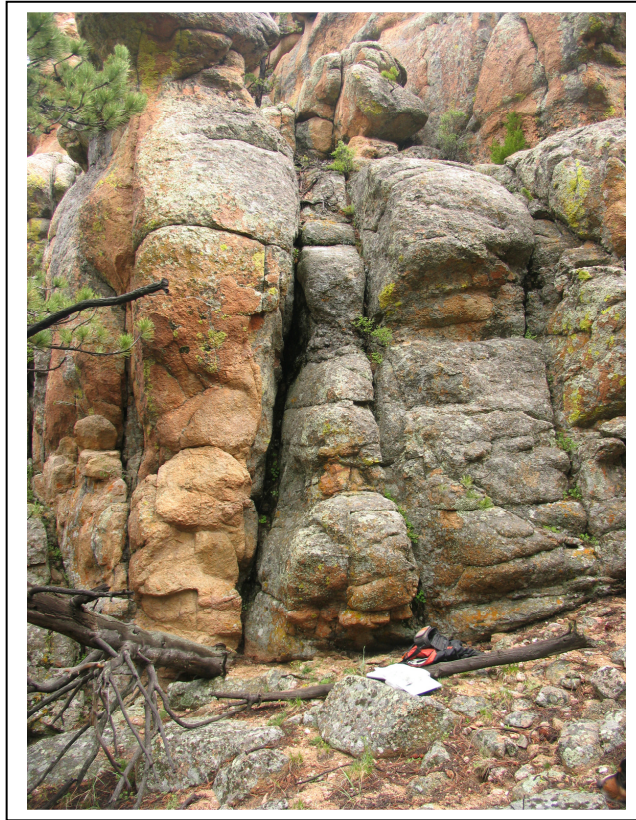


**Results of Field Survey and Status Report Update
for Laramie Columbine (*Aquilegia laramiensis*)**



prepared for
the Wyoming Natural Diversity Database,
University of Wyoming, and
the Bureau of Land Management, Casper Field Office

by Hollis Marriott and Dennis Horning
Laramie, Wyoming

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Report Citation

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Cover photo by Dennis Horning; Habitat photo taken near Wagonhound Benchmark.

Introduction

The Laramie columbine, *Aquilegia laramiensis*, is restricted to the Laramie Mountains in southeast Wyoming (Figure 1). It is listed as a Sensitive species by the Forest Service and Bureau of Land Management, and is ranked G2S2 by the Wyoming Natural Diversity Database (WYNDD), defined as “imperiled because of rarity” on a global and state basis (Heidel 2007). A comprehensive conservation assessment of the species was prepared most recently by the USDA Forest Service (Marriott and Pokorny 2006).

The species was first collected in 1895 by Aven Nelson “at the foot of Laramie Peak” in the northern Laramie Mountains. Nelson made more collections in 1900 and 1901, extending the known range south to Ragged Top Mountain east-northeast of Laramie. The next new records for the columbine were not reported until the 1970s and 1980s. All were in the northern Laramie Mountains in the general area of Laramie Peak. In 1993, C. Refsdal collected the columbine roughly halfway between Laramie Peak and Ragged Top Mountain. Several new records were found during general floristic surveys of the area (Packer 2000), including a range extension about 16 miles to the northwest in the vicinity of School Section Mountain by B.E. Nelson in 1997. By 2002, the species was known from 13 sites; two of these were considered historical without precise location data.

Systematic survey for the Laramie columbine began in 2003, on lands managed by Medicine Bow National Forest in the northern Laramie Mountains (Marriott and Horning 2004a). Twenty new sites were found, but the overall distribution remained limited, with most populations clustered in the northern part of the range. In 2004, surveys were done on lands managed by the Rawlins Field Office of the Bureau of Land Management (BLM) (Marriott and Horning 2004b), yielding twelve new sites for *Aquilegia laramiensis*.

During surveys on Medicine Bow National Forest in 2004 we recognized that there was unsurveyed potential habitat on BLM lands immediately west and north of the Forest. These are managed by the Casper Field Office, and were not included in the 2003 and 2004 field projects. In 2009, we entered into an agreement with the Wyoming Natural Diversity Database (WYNDD) to conduct surveys for *Aquilegia laramiensis* in the Laramie Mountains on lands managed by the Casper Field Office, with funding provided by the BLM.

