

**WYOMING PLANT SPECIES OF CONCERN ON  
CARIBOU-TARGHEE NATIONAL FOREST: 2007 Survey Results**

**Teton and Lincoln counties, Wyoming**



Prepared for  
Caribou-Targhee National Forest

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FS Agreement No. 06-CS-11041563-097

March 2008

## ABSTRACT

In 2007, the Caribou-Targhee NF contracted the Wyoming Natural Diversity Database (WYNDD) to survey for the sensitive plant species *Androsace chamaejasme* var. *carinata* (sweet-flowered rock jasmine) and *Astragalus paysonii* (Payson's milkvetch). The one previously known occurrence of *Androsace chamaejasme* var. *carinata* on the Caribou-Targhee NF at Taylor Mountain was not relocated, nor was the species found in seven other target areas having potential habitat. *Astragalus paysonii* was found to be extant and with more plants than previously reported at the Cabin Creek occurrence. It was confirmed to be extirpated at the Station Creek Campground occurrence. During surveys for *Androsace*, four new occurrences of *Lesquerella carinata* var. *carinata* (keeled bladderpod) and one new occurrence of *Astragalus shultziorum* (Shultz's milkvetch) were discovered. In addition, the historical *Lesquerella multiceps* (Wasatch bladderpod) occurrence at Ferry Peak was relocated. These are all plant species of concern in Wyoming. In addition to field survey results, a review of collections at the Rocky Mountain Herbarium (RM) led to several occurrences of *Lesquerella carinata* var. *carinata* and *Lesquerella paysonii* (Payson's bladderpod) being updated in the WYNDD database. Conservation needs for *Androsace chamaejasme* var. *carinata*, *Astragalus paysonii*, and the three *Lesquerella* species were identified during the project.

### Report citation:

Mancuso, M. and B. Heidel. 2008. Wyoming plant species of concern on Caribou-Targhee National Forest: 2007 Survey Results. Prepared for Caribou-Targhee National Forest. Wyoming Natural Diversity Database, Laramie, WY.

Cover photo: *Lesquerella carinata* var. *carinata* habitat on Peak 10262 (foreground),  
by Michael Mancuso

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## INTRODUCTION

The Caribou-Targhee National Forest (NF) in Wyoming includes the west slope of the Teton Range, located west of Grand Teton National Park (Teton County), and the west slope of the Snake River Range (Lincoln and Teton counties; Figure 1). The two confluent ranges are administered by the Teton Basin Ranger District and Palisades District, respectively. The easternmost portion of the Palisades District that lies between the Snake River Canyon and the Bridger-Teton National Forest is jointly administered by the Targhee and Bridger-Teton National Forests and included within the scope of this study.

The Teton Range, Snake River Range, and adjacent Teton County areas have been part of several floristic inventories and multi-species studies in the past (Markow and Fertig 1993, Marriot 1993, Hartman 1995, Markow 1994, Fertig 1998a), in addition to floristic work in progress (Scott and Hartman 2007). These surveys and other herbarium records documented populations of plant species of concern on the Caribou-Targhee NF and other adjoining public lands. The U.S. Forest Service Intermountain Region (Region 4; USDA Forest Service 1994) recognizes three sensitive plant species on the Caribou-Targhee NF in Wyoming: *Androsace chamaejasme* var. *carinata* (*A. c.* ssp. *carinata*; sweet-flowered rock jasmine), *Astragalus paysonii* (Payson's milkvetch), and *Lesquerella paysonii* (Payson's bladderpod). More than 15 other Wyoming plant species of concern are known from the Caribou-Targhee NF (Wyoming Natural Diversity Database 2008). Several of these are regional endemics including *Astragalus shultziorum* (Shultz's milkvetch), *Lesquerella carinata* var. *carinata* (keeled bladderpod), and *Lesquerella multiceps* (Wasatch bladderpod).

Systematic surveys to collect status information regarding U.S. Forest Service sensitive species and other Wyoming plant species of concern have not been conducted on the Wyoming portions of the Caribou-Targhee NF, and available collection records are mostly greater than 10 years old. The Caribou-Targhee NF identified a need to document and to evaluate plant species' status for project planning and other management purposes.

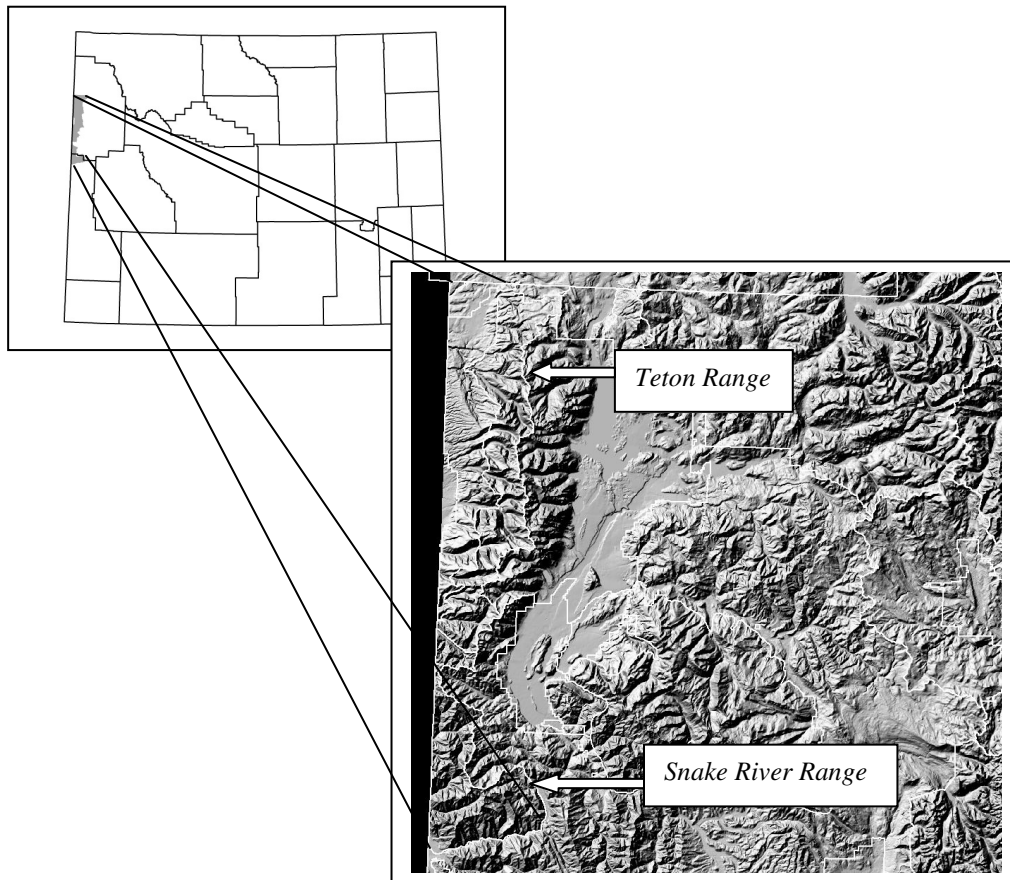
In 2007, the Caribou-Targhee NF contracted the Wyoming Natural Diversity Database (WYNDD) to survey two sensitive species. Objectives for the project were to (1) revisit and collect survey information at known *Androsace chamaejasme* var. *carinata* and *Astragalus paysonii* Element Occurrences (EO; occurrences), (2) survey for new occurrences of both species, and (3) collect information for all other Wyoming plant species of concern encountered during sensitive plant survey work using the current state list (Heidel 2007a). This report summarizes the results of our field investigation and associated conservation status implications.

Throughout this report, all mention of sensitive species refers explicitly to species designated as sensitive by the U.S. Forest Service Intermountain Region (USDA Forest Service 1994). All reference to species of concern refers to the Region 4 sensitive species plus all other Wyoming plant species of concern (Heidel 2007b). All plant nomenclature in the report is consistent with Dorn (2001); but more recent taxonomic interpretations are presented in the Discussion section, and in the updated state species abstracts (Appendix A).

