must travel some distance to obtain nest materials. “The size of the buffer zone that should be left around rare plant occurrences that rely exclusively on insect pollination depends on how far bees fly to obtain their resources (Tepedino 1996).” For insecticide spraying, Tepedino (1996) recommended a provisional, best guess buffer zone of 4.8 kilometers (km) (3 miles (mi)) around rare plant occurrences. Smaller buffers of 200 m (656 ft) or less are employed for most oil and gas development and other activities subject to Section 7 consultation because there is no available information regarding the effects of these activities on pollinators.

Substrate Endemism: The bladderpod grows only on barren white shale outcrops of the Thirteenmile Creek Tongue of the Green River Formation where it is exposed along downcutting drainages. The twinpod occurs primarily on the Thirteenmile Creek Tongue and on the Parachute Creek Member of the Green River Formation. The Parachute Creek Member includes the Mahogany ledge, one of the richest oil-shale zones in the basin, as well as potentially valuable deposits of nahcolite (soda ash) and dawsonite (soda ash and alumina) (Decker et al. 2006). This area is identified by BLM as a multimineral zone where the development of one of the three resources shall not destroy either of the other two. Whether this policy would result in more or less potential impact to the species habitat is not clear (BLM 2007).

2.3.1.2 Abundance, Population Trends, Demographic Features, or Demographic Trends

Additional survey work has expanded the known distribution and abundance of both species. The known occurrences of bladderpod have increased from five occurrences on about 20 ha (50 ac) over a range of 16 km (10 mi) to seven occurrences (consisting of 61 distinct mapped polygons) (Decker et al. 2006) within the same range. The current estimated total occupied habitat is 201 to 207 ha (496 to 512 ac) on BLM, State, and private lands in the

northern Piceance Basin in Rio Blanco County. The estimated total number of plants is 550,576 to 602,576 (CNHP 2006b).

The known occurrences of the twinpod have increased from five occurrences on about 101 ha (250 ac) reported in the Recovery Plan to 10 occurrences (comprised of 40 distinct mapped polygons) (Decker et al. 2006) covering an estimated total of 57 to 117 ha (142 to 290 ac) on BLM, State, and private lands in the northern Piceance Basin in Rio Blanco County. The estimated total number of plants is 18,300 to 27,800 (CNHP 2006b). These totals include a new occurrence of 2,000 plants on 3.2 ha (8 ac) discovered in 2007 (CNHP 2008).

BLM has conducted monitoring on the ACEC occurrences of both species from 1985 to 2007. At Dudley Bluffs ACEC, the results indicate a stable to increasing trend in bladderpod plant numbers. In a small area where plants were destroyed, the occurrence continued to decline, and new recruits were very slow to recolonize the area (BLM-WRFO 2002b). At Ryan Gulch ACEC, twinpod plants increased in size and numbers between 1993 and 2000. This increase may be linked to a 243 ha (600 ac) fencing of habitat (including both species) designed to exclude cattle and prevent browsing of flower heads and trampling of plants (BLM-WRFO 2002c). At Duck Creek ACEC, bladderpod numbers decreased 10 to 35 percent from 1996 to 2002. These declines were presumed to be linked to the increasing size of the wild horse herd and low levels of precipitation. BLM has since reduced the horse herd (BLM-WRFO 2002a), but subsequent monitoring results (2002 to 2006) show a significant decline in plant numbers at two sites in the Duck Creek ACEC. The cause of the decline could not be determined (Rickey and Kurzel 2007). Plant counts in Element Occurrence Records for both species are too inconsistent to show trends.

CNHP has assigned estimated viability ranks of A (excellent) to D (poor) for each recorded occurrence based on population size, condition of the plants, quality of habitat, viability, and defensibility. The average rank for the seven bladderpod occurrence was A-minus. The average score for the twinpod occurrence was B-minus.