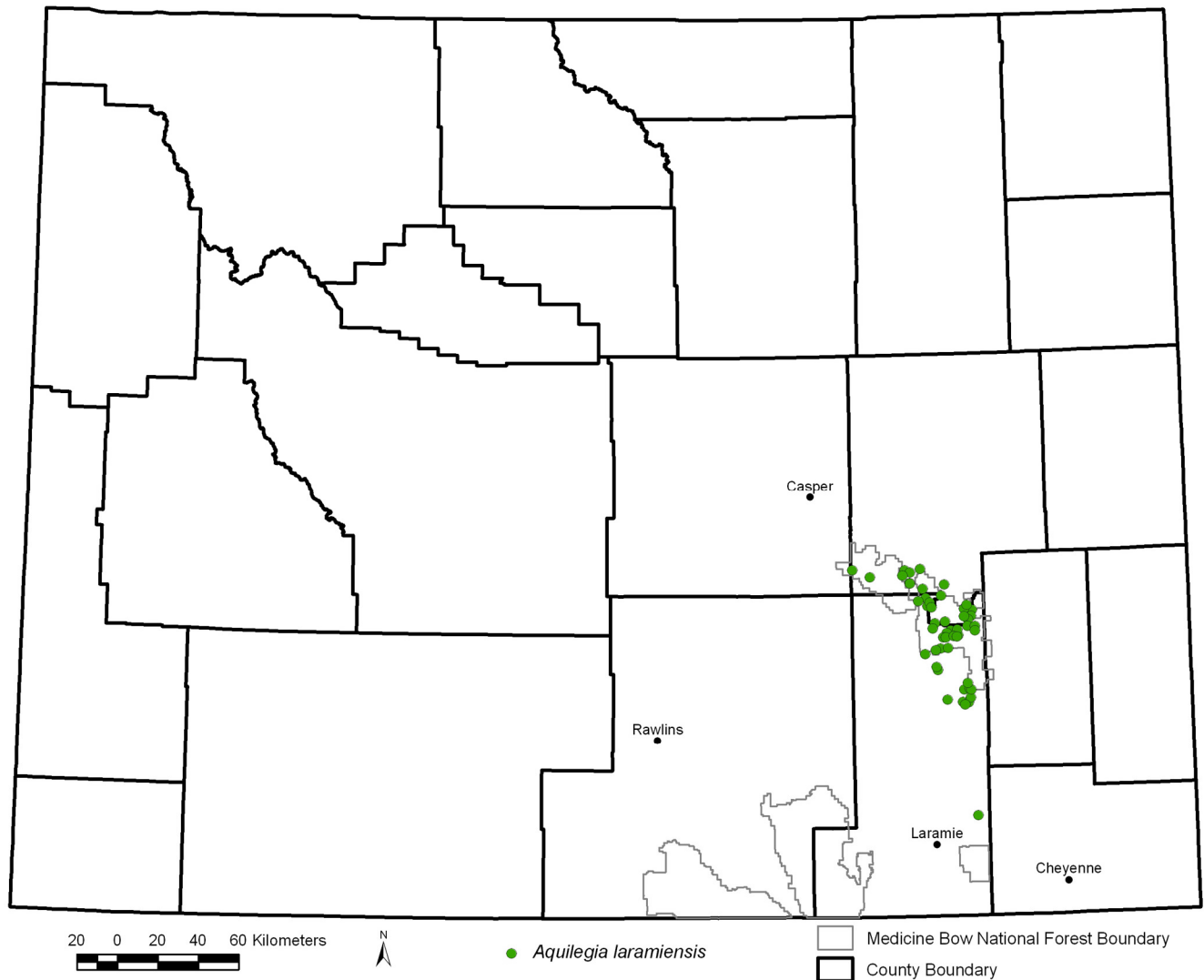
Study Area

The Laramie Mountains, in southeast Wyoming, extend north and then northwest from northeast Colorado near the Wyoming border approximately 140 miles, ending in the vicinity of Douglas, Wyoming. The range is typical of the Laramide mountain-building episode, when most of the Rocky Mountain ranges were uplifted. It is a broad anticline with sedimentary rocks exposed on the flanks. Precambrian intrusive and metamorphic rocks are found at high elevations (Blackstone 1996). Geology of the study area is described in detail in an earlier report (Marriott and Horning 2004a).