## STUDY AREA

The study area is the Caribou-Targhee National Forest (NF) of Teton and Lincoln counties, Wyoming. It encompasses parts of two mountain ranges (Figure 1). The Teton Range is a north-south trending range with over 7000 ft (2135 m) of topographic relief. It is the youngest mountain range in Wyoming, uplifted approximately 10 million years ago (Love and Reed 1995). The Caribou-Targhee NF

Figure 1. Caribou-Targhee National Forest study area



in Wyoming encompasses the western slopes of the Teton Range, and the Range covers the northern 2/3 of Caribou-Targhee NF. The Teton Range is a textbook example of a normal fault, with an estimated 30,000 foot (9145 m) displacement between Mount Moran and corresponding stratigraphy buried beneath the floor of Jackson Hole (Love and Reed 1995). The steep dip and sheer slopes on the east flank expose Precambrian basement metamorphics, in contrast to the broad and relatively gentle west slope mantled by younger sedimentary deposits. The Paleozoic formations in particular are primarily of marine origin, including off-shore deposits of limestone and dolomite. Over large areas of the west slope, the combined Madison-Darby formations are very extensive (Love and Christiansen 1985). The Madison Limestone complex is 1,000-1,200 ft (305-365 m) thick and often caps the topography (Love and Reed 1995). In addition to the Darby Formation, other underlying geology includes the Bighorn and Phosphoria formations.

The Snake River Range lies at the south end of the Teton Range and trends northwest almost at right angles to the Teton Range. The Caribou-Targhee NF in Wyoming encompasses all of the Snake River Range in the state, and the Snake River Range covers the southern 1/3 of Caribou-Targhee NF in Wyoming. It represents the northern end of the Cordilleran thrust belt that formed during Early Cretaceous until middle Eocene time (Royse 1993). The thrust belt extends from northeastern Utah to northwestern Wyoming and southeastern Idaho, and consists of long parallel ridges, valleys, and canyons. Despite its greater antiquity, it shares some common stratigraphy with the Teton Range, including limestone- and dolomite-rich members. The Snake River Canyon wraps around the south end of the Snake River Range, carving a rugged westerly course through folded and faulted sedimentary rocks of the thrust belt.

Upland forest types in the study area are dominated by *Pseudotsuga menziesii* (Douglas-fir), *Pinus contorta* (lodgepole pine), *Picea engelmannii* (Engelmann spruce) and *Abies lasiocarpa* (subalpine fir). Montane sagebrush steppe and meadows, and alpine dry meadows and rock outcrop communities are also extensive (Merrill et al. 1996). The rich flora of the Targhee NF was documented by Markow (1994), and also reported in Fertig and Markow (1993). The flora combines elements of the Central and Northern Rocky Mountains with the Basin and Range Province. In addition it harbors a series of regional endemics, with their limited centers of distribution in or near the study area.

The Teton Range and Snake River Range are among the wettest areas of Wyoming with over 60 inches (152 cm) of average annual precipitation (Roberts 1989).

## METHODS

*Androsace chaemajasma* var. *carinata* and *Astragalus paysonii* were the main plant species targeted in the 2007 field investigation. Before the field season, potential survey areas for *A. c.* var. *carinata* were identified based on habitat characteristics at the previously reported Taylor Mountain occurrence, north of Teton Pass. Areas combining high elevation open ridgecrest and upper slope landform and calcareous geology of the Madison Limestone-Darby Formation mapping unit were determined using Geographic Information System (GIS) themes that included surface geology (based on Love and Christiansen 1985), public land boundaries, and Digital Raster Graphics (DRGs; i.e. U.S.G.S. 7.5' topographic quadrangles) covering the project area. Field maps of potential habitat were produced by printing both DRGs and digital orthophotographs at quarter-quad scale. The resulting sets of maps represented a discontinuous series of potential survey areas extending from Taylor Mountain, northward for approximately 20 miles (32 km) to North Leigh Creek, and also southward for approximately 20 miles (32 km) to the south end of the study area above the Snake River Canyon. In addition to a resurvey of Taylor Mountain, seven other areas were selected for field investigation based on their extent of potentially suitable *A. c.* var. *carinata* habitat, their relatively even distribution along the length of the project area, and reasonable access (Table 1). At the Grand Targhee Resort, a local naturalist leading an Elderhostel outing asserted knowledge of the Teton Range flora and claimed to remember seeing a population of *A. c.* var. *carinata* several years ago at Table Mountain. Based on this conversation, her claim seemed credible and Table Mountain was added as an eighth area to survey.

Table 1. Areas targeted to survey for *Androsace chaemajasma* var. *carinata* on the Caribou-Targhee National Forest, 2007 (from north to south)

General Location	USGS 7.5' quad
Freds Mountain	Granite Basin
South Leigh Creek-North Leigh Creek divide	Granite Basin
Table Mountain	Grand Teton
Upper South Fork Darby Creek/Fossil Mountain	Mount Bannon
Taylor Mountain	Rendezvous Peak
Head of Sherman Canyon	Rendezvous Peak
East Table Creek – South Cabin Creek divide	Pine Creek
Ferry Peak	Ferry Peak

Before the field season, digital aerial photographs were compiled to consider potential survey areas for *Astragalus paysonii*, but there were no photointerpretation signatures or GIS layers identified for setting targets in advance. Species' habitat is typically characterized as well-drained, sandy soils having some measure of natural or man-made disturbance (Fertig and Marriott 1993). This corresponds with the habitat characteristics of previously known sites (Ozenberger 1996) on areas of Quaternary alluvium. Areas combining low elevation river terraces with alluvial benches and terraces were targeted within the eastern end of Caribou-Targhee NF, jointly administered by the Bridger-Teton NF. This linear potential habitat area spanned four USGS 7.5' topographic quadrangles (Alpine, Ferry Peak, Pine Creek, Munger Mountain), and was highly discontinuous within the rugged terrain of the Snake River Canyon. Survey extent was also interrupted in gentle terrain to exclude private inholdings. In addition, two Bridger-Teton NF parcels on the Snake River directly upstream from the known occurrences were included in surveys for *A. paysonii*, on the Munger Mountain and Camp Davis quadrangles.

Field survey for *Androsace chaemajasma* var. *carinata* was conducted June 18 – 24 (Mancuso) and July 8-10, 2007 (Heidel). Maps show routes and the location of each survey area (Appendix B). Survey for *A. c.* var. *carinata* began by revisiting the Taylor Mountain site, followed by surveys to the seven other target areas. Surveys were conducted by walking intuitive meandering transects to cover as much potential *A. c.* var. *carinata* habitat as possible. Vertical rock wall faces in portions of some survey areas were not directly searched for safety reasons. During the survey, other Wyoming plant species of concern were sought as secondary target species, including *Astragalus shultziorum*, *Lesquerella paysonii*, *Lesquerella carinata* var. *carinata*, and *Lesquerella multiceps*. Location, abundance, phenology, habitat, threat assessment, and other conservation information were collected at occurrences of each target species encountered. Coordinates were obtained to map the location of each occurrence using a navigation grade GPS (Garmin Legend) unit. Field information was documented by completing a Forest Service TES Plant Element Occurrence field form for each occurrence. Additional GPS coordinates were periodically taken to help map all survey routes on the appropriate topographic quadrangle.

Field surveys for *Astragalus paysonii* were conducted July 7-8, 2007 (Heidel). Surveys began with revisiting the two known occurrences on the Caribou-Targhee NF. They were first documented in 1995 as part of the environmental assessment conducted by the U.S. Forest Service prior to the addition of lanes and re-contouring slopes along the U.S. Highway 26/89 corridor (Ozenberger 1996). The 2007 survey was conducted several years after completion of all highway construction and accompanying corridor re-vegetation work. Three additional areas upstream and eight additional areas downstream had potentially suitable habitat, as determined by visits to all public access points and pull-offs.

