




BLM Agency updates

- **The Conservation and Landscape Health Rule was signed in June**
 - Advances the health and resilience of BLM lands by elevating conservation and restoration as “*land-uses*” under FLPMA.
- **6840 Manual Special Status Species Management update set for release**
 - Emphasizes the agencies obligation to engage in proactive conservation and recovery [Section 7(a)(1)] efforts of special status species.



Estimating the
minimum population
size of *Sclerocactus
dawsoniae*



McGlaughlin and Naibauer 2020

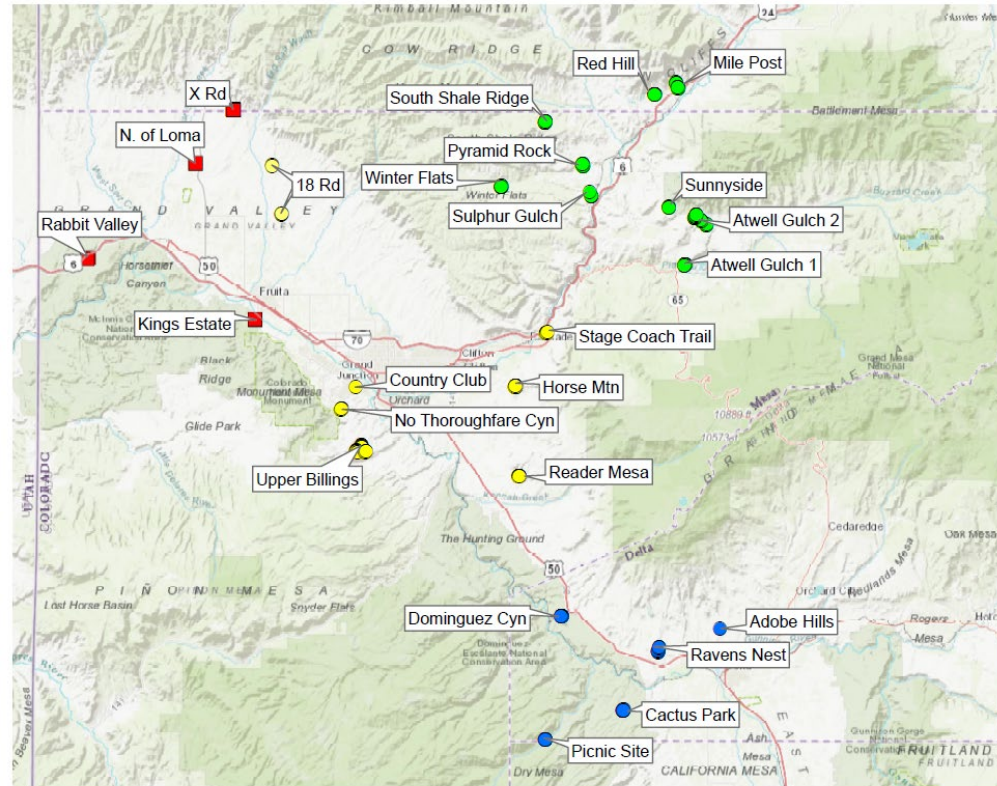
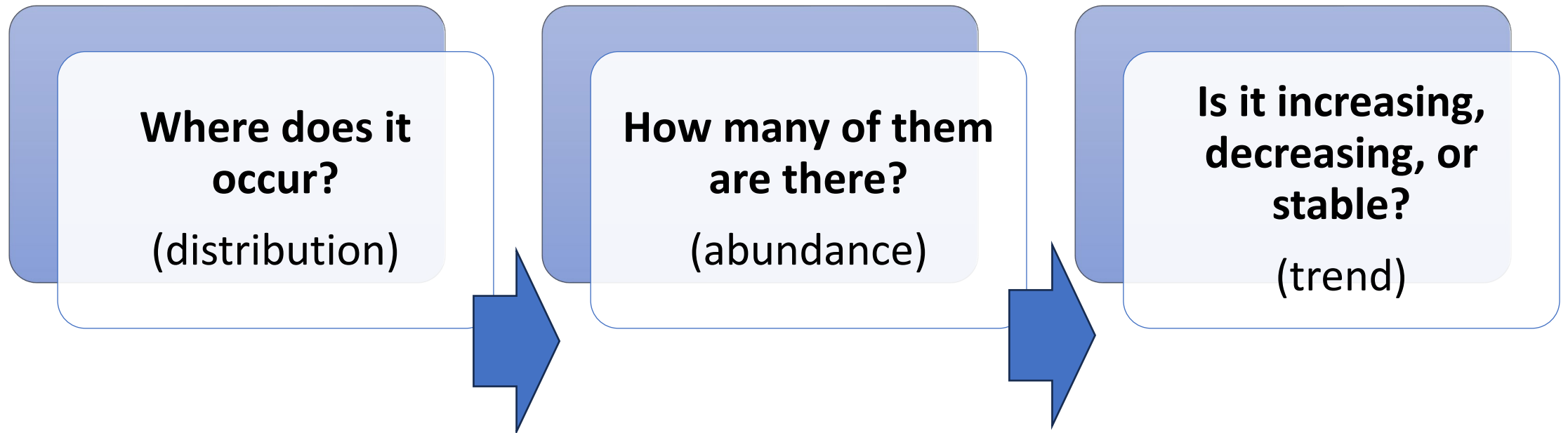