All known *Aquilegia laramiensis* populations are on granite or metamorphic rock outcrops. Most occur on Archean (earlier Precambrian) granite in the northern part of the Laramie Mountains, with scattered sites on Archean metamorphic rocks, mainly gneiss, as far south as Ragged Top Mountain east-northeast of Laramie. The 2009 study focused on outcrops of the Archean granite of the northern part of the range as well as a few sites with metamorphic rocks. Most survey sites were located on isolated parcels of BLM land. Where no public roads or land provided access, permission was obtained from land owners to cross their lands. No

surveys were done on private land. Several State parcels and one managed by Medicine Bow National Forest were surveyed also.

Figure 1. Range of *Aquilegia laramiensis*



Methods

Our primary goal was to document distribution of *Aquilegia laramiensis* on BLM lands to aid in assessing the conservation status of the species. In addition, distribution information is needed by the BLM to evaluate land parcels for disposal. To maximize coverage, site surveys were relatively rapid, focusing on presence/absence and characterizing habitat where the columbine was found. If it is determined that special management is warranted, additional information should be collected for each population for a better understanding of the species and its needs.

Survey Site Selection

Survey sites were chosen based on likelihood of having columbine populations. Based on knowledge gained in prior work and Horning's familiarity with the area, we selected BLM

parcels with large rock outcrops providing well-shaded microsites with little vegetative cover. Prior work showed that large granite outcrops with steep northerly aspects were most likely to support columbine populations. Less prominent outcrops were checked when easily accessed. Field work was restricted to lands managed by the BLM, Casper Field Office, for the most part. Some State and Forest Service land was visited when in proximity.

Data Collection

Surveys were done from June 5 to June 23. Because the primary goal of this project was to visit as many potential sites as possible, data collection was kept simple. Generally, less than one hour was spent at a site, with access much more time-consuming. No effort was made to find every plant at a site; some populations may be significantly larger than documented.

Data were collected to document location, roughly estimate population size, characterize habitat qualitatively, note any obvious threats or potential threats, and identify unsurveyed potential habitat in the area. A sample survey form is included in Appendix A at the end of this report. Field data have been entered into the database maintained by WYNDD.

All populations but one were sufficiently large for collection of voucher material. Specimens are deposited at the Rocky Mountain Herbarium (RM) at the University of Wyoming in Laramie. Photographs taken of plants and habitat at all sites are on file at WYNDD.

Results

Seven occurrences of *Aquilegia laramiensis* were documented in 2009, bringing the total to 51 (one was an expansion of an existing occurrence onto BLM land). Of the 51 occurrences, two are historical records without precise location information. As a result of 2009 field work, the known range of the species was expanded to the north slightly, but its overall range remains limited (Figure 2). Sections where it was surveyed but not found are also mapped (Appendix B). Further details on 2009 survey results are presented for each new occurrence record (Appendix C). The state species abstract was also updated (Appendix D.)