## RESULTS

The original study scope focused on *Androsace chaemajasma* var. *carinata*, but the 2007 surveys provided new or updated information on five others as well (Table 2; Figure 2). These six species represent all Forest Service sensitive and most globally rare species known to occur on the Caribou-Targhee NF in Wyoming. Addition of *Astragalus paysonii* to the 2007 study scope was prompted in part by documentation of *Aquilegia jonesii* and report of possible *Lesquerella multiceps* by Joan Lucas and Curtis Haderlie, Wyoming Native Plant Society members (Heidel 2007b).

The results presented in this section contributed to updated state species abstracts with revised state distribution maps (Appendix A), that will be posted on the internet (<http://www.uwyo.edu/wyndd>). The sets of survey photos were compiled with survey maps (Appendix B), the new and updated element occurrence information and maps prepared for the six species on the Caribou-Targhee NF (Appendix C), and field survey forms for *Lesquerella carinata* var. *carinata* conveyed using the USDA Forest Service 2005 TES field form (Appendix D). All records are also submitted as GIS files with linked databases.

Table 2. Wyoming plant species of concern documented on the Caribou-Targhee National Forest, 2007.

Scientific name	USFS Status	Pre-survey conservation ranks	# of EOs on CTNF/ or BTNF (WY) <sup>1</sup>	# of EOs off CTNF and BTNF (WY)	Study results summary
<i>Androsace chaemajasma</i> var. <i>carinata</i>	Sensitive	G5T4/S2	1/0	5 (1)	Failed to find 1 EO
<i>Astragalus shultziorum</i>	-	G3/S3	4 /21	1	Found 1 new EO at <i>Androsace</i> site
<i>Astragalus paysonii</i>	Sensitive	G3/S3	1(1)/35(1)	0	Updated 1 EO; confirmed 1 EO as extirpated
<i>Lesquerella carinata</i> var. <i>carinata</i>	-	G3G4T3T4/S2	6/3	6	Found 4 new EOs; added 1 based on herbarium record; deleted 1 based on annotated herbarium specimen
<i>Lesquerella multiceps</i>	-	G3/SH	1/0	0	Relocated 1 historic EO
<i>Lesquerella paysonii</i>	Sensitive	G3/S3	3/33	6	No change in number of EOs. Annotated 2 <i>L. carinata</i> specimens to <i>L. paysonii</i> .

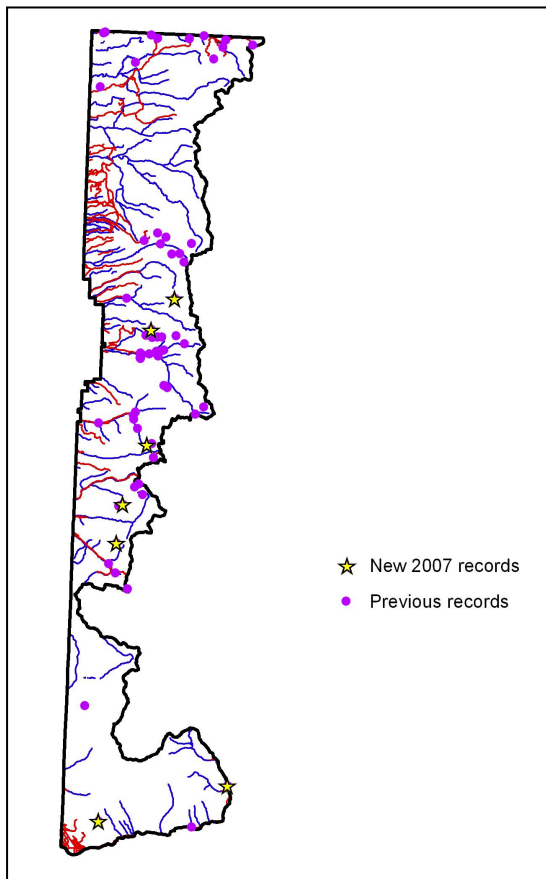


Figure 2. Map of new and updated element occurrence records resulting from sensitive plant inventory on the Caribou-Targhee National Forest, 2007

Four northern-most stars – *Lesquerella carinata* var. *carinata*  
 Middle southern star – *Astragalus shultziorum*  
 Southeast star – *Astragalus paysonii*  
 Southwest star – *Lesquerella multiceps*

★ New 2007 records  
 ● Previous records

<sup>1</sup> CTNF = Caribou-Targhee NF, BTNF = Bridger-Teton NF  
 The number of extant occurrences on the Caribou-Targhee NF is presented before “/” followed by the number of extant occurrences on the Bridger-Teton NF. Values in parentheses indicate the number of extirpated or historic occurrences on the Forests.



Table 3. New occurrence information for Wyoming species of concern on the Caribou-Targhee National Forest, 2007.

Species	Location	EO #	# of plants	Size in ac (ha)	# of discrete polygons (colonies)
<i>Astragalus paysonii</i>	Cabin Creek	35	200-500	30 (12)	1
<i>Astragalus shultziorum</i>	Taylor Mountain	26	500-1000	32 (13)	1
<i>Lesquerella carinata</i> var. <i>carinata</i>	Fossil Mountain	12	ca 1000+	7 (3)	2
<i>Lesquerella carinata</i> var. <i>carinata</i>	Freds Mountain	10	ca 2000	22 (9)	5
<i>Lesquerella carinata</i> var. <i>carinata</i>	North of Granite Basin	11	300+	4 (1.5)	1
<i>Lesquerella carinata</i> var. <i>carinata</i>	Upper Sherman Canyon	9	ca 300+	0.7 (0.3)	2
<i>Lesquerella multiceps</i>	Ferry Peak	1	ca 10,000	86 (35)	1

Table 4. New habitat information for Wyoming species of concern on the Caribou-Targhee National Forest, 2007.

Species	Location	EO #	Aspect	Slope	Elev. (ft)
<i>Astragalus paysonii</i>	Cabin Creek	35	E	flat to gentle	5840 - 5860
<i>Astragalus shultziorum</i>	Taylor Mountain	26	SE to NW	flat to steep	10,000 - 10,360
<i>Lesquerella carinata</i> var. <i>carinata</i>	Fossil Mountain	12	All	flat to steep	10,000 - 10,400
<i>Lesquerella carinata</i> var. <i>carinata</i>	Freds Mountain	10	E to W	mostly gentle, to 25%	9,000 - 9,900
<i>Lesquerella carinata</i> var. <i>carinata</i>	North of Granite Basin	11	SW to NW	gentle, mostly <20%	9,850 - 9,970
<i>Lesquerella carinata</i> var. <i>carinata</i>	Upper Sherman Canyon	9	W to NW	flat to gentle	10,000 - 10,200
<i>Lesquerella multiceps</i>	Ferry Peak	1	Mainly E, also S, N	flat to steep	8,600 - 9,500

*Androsace chaemajasma* var. *carinata* was not relocated at Taylor Mountain, nor was it found at any of the other survey areas. A related species, *A. septentrionalis* (pygmyflower rock jasmine), was relatively common at most survey areas including Taylor Mountain, although only a few individuals were observed on the summit block of Table Mountain. An Element Occurrence Record (EOR) summarizes *A. c.* var. *carinata* information for Taylor Mountain, accompanied by a map (Appendix C).

While searching for *Androsace chaemajasma* var. *carinata*, four new occurrences of *Lesquerella carinata* var. *carinata*, and one new occurrence of *Astragalus shultziorum* were discovered, and the one known historic *Lesquerella multiceps* occurrence in Wyoming was relocated (Tables 3 and 4). In addition, a previous report of *Aquilegia jonesii* (Jones' columbine) on Ferry Peak (Joan Lucas pers. commun. 2007) was confirmed, representing the first record of this regional endemic for the Caribou-Targhee NF and Lincoln County, Wyoming, and a southern range extension for the species. No other secondary target species were encountered during the *Androsace chaemajasma* var. *carinata* or *Astragalus paysonii* surveys. EORs with maps (Appendix C) and supporting field data forms (Appendix D) summarize

information and show the location of each new *Lesquerella carinata* var. *carinata* occurrence. Photos taken of each species are presented below (Figures 3-6), and a complete set of site photos are presented with field data forms (Appendix D).