2.3.1.3 Genetics, Genetic Variation, or Trends in Genetic Variation

No information is available on the genetics of either species.

2.3.1.4 Taxonomic Classification or Changes in Nomenclature

The genus *Lesquerella* has been united with and changed to the name of *Physaria* (Al-Shehbaz and O’Kane 2002, O’Kane et al. 1999). The name of *Lesquerella congesta* was changed to *Physaria congesta* with no change in the species’ status. This revision has not yet been incorporated into 50 CFR 17.12.

2.3.1.5 Spatial Distribution, Trends in Spatial Distribution, or Historic Range

The known range of the twinpod has expanded 17 km (10.5 mi) to the northeast with the 2007 discovery of a new outlying occurrence near Hay Gulch (CNHP 2008).

The known range of the bladderpod remains unchanged. The recovery plan reported a linear range of 16 km (10 mi) for bladderpod, which is contained within the current known linear range of 54 km (33.5 mi) for the twinpod in the northern Piceance Basin in Rio Blanco County (USFWS 1993; Decker et al. 2006; CNHP 2008).

2.3.1.6 Habitat or Ecosystem Conditions

Most observers report that the shale barrens habitat remains relatively intact (Arbogast and Smith 2001; Rickey and Kurzel 2007; CNHP 2006b). On public lands, pipelines and access roads have been built mostly in drainages between the shale hills, sometimes encroaching on the lower slopes of suitable habitat for the plants. Little information is available for private lands owned by energy companies.

Element distribution modeling indicates that there may be additional tracts of suitable habitat beyond the known occupied habitat for both species (Decker et al. 2006). While this model suggested substantial tracts of potential habitat, we believe this model overestimated likely suitable habitat. The potential habitat areas identified in the model have not yet been surveyed in the field or evaluated by experts familiar with the occupied habitat.

2.3.2 Five-Factor Analysis

2.3.2.1 Present or Threatened Destruction, Modification or Curtailment of Its Habitat or Range

Oil and Gas Development: While not discussed in the recovery plan, ongoing oil and gas development is currently the primary

threat to the bladderpod and the twinpod. Natural gas production is prolific from formations located stratigraphically below the oil shale. Four of the top 35 natural gas fields in the United States are located in the southern Piceance Basin (BLM 2007). This threat also is projected to increase significantly on the lands managed by the BLM-WRFO. Numerous projects are currently being planned and implemented to expand existing development and the associated infrastructure within the range of both plants. Along some pipeline routes, there is no room for additional pipelines without impacting occupied plant habitat.

In June 2006, the BLM initiated preparation of an Environmental Impact Statement (EIS) to evaluate the proposed amendment of the existing RMP to address the potential impacts of significant increases in oil and gas development in the area. In the last RMP revision in 1997, the BLM anticipated the potential development of 1,100 oil and gas wells, with 4 ha (10 ac) of disturbance per well (including roads and pipelines), at a rate of about 55 wells per year. The oil and gas industry is now projecting that more than 21,000 wells could be drilled in the planning area over the next 20 years (BLM-WRFO 2007; BLM 2007) with 13,000 of these in the Piceance Basin. The RMP Amendment and associated EIS will assess the impacts of this projected development.

In the past, some well pads and pumping stations have been placed within 60 m (197 ft) of plants. Spray from an evaporation pond reportedly drifted onto nearby plants. Pipelines have been located within 50 m (164 ft) of plants (Kurzel 2006). Some unpaved roads run along the edge of occupied plant habitat. The impacts/effects of these activities have not been monitored or assessed.