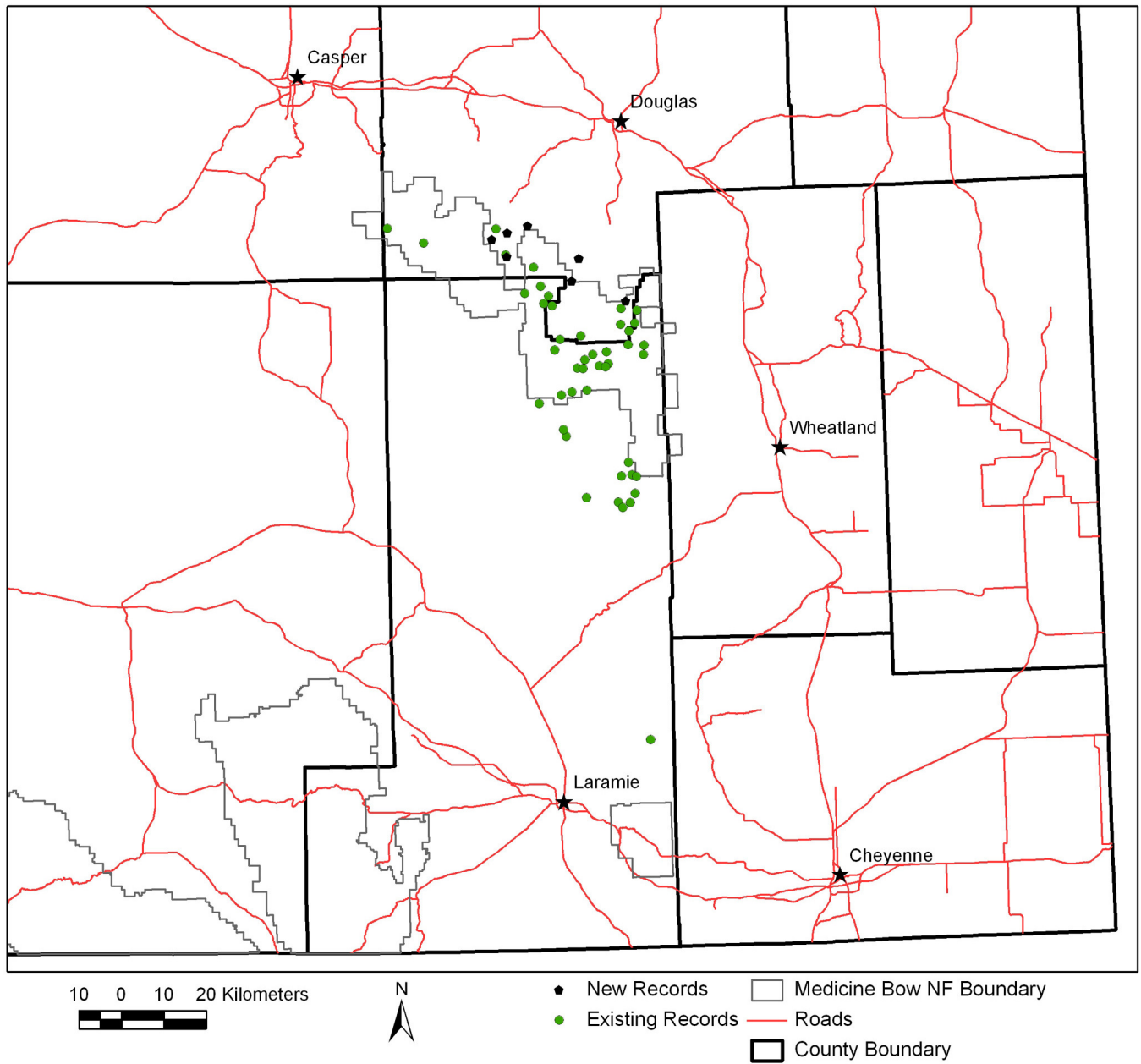
Populations of Laramie columbine typically are small (Marriott and Horning 2004a, Marriott and Pokorny 2006). Population size correlates with outcrop size and microsite availability. In the core of its range where there are extensive systems of rock outcrops, the Laramie columbine can occur as many scattered patches. Most of the sites surveyed in 2009 provide only limited habitat and populations are generally small, sometimes with as few as 20-30 individuals.

Little new information regarding habitat of *Aquilegia laramiensis* was added based on 2009 surveys. The elevational range of the species was not extended. All newly documented sites were on the Archean granite of the northern Laramie Mountains; as observed in past surveys, the columbine was not present on the reddish coarse-grained granite found in parts of the study area (see Marriott and Horning 2004a, and Marriott and Pokorny 2006 for additional information on rock types and habitat suitability). As was seen in earlier surveys, the species grows on most aspects rather than just northerly as originally reported. Microsites are well shaded in some fashion (e.g. crevices, overhangs).

Aquilegia laramiensis typically is found on microsites with little other vegetative cover. It appears to prefer shaded but not too mesic conditions, and is usually absent from sites with more lush vegetation. Exceptions to this rule were observed at two sites on the northeast flank of the range southwest of Douglas (Wagonhound Bench and Point of Rocks), where microsites

supported more vegetation than is typically found with the columbine. In some cases the columbine was growing out of wet moss.