Figure 3. *Astragalus paysonii* #035  
(Cabin Creek) by B. Heidel



Figure 4. *Astragalus shultziorum* #026  
(Taylor Mountain) by B. Heidel



Figure 5. *Lesquerella carinata* var. *carinata* #009  
(Peak 10262 by Sherman Canyon) by Michael Mancuso



Figure 6. *Lesquerella multiceps* #001  
(Ferry Peak) by Joan Lucas



More new data was documented for *Lesquerella carinata* var. *carinata* than any other taxon. The four new occurrences ranged in size from approximately 300 to 2000 plants, supporting a total of >3500 individuals. All but one was comprised of multiple suboccurrences separated by unoccupied habitat. Plants occurred on varied aspects along open ridgecrests and associated gentle to steep upper slope positions between approximately 9000 – 10,400 ft (2740 - 3170 m) elevation. Sites were underlain by Madison Limestone-Darby Formation geology and had stony or shaley soil, bedrock at or near the surface, and high rock ground cover. Low-growing forbs, or a mix of forbs and bunchgrasses dominated the vegetation at each occurrence, although patches of subalpine fir and *Pinus albicaulis* (whitebark pine) often occurred nearby. Associated species at multiple occurrences included *Pteryxia terebinthina* (turpentine wavewing), *Cymopterus glaucus* (waxy springparsley), *Sedum lanceolatum* (spearleaf stonecrop), *Ivesia gordonii* (Gordon's ivesia), *Frasera speciosa* (elkweed), pygmyflower rock jasmine, *Stenotus acaulis* (stemless goldenweed), and *Elymus spicatus* (bluebunch wheatgrass).

*Lesquerella carinata* var. *carinata* occurrences at North of Granite Basin and Upper Sherman Canyon were undisturbed and had no obvious threats. Portions of the Fossil Mountain and Freds Mountain occurrences have been slightly disturbed by official or user-created trails and associated recreational use. However, these disturbances did not appear to threaten the long-term persistence of *L. c.* var. *carinata* in either area. Evidence of livestock grazing was absent at or near any of the occurrences. A few *Taraxacum officinale* (common dandelion) plants at Fossil Mountain were the only introduced plant species observed in any of the occurrence areas.

In addition to field survey results, a review of collections at the Rocky Mountain Herbarium (RM) led to a few updates being made to the WYNDD databases. A specimen originally identified as *Lesquerella carinata* var. *carinata* from Teton Pass was annotated to *L. paysonii* (Evert 23613). Teton Pass straddles the boundary between the Caribou-Targhee NF and the Bridger-Teton NF. Another putative *L. carinata* var. *carinata* specimen (Ripley and Barneby 8897), from the vicinity of Teton Pass collected in 1947 and deposited at the New York Botanical Garden and Smithsonian Institute, was unavailable for review. A specimen from Grand Teton National Park originally identified as *L. carinata* var. *carinata* was also annotated to *L. paysonii*. A third specimen identified as *L. carinata* var. *carinata* (Evert 32064) was added as a new occurrence to the WYNDD database for Rendezvous Pass, and area that also straddles the Caribou-Targhee NF boundary. The specimen lacks fruits to confidently distinguish it from *L. paysonii*, a species already known from the Rendezvous Pass area. It was entered in the WYNDD database as a record of uncertain determination, and needing field evaluation. Teton Pass was the only area previously known to have collection records of both *L. carinata* var. *carinata* and *L. paysonii*. Rendezvous Peak and Freds Mountain now also have collection records of both taxa. However, only Freds Mountain has both species vouchered by specimens in fruit. There are no other reports of both species being present in the same locality.

*Lesquerella multiceps* was found in habitat similar to that for *L. c.* var. *carinata*, although in a separate mountain range, the Snake River Range. It occurred along approximately 2 miles (3 km) of ridgeline on Ferry Peak interrupted by breaks and knolls, but semi-continuous. The species was first documented at this location in 1923, but had not been reported in intervening years. The population approached or exceeded 10,000 plants, and density varied greatly, from 1 - 50+ plants/m<sup>2</sup>. Associated species included *Elymus spicatus*, *Bupleurum americanum* (American thorow wax), *Sedum debile* (orpine stonecrop), *Leucopoa kingii* (spike fescue), *Linum lewisii* (blue flax), *Penstemon procerus* (pincushion beardtongue) and *Eremogone congesta* (ballhead sandwort). Recreational use levels are low at Ferry Peak, but as a promontory close to the town of Alpine, it may at risk of developments like cell phone tower construction.

*Astragalus shultziorum* was also documented incidental to *Androsace chamaejasmie* var. *carinata* survey. It occurred along about 0.8 miles (1.3 km) of ridgeline on Taylor Mountain. It was in very early

flower and inconspicuous on gravelly and rubble-covered slopes. A preliminary estimate of over 300 plants was made for the new occurrence. It was associated with characteristic alpine species such as *Sibbaldia procumbens* (creeping sibbaldia), *Silene acaulis* (moss campion), and *Carex elynoides* (blackroot sedge). Recreational use is frequent at Taylor Mountain, but the rocky summit ridge is scarcely affected, and it is mainly on side slopes that do not get recreational use.

The *Astragalus paysonii* survey documented a persisting population at Cabin Creek that had similar or increased plant numbers compared to the original survey over a decade ago. At Cabin Creek, the population extended for over 1 mile (2 km) north of the mouth of Cabin Creek, on both sides of the highway. *Astragalus paysonii* occurred in three disturbed settings: re-graded highway right-of-way, bladed roads within the abandoned Elbo Campground, and what seemed to have been the camping pad sites in the abandoned Elbo Campground. The camping pad settings did not appear to have been reworked by machinery, but were dry, sparsely-vegetated openings with a high component of annual and non-native species. When the campground was operating, there would have been mowing, foot traffic, soil compaction, and perhaps other site alterations. At all three settings, *A. paysonii* was sought, but not found in the adjoining forested habitats outside of the zones of heavy disturbance.

The *Astragalus paysonii* occurrence at Cabin Creek was reported to have at least 41-43 plants in 1995. The 1995 survey was conducted before highway widening but after campground abandonment, and it was limited to within 200 ft (60 m) of the highway centerline. The population size of *A. paysonii* was estimated at 200-500 plants in 2007, representing a net increase. It is possible that widening of the right-of-way and succession within the abandoned campground created new habitat. It was noted in 1995 that the scattered colonies were usually made up of 2-5 plants. In 2007, there was one colony with more than 30 plants, and many of the 12 colonies had over 5 individuals. This positive trend in *A. paysonii* abundance was tempered by the observation that some of the largest colonies consisted of mostly brown, shriveled, dead-looking plants, particularly in the camping pad sites. It appeared that many of the shriveled plants did not flower in 2007, and it was not known whether they would be expected to survive.

The overall *Astragalus paysonii* setting at Cabin Creek was characterized as mid-seral stands of subalpine fir and lodgepole pine on gravelly, silt-loam soil, mainly on a terrace less than 33 ft (10 m) above the Snake River. *Astragalus paysonii* was present along both sides of the highway corridor, and apparently in higher numbers on the widened west side, present on both dips and rises, and generally concentrated at the woodland margin. Plants were present in relatively open wooded areas in the former campground. Associated species in the open highway corridor included *Amelanchier alnifolia* (juneberry), *Elymus spicatus*, *Lupinus argenteus* (silver lupine), seeded *Linum lewisii*, and *Medicago lupulina* (bird's-foot treefoil). Associated species in the partially-shaded abandoned roadbed and camping pad sites included *Agropyron repens* (quackgrass), *Medicago sativa* (alfalfa), *Poa pratensis* (Kentucky bluegrass), and *Poa bulbosa* (bulbous bluegrass). *Astragalus paysonii* was absent within locally common patches of native species of *Antennaria* ssp. (pussytoes) and *Carex* ssp. (sedges). There were no apparent threats or management activities in occupied habitat apart from highway corridor maintenance. Although introduced species were common in places, noxious weeds were not seen in the corridor. Any selective thinning in the abandoned campground to modify stand structure or open the views between the highway and the river could serve the dual purposes of gauging *A. paysonii* response to canopy reduction.