In 2007, a Record of Decision (ROD) was issued by the BLM-WRFO granting ExxonMobil a right of way application for a planned expansion of operations on its Piceance Creek and Freedom Units (BLM-WRFO 2007). Facilities will include a central natural gas treating facility, several fresh-water wells and a fresh-water pond, and a system of natural gas pipelines, tank batteries, and natural gas stations. These facilities will be constructed to treat and transport natural gas produced from up to 1,080 wells with up to nine well bores from as many as 120 well pads. ExxonMobil's Piceance Creek Unit was formed in 1940 and has been in continuous production since the 1950s. As of 2005, the Piceance Creek Unit was producing an average of 849,505 cubic m (30 million cubic ft) of gas per day from 37 wells. The proposed action will greatly increase production of natural gas and associated hydrocarbon liquids. The life of the project is expected to be 30 years or longer. Only 20 well pad sites were

included in the Biological Assessment for the project because they were the only sites that did not conflict with habitat for the plants. Another 80 well pads and associated development must be assessed for impacts to the bladderpod and the twinpod as each site is proposed for a drilling permit (Bennett 2006). Conservation measures for the plants were included in the Record of Decision (BLM-WRFO 2007) to avoid and minimize impacts to plants and habitat.

Oil Shale Development: The potential for oil shale development in the Piceance Basin was identified as the primary threat to both species in the 1993 recovery plan. In 2008, the threat is imminent. In Section 369 of the Energy Policy Act of 2005, Congress directed the Secretary of the Interior to complete a programmatic environmental impact statement for a commercial leasing program for oil shale and tar sands resources on public lands, with an emphasis on the most geologically prospective lands in Colorado, Utah, and Wyoming. The area identified as the Most Geologically Prospective Oil Shale Resource in Colorado is in the Piceance Basin, which encompasses the entire known range of the bladderpod and all but one occurrence of the twinpod (BLM 2007).

The following information from the Draft Oil Shale and Tar Sands RMP Amendments Programmatic EIS pertains to the Colorado Most Geologically Prospective Oil Shale Resource area in the Piceance Basin (BLM 2007).

The Draft Programmatic EIS Presents Three Alternatives:

Alternative A (the No Action Alternative) in Colorado includes the five existing Oil Shale Research Development and Demonstration lease areas that were issued in January 2007. Habitat for the bladderpod and the twinpod is not found within the Oil Shale Research Development and Demonstration sites and would not be affected by this research-only scenario (USFWS 2006).

Under Alternative B, BLM's preferred alternative, the amount of land available for commercial leases would total 138,952 ha (343,358 ac) (BLM 2007). The entire range of the bladderpod and most of the range for the twinpod are within this recommended leaseable area, including the protective ACECs established for these plants.

Under Alternative C, the amount of land available for commercial leases would total 13,265 ha (32,780 ac) (BLM 2007). The three ACECs for the plants would not be available for leasing under Alternative C. The Yellow Creek ACEC, that the recovery plan recommended BLM establish, is not included in the draft RMP. Yellow Creek would be managed in the same manner as additional lands that are identified as requiring special management or resource protection in existing land use plans, to be excluded from leasing in order to provide maximum protection to the resources present in those areas (BLM 2007). At least three of the seven known bladderpod occurrences and one of the ten known twinpod occurrences appear to be within the leaseable area of Alternative C (BLM 2007).

In addition to the facilities and activities that would occur within the oil shale lease areas, related commercial projects essential to support these activities would include development of additional coal fired power plants, transmission lines, feeder pipelines, access roads and employer-provided housing (BLM 2007). Construction of transmission lines would impact up to 1,093 ha (2,700 ac) per project, while the resultant right of ways would occupy 728 ha (1,800 ac) per transmission line (BLM 2007). Similarly, construction of the feeder pipelines (one for each project) would impact 271 ha (670 ac) per pipeline, while the resultant right-of-ways would occupy 134 ha (330 ac) per pipeline (BLM 2007). Construction of each power plant would disturb up to 1,943 ha (4,800 ac) (BLM 2007). These actions may occur within the range and habitat for the plants.