Figure 2. Range of *Aquilegia laramiensis*, showing new sites from 2009



Discussion

Additional Survey Needs

There remains some unsurveyed potential habitat for *Aquilegia laramiensis* on public lands, mainly in the northeast Laramie Mountains. There is potential habitat on Forest Service land

from Harris Park south to Albany Peak, and on south across the canyon of the North Laramie River. The columbine may be found on a few small parcels of BLM land in Albany County (e.g. Point of Rocks and Cottonwood Creek vicinity).

Further north, there is potential habitat from Slick Rock northwest to Wagonhound Gorge and then southwest to LaPrele Creek (mainly private land with some Forest Service parcels). Other scattered potential sites occur from Slick Rock southeast to the Esterbrook Road.

It is likely that *Aquilegia laramiensis* grows in Deer Creek Canyon upstream from BLM lands surveyed as part of this project (where it was not found). In 2003 it was documented in the canyon about twelve miles upstream from the 2009 survey site, and there is much potential habitat between the two sites, on private and Forest Service lands in the canyon, as well as on outcrops on Forest Service lands on both sides of the drainage.

There are some larger areas of unsurveyed potential habitat for the Laramie columbine on Medicine Bow National Forest, mainly large complex systems of rock outcrops in the vicinity of Laramie Peak. Most of these sites are difficult to access, and survey would take significantly more time compared with work done previously. The Buck Peak area in the northwest part of the Laramie Mountains is another site on Medicine Bow National Forest with potential habitat; access is difficult (a long hike) without permission to cross private land.

Aquilegia laramiensis is known from Ragged Top Mountain east-northeast of Laramie. This area is mostly privately-owned with a few scattered State parcels, and has not been surveyed. It is not known if there is potential for additional columbine populations in this area.

Conservation Status

The Laramie columbine has been documented at 49 sites; there also are two historical reports without precise location information. The main distribution of the species is in the northern Laramie Mountains, within an area approximately 35 air miles in length, with a few disjunct populations as far south as Ragged Top Mountain east-northeast of Laramie. The overall range of the species remains limited, and populations are small.

There are no obvious threats to overall viability of the Laramie columbine at this time. The rugged terrain makes access difficult. At more accessible locations, collecting for cultivation may be a concern, as the species is of interest to gardeners (e.g. Nold 2003). Several populations documented in 2004 and 2009 are on small outcrops at lower elevations. In these cases, populations are quite small, and collecting could impact or extirpate the species.

All populations on BLM lands documented in 2009 are on parcels targeted for disposal (Bureau of Land Management 2007). Given the limited overall range of the Laramie columbine, the relative vulnerability of these smaller populations on BLM lands, and its designation as sensitive by the BLM in Wyoming, disposal should be reconsidered.

Grazing, timber harvest and recreation do not pose obvious threats currently. Laramie columbine populations appear to tolerate fire, mainly because there is little fuel on rock outcrops where the plants grow; shading is provided by aspect and topography rather than trees in most cases. More thorough discussions of possible impacts and conservation needs is included in earlier reports, and remains relevant (Marriott and Horning 2004a, Marriott and Pokorny 2006).

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Appendix A. Field form used in 2009 surveys for *Aquilegia laramiensis*.

Rare Plant Survey Form			
Survey Date	Surveyors		Occurrence Number
Target Species		Managing Agency	
LOCATION			
Survey Site	Site Code		
County	USGS Quad Name		
Township/Range/Section			
GSP data	E	N	GPS accuracy
			Datum
			Predicted?
Directions			
Location Comments			
HABITAT			
General Setting			
Habitat Description			
Slope	Aspect	Light Exp	Elev
Yeg Type/ Dominant Spp			
Associated Species			
Habitat Comments			
POPULATION DATA			
Number	Unit Counted	Area	
Size Comments			
Phenology			
OTHER INFORMATION			
Land Use/Signs of Disturbance			
Existing or potential threats			
Specimen	Photos		
Survey needs			
Other Comments			

Appendix B. Sections surveyed in 2004 and 2009 for *Aquilegia laramiense* where it was not found