Furthermore, *Astragalus paysonii* was not relocated along the highway at the Station Creek Campground entrance, confirming earlier inferences that it was extirpated from this locale. The Station Creek population was previously reported as a right-of-way population comprised of six plants (Ozenberger 1996), surveyed before the highway corridor was graded and re-contoured.

## DISCUSSION

The 2007 field survey and associated review of selected specimens at the Rocky Mountain Herbarium obtained new or updated information for six plant species of concern in Wyoming, including three species considered sensitive for the Caribou-Targhee NF. Five of the six plant species are calciphiles, pointing to the high biogeographic significance of the high elevation limestone and dolomite ridges and peaks of the Caribou-Targhee NF. Survey results indicate *Androsace chaemajasma* var. *carinata* and *Astragalus paysonii* are rare within the study area, and *Lesquerella carinata* var. *carinata* to be more common than previously documented. Relocation of the historic *Lesquerella multiceps* occurrence at Ferry Peak confirms that this species is extant in Wyoming. Discussions of the survey results and implications follow for each of the six species. Taxonomic status information and recommendations to the Caribou-Targhee NF are included as appropriate.

### *Androsace chamaejasme* var. *carinata*

*Androsace chaemajasma* var. *carinata* is a mat-forming perennial herb with aromatic white or cream-colored flowers that bloom soon after snowmelt. The species is circumboreal and widespread across western North America, extending from Alaska and Canada southward in the mountains as far as New Mexico (Holmgren 2005a). It has been documented from seven occurrences in Wyoming, including one on the Caribou-Targhee NF at Taylor Mountain (Wyoming Natural Diversity Database 2008). It is not known from Idaho, but occurrences in New Mexico and Utah are within the Forest Service's Intermountain Region (Region 4). Except for Taylor Mountain, other Wyoming occurrences, and all Colorado occurrences, are in the Rocky Mountain Region (Region 2).

In Wyoming, *Androsace chaemajasma* var. *carinata* is known from open, high elevation, rocky ridgecrests and slopes, rock outcrops, stabilized talus, meadow, and forest opening habitats with other low-growing vegetation, almost exclusively on limestone substrate. Most occurrences in the state are secure due to their location in rugged, relatively remote areas and apparently stable habitats without large-scale, serious disturbance threats.

The status of *Androsace chaemajasma* var. *carinata* was summarized through 1997 (Fertig 1998b) with further documentation the following year during botanical surveys (Jones and Fertig 1999a, Jones and Fertig 1999b). Information on the species was compiled in a state species abstract by Walter Fertig that is updated in Appendix A.

*Androsace chaemajasma* var. *carinata* was collected on the summit ridge of Taylor Mountain in 1999, but precise coordinates, habitat, plant abundance, and the extent of the occurrence were not documented (Wyoming Natural Diversity Database 2008). Located approximately 3 miles (5 km) north of Teton Pass, Taylor Mountain is the only occurrence of *A. c.* var. *carinata* known for the Caribou-Targhee NF and the Teton Range. Other occurrences in Wyoming are located on the east slope of the Wind River Range and the northern Absaroka Range, approximately 68 and 110 air miles (110 and 175 km) to the east and the northeast, respectively, on the Shoshone NF. There is also a historical 1892 collection of *A. c.* var. *carinata* from Yellowstone National Park (Wyoming Natural Diversity Database 2008). Most potential habitat in the Park has been surveyed, but the species has not been found (Jennifer Whipple pers. commun. 2008). Known occurrences on the Shoshone NF are within approximately 24 air miles (39 km) of the Park boundary.

The open, rocky summit ridge of Taylor Mountain supports relatively sparse cushion or low-growing herbaceous vegetation, with patches of conifers approaching the crest in places (Appendix C). Madison Limestone is the dominant rock, although outcrops of Gypsum Spring Formation (an

interbedded red shale, dolomite, and gypsum geology of Jurassic age) also occur in the area (Love and Christiansen 1985). The mountain reaches >10,300 ft (3140 m) elevation, with the summit ridge rimmed by nearly vertical walls descending to the southeast, and a mix of gentle to steep slopes descending to the northwest. Hikers visit Taylor Mountain, but the area appeared undisturbed. Based on descriptions from other Wyoming occurrences, habitat at Taylor Mountain appeared suitable for *Androsace chaemajasma* var. *carinata*.

Although mostly snow-free, several persistent snowbanks covered portions of Taylor Mountain's summit ridge in late June. If restricted to a small area, it seemed possible that *Androsace chaemajasma* var. *carinata* could be missed because of the snow cover. A second visit to Taylor Mountain in July after all the snow had melted also failed to relocate the species. The original identification of *A. c.* var. *carinata* at Taylor Mountain remains unquestioned. However, it is now uncertain if the occurrence remains extant. If future surveys continue to fail in the relocation of *A. c.* var. *carinata* at Taylor Mountain, then extirpation of the occurrence can be considered.

The anecdotal report of *Androsace chaemajasma* var. *carinata* at Table Mountain was not confirmed during the survey. It is not known whether the anecdotal report was in error, or if plants were missed. Despite a thorough survey around the summit zone, it was impossible to search every nook and cranny, especially in very steep sections. Table Mountain is a popular hiking destination for its spectacular views of the Teton Range. A small, but showy wildflower like *A. c.* var. *carinata* would make a tempting collection to a recreational visitor. It would probably not take long for a small, local population to be extirpated if even just a small fraction of visitors removed some plants each year. A few *Androsace septentrionalis* plants occurred atop Table Mountain but there is no and the shared genus name may have been a source of confusion. However, *A. c.* var. *carinata* is a perennial with clustered heads of comparatively large flowers having yellow-to-orange "eyes", and looks very different from *A. septentrionalis* with its annual growth form, highly-branched inflorescence, and tiny white flowers with inconspicuous white-colored "eyes".

Habitat that appeared to be suitable for *Androsace chaemajasma* var. *carinata* occurred in portions of all the high elevation areas surveyed, including the upper Sherman Canyon, Fossil Mountain, Freds Mountain, Table Mountain, and South Leigh Creek-North Leigh Creek divide areas. All had open, rocky ridgecrest and upper slope habitat dominated by low herbaceous vegetation and Madison Limestone-Darby Formation geology. Surveys were locally thorough at each of the areas visited. The original collection label clearly placed the location at Taylor Mountain except for one inconsistency in reporting the range at "116W" rather than "118W," but all else is consistent and taken as accurate.

*Androsace chaemajasma* var. *carinata* is rare on the Caribou-Targhee NF. It was not relocated at the one previously documented occurrence, nor was it found during surveys of other areas on the Forest with potentially suitable habitat. We recommend that *A. c.* var. *carinata* remain on the Caribou-Targhee NF sensitive plant list, and another attempt to relocate the Taylor Mountain occurrence be made in the future.

The nomenclature accepted in Dorn (2001) is followed by WYNDD in almost every case. There is an alternative treatment that does not recognize a distinction between *Androsace chaemajasma* var. *carinata* and *A. c.* var. *lehmanniana* (cited in Hartman and Nelson 2001) put forward by T. Kelso, genus author for pending treatment of *Androsace* in *Flora of North America* (FNA). She maintains that characteristics originally used to define species-level separation and then subspecies or variety distinctions between *A. chaemajasma* var. *carinata* and *A. c.* var. *lehmanniana* do not hold. When growing on Pikes Peak (Colorado) or in exposed situations, leaves are keeled and the growth form tight. However, when growing or transplanted into less harsh environments, the leaves uncurl, and plants have more luxuriant and open forms identical to those found in moist, protected areas in Alaska (Tass Kelso pers.

commun. 2008). This means that plants of the Central and Southern Rocky Mountains do not represent a distinct taxon. There may still be taxonomic distinctions below the species level between populations in Europe versus North America and Asia. After publication, the WYNDD will follow the taxonomy of FNA for *Androsace*.