The threatened plants could be affected by a variety of impacting factors including: injury or mortality of individuals, soil and seed bank disturbance and removal, vegetation clearing, habitat fragmentation, dispersal blockage, alteration of topography, changes in drainage patterns, erosion, sedimentation from runoff, oil and contaminant spills, fugitive dust, increased human access and human collection, spread of invasive plant species, air pollution (BLM 2007), and loss of pollinator habitat.

As listed species, all projects that may affect listed species would be required to include consultation between the BLM and the Service under Section 7 of the ESA (BLM 2007).

Conservation measures for listed plants discussed in the Draft Programmatic EIS would include requirements for surveys prior to disturbance, buffer distances for avoidance and minimization of impacts to plants and suitable habitat, and monitoring for the

duration of a project. The extent to which the conservation measures will be approved or implemented is uncertain at this time.

Energy Corridors: The Energy Policy Act of 2005 calls for designation of West-wide Energy Corridors on Federal lands. The West-wide Energy Corridor Programmatic EIS indicates that two separate energy corridors for pipelines and for power lines may be routed through the Piceance Basin. Preliminary mapping of the route is subject to selection of alternatives. It is not possible at this time to predict the extent to which the corridors will directly or indirectly impact the plant occurrences (U.S. Department of Energy et al. 2006).

The potential designation of energy corridors is likely to impact energy development throughout the western United States, including commercial oil shale and tar sands development, because the location of energy corridors may facilitate development by removing administrative and planning barriers for potential pipelines, electric transmission lines, and associated infrastructure (BLM 2007).

Summary of Energy Development: Oil and gas development presents an imminent threat to the entire range of both species. BLM has managed to avoid oil and gas impacts on the species in most of the range, but further development in some areas may not be possible without disturbing suitable habitat for the species. The potential impacts from oil shale development depend on the alternative selected and the amount and distribution of leased areas. Potential impacts could be severe. New energy corridor designations may facilitate a larger volume of oil and gas activity and threats to the species, depending on the routes. As a listed species, consultation through Section 7 should minimize impacts. In the absence of the ESA's protections, we believe substantial threats would threaten both species range-wide.

2.3.2.2 Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

None known for either species.

2.3.2.3 Disease or Predation

The bladderpod has been trampled by horses and cows at the Duck Creek ACEC. The wild horse herd there has been reduced to the "appropriate management level" by the BLM. The ability to

maintain these levels in the future is unknown. Cattle trampling remains at a low level (BLM-WRFO 2002a). Monitoring in this ACEC from 1996 to 2002 shows fluctuations in plant numbers that are attributed to drought more than to livestock damage (BLM-WRFO 1990, BLM-WRFO 2002a). Rickey and Kurzel (2007) observed a decline in plants on the Duck Creek ACEC between 1996 and 2006, but could not show a correlation with horse or cattle stocking rates.

In 2000, several occurrences of the bladderpod and the twinpod were fenced in a 243 ha (600 ac) cattle enclosure at Ryan Gulch ACEC because of concern over cattle browsing on flowers and trampling damage (BLM-WRFO 2002c). The total number of plants on monitoring plots at this site increased between 1994 and 2000.

In conclusion, information on cattle and wild horse trampling of plants shows only localized damage to plants in a few occurrences. The effect on plant numbers cannot be distinguished from population fluctuations during drought years.

2.3.2.4 Inadequacy of Existing Regulatory Mechanisms

Federal Land: An estimated five percent of the plants on BLM lands are not protected within ACECs (Roberts 2007). CNHP (2006b) estimates that this includes 101 ha (250 ac) of occupied habitat. The 1997 BLM-WRFO RMP stipulates No Surface Occupancy on known and potential habitat, which was about 18,373 ha (45,400 ac) at that time. The RMP also states that all known and potential threatened and endangered habitat will be excluded from new right of way authorizations. Exceptions may be made by the BLM Area Manager if an environmental analysis and surveys indicate that no plants will be *directly* impacted or affected by the action. These exceptions have resulted in the placement of pipelines, well pads and roads on potential habitat close to the plants both within and outside the ACECs. No monitoring results are available to measure the effects of these actions on the plants. One of the reasons for such exceptions is that some lease rights predate the designation of ACECs and the existing RMP (BLM-WRFO 1997).