### *Astragalus paysonii*

*Astragalus paysonii* is a perennial in the bean family approximately 10-20 in (20-45 cm) tall, with relatively inconspicuous white flowers. Fruit pods are crescent-shaped, 10-17 mm long, 3-sided in cross-section, and bent downward when mature (Figure 3). It is a Forest Service Regions 1 and 4 sensitive species, and regionally endemic to the Clearwater Mountains of north-central Idaho (Region 1), the Palisades Reservoir area of eastern Idaho, and the Wyoming, Salt River, and Gros Ventre ranges of western Wyoming (Region 4). *Astragalus paysonii* occurs primarily in disturbed areas such as recovering burns, clear cuts, road cuts, and blow downs. It is usually found on sandy soils with low cover of forbs and grasses. Elevation range from 5800 - 9600 ft (1770 - 2925 m; Lorain 1990, Fertig and Marriott 1993).

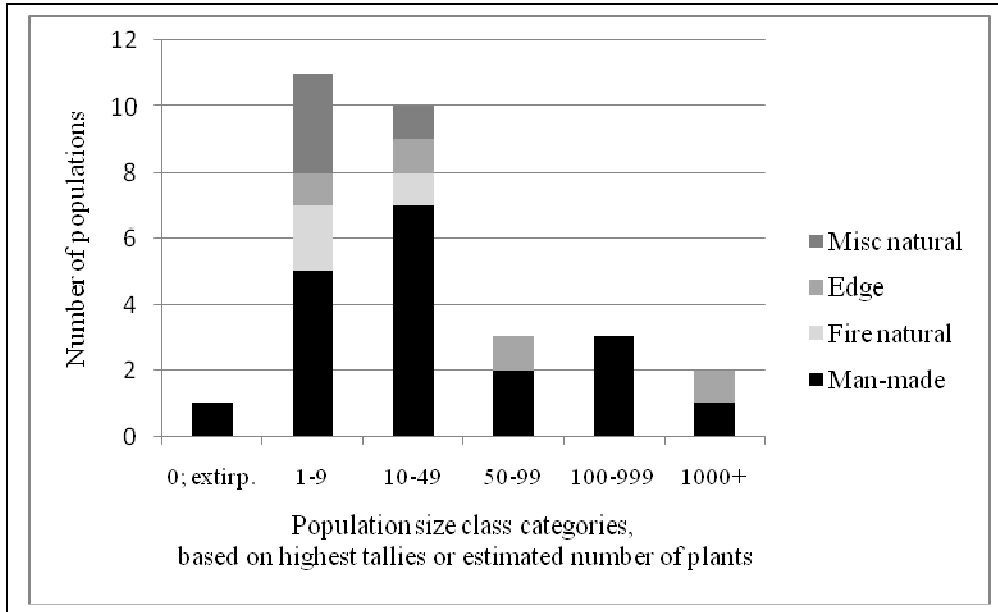
*Astragalus paysonii* status in Wyoming was addressed by Fertig and Marriott (1993) with emphasis on the Bridger-Teton National Forest. Information on the species was compiled in a state species abstract by Walter Fertig that is updated in Appendix A.

One recent addition of *Astragalus paysonii* to the WYNDD database was documented by fire management personnel in the Bridger-Teton NF, who found it in a lodgepole pine stand that burned in an intense crownfire three years earlier (addition to EO #33; Scott 2007). There is also a report of it after wildfire in riparian bottomlands (Dwire 2007), pending species verification.

The 2007 re-survey at a previously reported occurrence at Station Creek Campground found it to be extirpated, so *Astragalus paysonii* is now known from only one extant occurrence on the Caribou-Targhee NF. Some of the *A. paysonii* plants in the Cabin Creek population appeared to be in poor condition, a potential matter of conservation concern for the species on the Caribou-Targhee NF. We recommend *A. paysonii* maintain its sensitive species status for the Caribou-Targhee NF. To gain a comprehensive status picture for *A. paysonii* in Region 4 it would be necessary to conduct a status survey update for *Astragalus paysonii* on both the Caribou-Targhee NF (Idaho and Wyoming) and Bridger-Teton NF. This would entail a systematic survey to relocate historic collection sites in the Palisades District in Idaho, and repeat surveys of representative occurrences in Wyoming having the most complete population information, to gauge trend and relative contributions of natural vs. man-made disturbance in species' persistence. The Cabin Creek occurrence also presents monitoring opportunities to study the species' response to maintenance or other management activities at a readily accessible area.

The Cabin Creek population of *Astragalus paysonii* is one of only five known populations in Wyoming with numbers of 100+ plants. A rudimentary sorting and graphing of the 37 known records of *A. paysonii* from Wyoming indicates that of the 30 known populations with population size and habitat information, over 70% had less than 50 plants. At least 63% of all known populations were mainly or exclusively in man-made disturbance habitats, including both large and small populations. Man-made disturbance settings included skid trails, clearcuts, road grading, and the abandoned road and campground settings of Cabin Creek. It appeared that the only large populations in natural habitat were found in ecotones (forest margins; Figure 7). The Cabin Creek population is in an area of the Caribou-Targhee NF administered by the Bridger-Teton NF. While the Caribou-Targhee NF manages the grazing allotment within this area, the Bridger-Teton NF is responsible for those practices most likely to influence *A. paysonii*, including roads, recreation and noxious weed management.

Figure 7. *Astragalus paysonii* populations in Wyoming, by size class and habitat setting



The *Astragalus paysonii* records in Idaho, representing the rest of the species’ distribution, follow similar patterns. Idaho appears to have a greater number of large *A. paysonii* populations (ten populations with 100+ plants) than Wyoming. The populations are in Nez Perce National Forest (Region 1). The accompanying habitat information at each of Idaho’s large populations mentions the presence of man-made disturbances (Idaho Conservation Data Center 2008). Any interpretations are preliminary without more deliberate effort to gauge trend and relative contributions of natural vs. man-made disturbance in species’ persistence.

*Astragalus shultziorum*

*Astragalus shultziorum* is a low perennial in the bean family with stems that arise from a buried rootcrown. It produces 1-4 small, cream-colored, lavender-tinged flowers, typically in pairs (Figure 4). Fruit pods are straight, 10-12 mm long, and 3-sided in cross-section. It is a regional endemic known from the Teton, Salt River and Wind River ranges of western Wyoming, and recently discovered in the Snake River Range in adjoining Idaho. *Astragalus shultziorum* is found in subalpine and alpine forb communities on shallow, rocky, calcareous soils, ranging from 8800 - 11,500 ft (2680 - 3505 m; Figure 8). *Astragalus shultziorum* status in Wyoming was addressed by Marriott (1990) with emphasis on the Bridger-Teton National Forest. The most current information about Shultz’ milkvetch in Wyoming is summarized in an updated species abstract (Appendix A).



*Lesquerella carinata* var. *carinata*

*Lesquerella carinata* var. *carinata* is a low-growing perennial herb in the mustard family with dense silvery-pubescence, yellow flowers, and flattened fruits strongly keeled along the margins and partition that make the siliques appear diamond-shaped in cross-section (Figure 5). *Lesquerella carinata* var. *carinata* is regionally endemic to the Teton and Gros Ventre ranges in northwestern Wyoming and several mountain ranges in east-central Idaho (Fertig 1997a). It occurs on calcareous outcrops of sparsely vegetated gravel, talus, shaley material, or other rocky rubble openings on slopes and ridgecrests from mid- to high elevations in the foothills and mountains (Rollins and Shaw 1973, Rollins 1993). Information on the species was compiled in a state species abstract by Walter Fertig that is updated in Appendix A.

Discoveries of *Lesquerella carinata* var. *carinata* during the field survey increased the number of known occurrences in Wyoming from 8 to 12 (Wyoming Natural Diversity Database 2008). Prior to 2007, the species was reported from only two occurrences within the Caribou-Targhee NF, one an historical occurrence from South Teton Canyon, the other from the Teton Pass area, both at >8000 ft (2440 m) elevation. Most other *L. c.* var. *carinata* occurrences in Wyoming are reported from elevations between approximately 6500 – 7700 ft (1980 – 2350 m) in the Jackson Hole and Grand Teton National Park areas. The discovery of *L. c.* var. *carinata* at elevations up to 10,400 ft (3170 m) indicates potential habitat for this species on the Caribou-Targhee NF is more extensive than previously thought. Additional occurrences may be scattered on the west slope of the Tetons and perhaps other mountain ranges in the region having extensive calcareous outcrops. However, there has been sufficient botanical exploration on the Caribou-Targhee NF and adjacent areas to discount *L. c.* var. *carinata* being a common species.

Habitat of *Lesquerella carinata* var. *carinata* has been described at most previously documented occurrences in Wyoming as dry, sparsely vegetated outcrops dominated by bunchgrass and cushion plant species on slopes and ridgecrests with calcareous soil (Wyoming Natural Diversity Database 2008). Shrubs such as mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) may be present in these communities, but tend to be absent at microsites with *L. c.* var. *carinata* (Fertig 1997). The four occurrences discovered during the field survey have similar habitat attributes, except for their much higher elevation and the tendency for low-growing forb species to be as common, or more so, than graminoids. Prior to our survey, only *L. paysonii* was known from alpine elevations, while both species were known from lower elevations.

Three of the *Lesquerella carinata* var. *carinata* occurrences discovered in 2007 are located within the Jedediah Smith Wilderness Area. They are largely undisturbed, although a hiking trail at the pass separating the South Fork Darby and Fox creek drainages cuts through a small portion of the occurrence below Fossil Mountain. The pass provides access to a ridge used by scramblers to climb Fossil Mountain, and a minor, user-created trail ascending the ridge bisects another segment of the occurrence. The Freds Mountain area contained the largest *L. c.* var. *carinata* occurrence found in 2007. The Grand Targhee Resort ski lift runs to the top of Freds Mountain and some *L. c.* var. *carinata* habitat was probably lost during construction of the lift towers and associated out buildings. A minor, user-created walking trail runs southward from the ski lift near the ridgecrest and passes through habitat occupied by the species. Another portion of the occurrence is located close to Trail 023, while other segments also occupy areas that receive some recreational scrambling use. Trails and associated recreational impacts were minor within both the Fossil Mountain and Freds Mountain occurrences, and did not appear to threaten the long-term persistence of *L. c.* var. *carinata* or its habitat. Rocky habitats at each of the *L. c.* var. *carinata* occurrences appeared stable, and although speculative, population trend is also probably stable at these sites on the Caribou-Targhee NF.

*Lesquerella paysonii* is a Forest Service sensitive species that occurs in the Teton Range on the Caribou-Targhee NF and Bridger-Teton NF. It looks similar to the closely related *L. carinata* var. *carinata*, and mature fruits are needed to reliably distinguish the two taxa. Primary habitat for *L. paysonii* includes windswept, gravelly, calcareous ridgecrests, slope openings, and rocky benches (Fertig 1997b), with the majority of Wyoming occurrences at >8,000 ft (2440 m) elevation, but others occurring down to approximately 5,500 ft (1675 m). Habitat occupied by *L. paysonii* mirrors habitat supporting *L. c.* var. *carinata* occurrences found during the 2007 field survey. Their similar appearance, close overlap in habitat conditions, and apparent occasional sympatry (discussed below), can confound ready distinction between the two species in the field.

There is no longer an elevation distinction or geographic distinction between the two taxa in Teton County, Wyoming as reported previously. The distribution of the two species does not overlap in Idaho or in Montana. The occurrence of more than one *Lesquerella* species at the same site is rare (Rollins and Shaw 1973). *Lesquerella carinata* var. *carinata* found in 2007 at Freds Mountain is in the same area as a previously reported occurrence of *L. paysonii*. In addition, both species may be sympatric at Teton Pass and Rendezvous Peak, areas that straddle the Caribou-Targhee NF and Bridger-Teton NF boundary. Confirmation of *L. c.* var. *carinata* at Teton Pass hinges on the *Ripley and Barneby* (#8897) specimens at the New York Botanical Garden and Smithsonian Institute, neither of which have been readily available for review by Wyoming botanists. *Lesquerella carinata* var. *carinata* at Rendezvous Peak is based on flowering material collected by Evert (#32064). Confirmation will require the collection of plants with mature fruits at a future date.

*Lesquerella carinata* var. *carinata* is relatively widespread in the mountains of east-central Idaho, occurring in Butte, Clark, Custer, and Lemhi counties. Most of the 44 collections on file at the University of Idaho Herbarium are from the Lost River and Lemhi ranges (Emily Poor, University of Idaho herbarium, pers. commun. 2008). Fewer collections are from the Beaverhead Range, or subsidiary ranges between the main Lost River and Lemhi crests. At least 10 of the collections are from lands fully or partly managed by the Caribou-Targhee NF. Approximately 20% of *L. c.* var. *carinata* collections in Idaho are from >10,000 ft (3050 m) elevation. Another approximately 25% are from below 8000 ft (2440 m), with the lowest reported elevation at roughly 6000 ft (1830 m). With one exception, all are reported from limestone, dolomite, or other calcareous substrates. Most Idaho collections note talus, ridgecrest, summit, and rock outcrop habitats, but several were taken from roadsides. This may indicate the species adaptation to some level of ground disturbance.

By comparison, *Lesquerella carinata* var. *carinata* has a more geographically restricted distribution in Wyoming, and is only known from <15 occurrences. Five of these have been estimated to have excellent or good long-term viability (Wyoming Natural Diversity Database 2008). Occurrences discovered during the 2007 field survey were also judged to have excellent long-term viability due to their size, relatively remote location, and absence of large-scale threats. Overall, long-term conservation prospects for *L. c.* var. *carinata* appear to be favorable in Wyoming, at least in part due to secure occurrences on the Caribou-Targhee NF.

We recommend revisiting occurrences at Teton Pass and Rendezvous Peak to make collections of material with mature fruits to confirm or refute sympatry of *Lesquerella carinata* var. *carinata* and *L. paysonii* in these two areas. Freds Mountain is only area of putative sympatry known to be supported by voucher specimens in fruit. All three of these sites present an opportunity to investigate and describe habitat overlap or differentiation between the two species. We also recommend a field survey targeting the genus *Lesquerella* on the Caribou-Targhee NF in the Teton and Snake River ranges to better define the distribution, abundance, and general conservation status of *L. c.* var. *carinata*, *L. paysonii*, and *L. multiceps* in the area.

A recent taxonomic treatment transferred most *Lesquerella* species to the genus *Physaria* (Al-Shehbaz and O’Kane 2002). More recently, *Lesquerella paysonii* has been reduced to a subspecies of the *Lesquerella carinata* complex (O’Kane 2007). Using this new taxonomy, the scientific name for *Lesquerella carinata* var. *carinata* is now *Physaria carinata* ssp. *carinata*. The new scientific name for *Lesquerella paysonii* is *Physaria carinata* ssp. *paysonii*. Features of the fruits are still used to distinguish the two taxa, as well as a third entity in the complex, *Physaria carinata* ssp. *pulchella*, known only from Montana. Distinction between the three taxa is not always clear and consistent because “where the three subspecies come together near where Idaho, Montana, and Wyoming join, fruit morphology becomes so blurred that the three subspecies are often indistinguishable (Steve O’Kane, pers. commun. 2007).”