The BLM-WRFO is drafting an RMP amendment and associated EIS that will address the potential impacts of significant increases in oil and gas development within the 1.5 million-acre field office area over the next 20 years (BLM-WRFO 2006). Whether the plan amendment will provide added protection areas for the plants, or

open the habitat to more leasing, will depend on the alternative selected. Regulations for protecting the plants are implemented by the BLM biologists who determine the best method of impact avoidance for each project in the field, and write the conditions of approval. RMPs provide the basis for minimizing impacts on BLM lands, but they do not guarantee protection for all occupied, suitable and potential habitat.

Pollinator habitat protection needs can only be estimated. BLM states that if the pollinator complex was known and identified as a Primary Constituent Element of a proposed Critical Habitat rule, then certain actions determined by the Service would be taken to actively protect the pollinator complex (BLM-WRFO 2007). Critical habitat, sufficient to protect pollinators, has not been identified or proposed; therefore, implementation of measures to protect pollinators on BLM lands is uncertain.

Private Land: Occupied habitat on private lands with no conservation agreements is estimated to be 10 percent of the total bladderpod habitat and 15 to 20 percent of the total twinpod habitat (Roberts 2007). Little or no protections exist for federally listed plants on private land.

Ownership of one bladderpod occurrence at Duck Creek (not included in the above 10 percent estimate above) was transferred from State Division of Wildlife to a private energy company. A permanent conservation management and monitoring plan Memorandum of Agreement for the plants was attached to the land exchange.

State Land: State Natural Areas, which have been designated on 656 ha (1,620 ac) of suitable habitat for both species that coincide with the ACECs, benefit from additional monitoring and collaborative planning that support the BLM management efforts. On CDOW lands that were acquired with Federal funds, Section 7 consultation with the Service is completed prior to land exchange or development actions.

Summary of Regulatory Mechanisms: Protection of habitat for both species depends on BLM management regulations. In the past year, BLM has worked with the Service to develop and apply more comprehensive conservation measures and larger avoidance buffers for oil and gas development. To date, all Section 7 consultations for the plants have resulted in findings of not likely to adversely affect. Increasing pressure on BLM to approve applications for more intensive oil and gas development is likely to

result in formal consultations and more disturbance to potential if not occupied habitat. In the absence of the ESA's protections, we believe the situation would be considerably worse.

2.3.2.5 Other Natural or Manmade Factors Affecting Its Continued Existence

Secondary Impacts of Energy Development: Air pollution from diesel truck exhaust and from proposed coal-fired power plants for oil shale production could be a potential impact. Development of each new gas well requires between 375 and 1,375 round trips by large trucks to deliver materials, supplies and equipment, depending on the depth and location of the well. Operating wells require 0.25 truck trips per day (Kuhn 2006). Possible effects on the plants have not been predicted. Likewise, dust from heavy use of nearby roads may impede growth of the plants; information on likely impacts is not available. Conservation measures that are being implemented by BLM include dust abatement using water on roads, instead of magnesium chloride that could damage plants.

Overspray from a produced-water evaporation pond on private land has reached an adjacent BLM plant occurrence; effects on the plants have yet to be determined. Accidental release of produced water from gas wells has been observed to kill sagebrush and associated vegetation near a few well pads.

These species rely exclusively on insect pollination. As described above in section 2.3.1.1, Tepedino (1996) estimates that foraging bees may fly 4.8 km (3 mi) to obtain nesting materials. Increasing ground disturbance in the vicinity of occupied plant habitat may be curtailing nesting resources for ground nesting bee pollinators. Increasing vehicle traffic may cause mortality of pollinators. Available information regarding these potential threats is not sufficient to show that larger buffer areas would benefit the pollinators.

Climate Change: Climate change could potentially impact both species. 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). Bladderpod numbers decrease during drought years, but recover in subsequent seasons that are less dry (BLM-WRFO 1990; BLM-WRFO 2002a; Rickey and Kurzel 2007).

Changes in the global climate system during the 21st century are very likely to be larger than those observed during the 20th century (IPCC 2007). For the next two decades, a warming of about 0.2°C per decade is projected (IPCC 2007). Afterwards, temperature projections increasingly depend on specific emission scenarios (IPCC 2007). Various emissions scenarios suggest that by the end of the 21st century, average global temperatures are expected to increase 0.6 to 4.0°C with the greatest warming expected over land (IPCC 2007). Localized projections suggest the southwest may experience the greatest temperature increase of any area in the lower 48 States (IPCC 2007). It is very likely that hot extremes, heat waves, and heavy precipitation will increase in frequency (IPCC 2007). There also is high confidence that many semi-arid areas like the western United States will suffer a decrease in water resources due to climate change (IPCC 2007). Milly et al. (2005) project a 10 to 30 percent decrease in precipitation in mid-latitude western North America by the year 2050 based on an ensemble of 12 climate models.

Drought years result in a loss of plants. When occurrences also are impacted by other factors during drought years, they may require several years to recover. Dislodging of plants while monitoring during drought years has been cited as a factor in population decline at two ACEC sites (BLM-WRFO 1989; BLM-WRFO 2002b). Climate change may exacerbate the frequency and intensity of droughts in this area.

Summary of Other Factors: Monitoring to date shows some effect from drought. It does not indicate how much of a buffer area is needed to protect pollinators and reduce the cumulative effects of climate warming, pollution, dislodging and dust on plants in the vicinity of oil and gas development activities. Implementation of a 200 meter avoidance buffer is intended to minimize effects of these potential threats to habitat, plants and pollinators until additional information is available to guide management actions. However, typical buffer areas are much smaller due to physical constraints of the sites.

2.4 Synthesis

The total estimated number and density of known plant occurrences have increased since 1993 due to newly documented occurrences and to fluctuations in plant density. The number of element occurrences have increased 40 percent for the bladderpod, and 50 percent for the twinpod (CNHP 2006b, 2008). Some occurrences have declined 10 to 35 percent between 1996 and 2006 due to drought, probably combined with livestock trampling and other undetermined causes (Rickey and Kurzel 2007). It is likely that the drought is part of the warming climate system. Available survey and monitoring data is insufficient to show an overall trend in the status of either species. On a viability ranking scale of A to D, the average rank for the seven bladderpod occurrences is A-minus. The average rank for nine twinpod occurrences is B-minus.

BLM manages about 85 percent of the habitat for the twinpod and about 90 percent of the habitat for the bladderpod. Approximately 80 percent of the twinpod habitat and 85 percent of the bladderpod habitat are within ACECs (Roberts 2007) that do not entirely exclude development activities. Using the existing stipulations and conservation measures for the plants and their habitat, BLM has avoided significant direct impacts on the species up to this time. Formal consultation has not been necessary. BLM is currently working with the Service to apply appropriate buffer distances to protect the plants and their habitat from direct and indirect effects of oil and gas development activities. It is unknown if current protections provided for pollinators is adequate as the available information is insufficient to document pollinator needs.

Oil and gas development in the Piceance Basin, throughout the range of these two species, has been increasing dramatically since 2003 and is expected to continue for 20 to 30 years. Leases for oil shale research and extraction projects have been issued and additional leases covering almost the entire range of both the bladderpod and twinpod are being proposed by BLM. Under the preferred alternative for the leasing program, the plant habitat would be evaluated for impacts from oil shale development mainly through consultations under Section 7 of the ESA. Proposed energy corridors may add more ground disturbance and facilitate the increased volume of development.