### *Lesquerella multiceps*

*Lesquerella multiceps* is a slender, sprawling perennial herb in the mustard family with yellow flowers and globose fruits loosely arranged on s-shaped pedicels (Rollins 1993, Welsh et al. 2003; Figure 6). It occurs on rock outcrops, talus, and dry rocky soils on open ridges and slopes or in woodland openings in the mountains, generally on calcareous substrates (Mancuso 2003, Holmgren 2005b; Figure 12). *Lesquerella multiceps* is a regional endemic of the northern Wasatch and confluent Bear River ranges in northeastern Utah and adjacent southeastern Idaho, and further north in western Wyoming (Rollins 1993, Holmgren 2005b). An historical collection relocated in 2007 at Ferry Peak in the Snake River Range in northern Lincoln County is the only confirmed Wyoming occurrence (Wyoming Natural Diversity Database 2008). Holmgren (2005b) also reports it from the Salt River Range, but this may be a misinterpretation of the location for a specimen in southern Lincoln County from the Bear River Divide (Cronin, E.H. s.n. 1964). This specimen at the Utah State herbarium does not have mature fruits, and efforts to relocate the species at the original collection locale documented *L. prostrata* (prostrate bladderpod) instead (Heidel 2005).

Relocation of the formerly historical Ferry Peak occurrence during our survey confirmed the presence of *Lesquerella multiceps* on the Caribou-Targhee NF. The ridgeline straddles the management boundary with portion of the Caribou-Targhee NF managed by the Bridger-Teton NF. Potential *L. multiceps* habitat was observed along some other slopes and ridges during our survey, but the species was not encountered, and its range apparently does not extend north to the Teton Range.

*Lesquerella multiceps* has not been previously addressed in a status report for Wyoming. The most current information about Wasatch bladderpod in Wyoming is summarized in an updated species abstract (Appendix A).

A recent taxonomic treatment transferred most *Lesquerella* species to the genus *Physaria* (Al-Shehbaz and O’Kane 2002), and included changing the name of *Lesquerella multiceps* to *Physaria multiceps*. This treatment provides the framework that will be incorporated in the FNA (Steve O’Kane pers. commun. 2007).

### *Lesquerella paysonii*

*Lesquerella paysonii* is a low-growing perennial herb in the mustard family with dense silvery-pubescence, yellow flowers, and flattened fruits having rounded (not keeled) valve margins (Figure 13). It is a regional endemic of west-central Wyoming, eastern Idaho, and southwestern Montana (Rollins 1993, Fertig 1997b), and a Forest Service Region 4 sensitive species. *Lesquerella paysonii* occurs primarily on windswept, gravelly, calcareous ridgetops, semi-open slopes, upper talus slopes, and rocky benches from montane to more often, high elevations in the mountains (Fertig 1997b; Figure 14). *Lesquerella paysonii*

is known from 35 extant and 5 historical occurrences in Wyoming, most of them on the Bridger-Teton NF (Wyoming Natural Diversity Database 2008). Three occurrences are known from the Caribou-Targhee NF, including one in the Teton Pass area extending onto the adjacent Bridger-Teton NF. Threats are largely absent or low at occurrences in Wyoming, although impacts from recreational use or occasionally other disturbances have been reported for several occurrences in Grand Teton National Park and the Bridger-Teton NF (Fertig 1997b). Unsuccessful searches for this species were made opportunistically during our field survey. All *L. carinata* var. *carinata* occurrences discovered during our survey had habitat potentially suitable for *L. paysonii* as well. The new *L. c.* var. *carinata* occurrence found at Freds Mountain in 2007 was in an area previously documented to have *L. paysonii*. The two taxa may be sympatric in several other places in the Teton Range. Information on the species was compiled in a state species abstract by Walter Fertig that is updated in Appendix A.

In Idaho, *Lesquerella paysonii* is known from eight occurrences (Idaho Conservation Data Center 2008) where most are located on the ridges and high peaks of the Snake River Range above the escarpment that parallels the Snake River (Moseley 1996). One occurrence is also known from further southwest at Caribou Mountain in the Caribou Range. All Idaho occurrences are in Bonneville County on lands managed by the Caribou-Targhee NF. *Lesquerella paysonii* in Idaho is restricted to carbonate substrates, occurring on ridgelines, or less often on slopes in sagebrush and forest stand openings. Plant communities are open, with low cover of forbs, grasses, and an occasional shrub in areas dominated by exposed rock and soil ground cover (Moseley 1996). Elevations range from 6000 - 9950 ft (1830 - 3030 m), with most populations occurring above 8000 ft (2440 m). Habitats occupied by *L. paysonii* in Idaho are similar to conditions in adjoining Wyoming.

A recent taxonomic treatment transferred most *Lesquerella* species to the genus *Physaria* (Al-Shehbaz and O’Kane 2002). More recently, *Lesquerella paysonii* has been reduced to a subspecies of the *Lesquerella carinata* complex (O’Kane 2007). Using this new taxonomy, the new scientific name for *Lesquerella paysonii* is *Physaria carinata* ssp. *paysonii*. Features of the fruits are still used to distinguish the two taxa, as well as a third entity in the complex, *Physaria carinata* ssp. *pulchella*, known only from Montana. Distinction between the three taxa is not always clear and consistent, because “where the three subspecies come together near where Idaho, Montana, and Wyoming join, fruit morphology becomes so blurred that the three subspecies are often indistinguishable (Steve O’Kane, pers. commun. 2007).”

In addition, *Aquilegia jonesii* (Jones’s columbine) was documented on Caribou-Targhee National Forest for the first time (Joan Lucas pers. commun. 2007). The Caribou-Targhee NF population is the southernmost outlier in its distribution, ranging from southern Alberta to northwestern Wyoming, and it is the only one west of the Continental Divide. Though it is no longer a tracked species in Wyoming, it represents the only occurrence in the Intermountain Region of the U.S. Forest Service. It is present at Ferry Peak near *Lesquerella multiceps*, contributing to the botanical significance of the area, representing one more habitat specialist on calcareous substrate, and providing one more example of the challenges of integrating and applying information in a botanically rich area that spans state lines.

There are three outstanding conservation status needs identified in this study. The first is a concerted effort to relocate *Androsace chamaejasme* ssp. *carinata* at Taylor Mountain before treating it as extirpated. Second is a systematic status survey of *Lesquerella* species on the Caribou-Targhee NF in Wyoming, including: relocation of historic collections of *Lesquerella carinata* var. *carinata* at Teton Pass and South Teton Canyon; confirmation of the *Lesquerella carinata* var. *carinata* occurrence at Rendezvous Peak, currently supported only by a flowering voucher specimen; and detailed mapping of *L. carinata* var. *carinata* and *L. paysonii* at Freds Mountain. Third is the need for a status survey update of *Astragalus paysonii* on both Caribou-Targhee NF (Idaho and Wyoming) and Bridger-Teton NF. This would entail a systematic survey to relocate historic collection sites in the Palisades District in Idaho, and revisiting representative occurrences at natural and man-made habitats in Wyoming that have complete

population information to allow the gauging of trend and the relative contribution of natural versus man-made disturbances in species' persistence.

## ACKNOWLEDGMENTS

Rose Lehman coordinated this project for the Caribou-Targhee National Forest and provided the support and encouragement that made it possible. Stuart Markow laid the groundwork for documenting sensitive plant species and other species of concern on the Caribou-Targhee National Forest. This work draws heavily on the work and reports of Markow, Walter Fertig and Hollis Marriott (WYNDD). Information provided by others contributed significantly to an understanding of the species and their occurrences, including information conveyed by Jim Ozenberger (Bridger-Teton NF), Joan Lucas, Dave Scott and Kathleen Dwire. Communications by authors contributing to Flora of North America taxonomic treatments, including Tass Kelso and Steve O'Kane, are acknowledged with gratitude. Documentation of *Aquilegia jonesii* and report of possible *Lesquerella multiceps* by Joan Lucas and Curtis Haderlie, Wyoming Native Plant Society members, prompted the expanded survey scope in the 2007 field season. The specimens, photos, and company on a second visit as provided by Joan Lucas were greatly appreciated. Joy Handley (WYNDD) helped enter and export data and produce maps. Information exchanges with the Idaho Conservation Data Center greatly improved interpretation of results. The facilities and resources of the Rocky Mountain Herbarium were fundamental to this study and deeply appreciated.

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