As a result of requirements in the Energy Policy Act and unprecedented demands for energy development across the entire range of these two species, the BLM-WRFO is drafting an RMP amendment and associated EIS that will address the potential impacts of significant increases in oil and gas development within 1.5 million-acres over the next 20 years (BLM 2006). Under the amended RMP, it appears likely that protection from the effects of oil and gas and oil shale development for the bladderpod and twinpod and their habitat will depend heavily on Section 7 consultations. Therefore, the status of the bladderpod and the twinpod remains threatened. The overall status of these two species could be

further threatened depending on the alternative selected in the Final EIS for oil shale development.

3.0 RESULTS

3.1 Recommended Classification

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

3.2 New Recovery Priority Number

2c (No change)

Brief Rationale: The recovery priority number for both the Dudley Bluffs bladderpod and Dudley Bluffs twinpod remains 2c, indicating that (1) occurrences face a high degree of threat; (2) recovery potential is high; (3) the entities are listed at the species level; and (4) the species are in conflict with construction or other development projects or other forms of economic activity.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- 4.1 Publish a technical correction in the *Federal Register* noting the change in taxonomy from *Lesquerella congesta* to *Physaria congesta*, and correcting 50 CFR 17.12.
- 4.2 Revise the recovery plan for both species so that it reflects the best scientific and commercial information available. The revised recovery plan should include objective, measurable criteria which, when met, will result in a determination that the species be removed from the Federal List of Endangered and Threatened Plants. Recovery criteria should address all threats meaningfully impacting the species. The recovery plan should also estimate the time required and the cost to carry out those measures needed to achieve the goal for recovery and delisting.
- 4.3 Designate critical habitat for both species. “Critical habitat” is defined as:
(1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and
(2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation. This could be done concurrently, in a single rule, with other neighboring plant species.
- 4.4 Recommend at least a 200 m (656 ft) buffer between occupied or suitable habitat and ground disturbance or other activities that may affect the plants or their habitat.

- 4.5 Develop and implement consistent conservation measures in the WRFO RMP revision that will avoid and minimize impacts from all development, ORV, and grazing activities. Include protection for all occupied and suitable habitat in the conservation measures. Expand existing ACECs to include contiguous occupied and suitable habitat for the plants and their pollinators. Designate the Yellow Creek occurrence as an ACEC as was proposed in the recovery plan, plus contiguous occupied and suitable habitat.
- 4.6 Inventory remaining potential habitat on public and private lands. Report results to CNHP, BLM, and the Service.
- 4.7 Map all potential habitat, occupied habitat, and areas of existing and proposed leases, applications to drill, and development activities in GIS format.
- 4.8 Develop and implement permanent conservation agreements for occurrences on private lands.
- 4.9 Monitor the effects of development activities located within 200 m (656 ft) of plant occurrences on plants, pollinators, and habitat. Change buffers as determined by monitoring results.
- 4.10 Conduct annual status evaluations including estimates of mean density and population sizes at all Element Occurrences for the duration of intense energy activities within the range of both species.
- 4.11 Research the function of pollinators in the life history needs of the species, determine the habitat requirements of key pollinators, and adjust energy development best management practices accordingly.

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**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW
of Dudley Bluffs bladderpod (*Physaria congesta*)
and Dudley Bluffs twinpod (*Physaria obcordata*)**

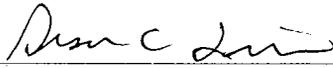
Current Classification: Threatened range-wide (both)

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed (both)

Review Conducted by: Ellen Mayo, Botanist/Plant Ecologist, Western Colorado Field Office

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

Approve: 
Field Supervisor, Colorado Ecological Services Office

Date: April 25, 2008

REGIONAL OFFICE APPROVAL:

Lead Regional Director, U.S. Fish and Wildlife Service

Approve: 
Regional Director, Region 6

Date: 6/20/08

Acting