Figure 2. Population sampling of traditional *Sclerocactus glaucus* (circles) and *S. parviflorus* (squares) in Colorado. Individual populations are color-coded by their genetic grouping: Blue – *S. glaucus* Gunnison River; Yellow – *S. glaucus* Grand Valley; Green – *S. dawsonii*; Red – *S. parviflorus*. See Figure 3 for samples collected in Utah.



Types of biological information



Key Points:

- Developed a sampling-based procedure
- Estimated the minimum population size of *S. glaucus* to be ~100,000 individuals (Krening et al., 2021)
- We found that the minimum population size of *S. dawsoniae* to be ~17,000 individuals
- *S. dawsoniae* is not equally distributed across its range



Population size?

*“even though the current population was estimated for 44% of all species in original [recovery] plans, **nearly half of these were guesses or best estimates** and were not derived from a census or sample surveys.”*

-Tear et al., 1995

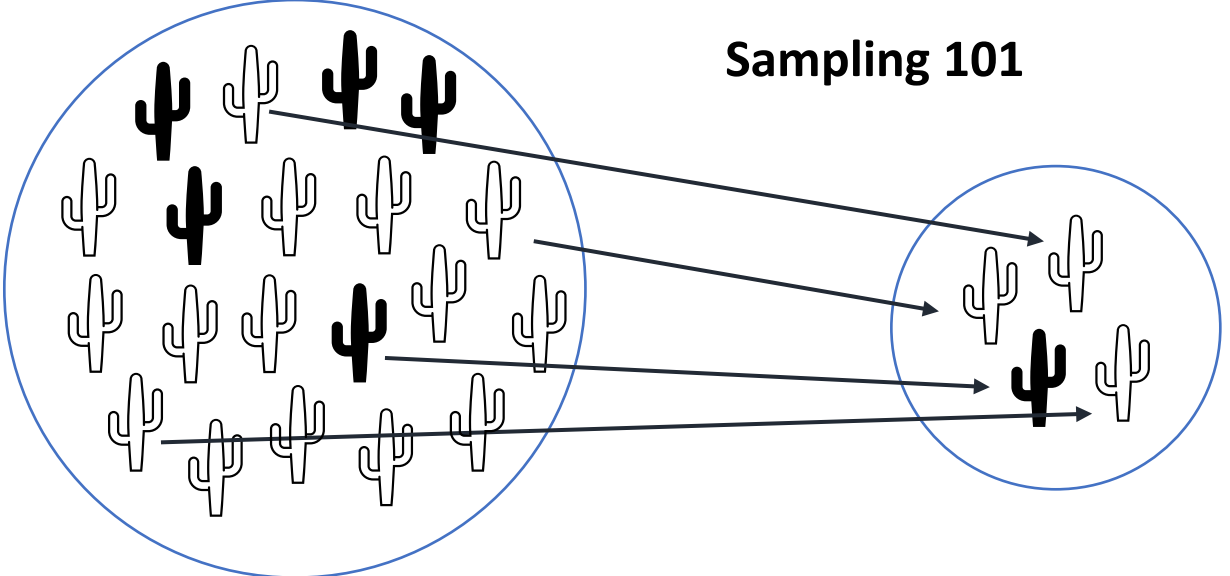
Census vs. Sample

Census

- A census of a population counts or measures every individual
- No statistics required
- Time and resource intensive

Sample

- A sample measures only a portion of the population
- Some amount of error associated
- Requires statistics
- Generally, more efficient in terms of time/resources



Sampling 101

Population

Sample

D = density

a = area

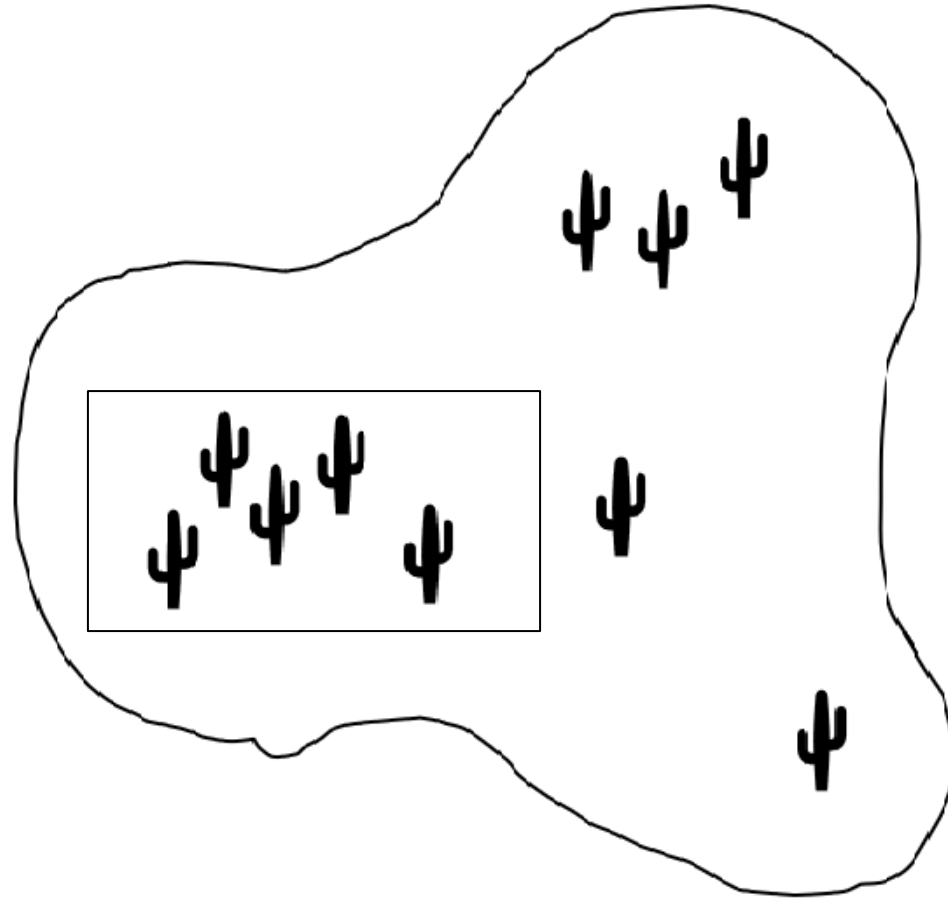
y = number of plants

$$\hat{D} = \frac{\bar{y}}{a}$$

A sampling-based procedure

1. Sampled $n = 28$ habitat areas
2. Sample was randomly drawn from a series of 5 strata
3. Strata were defined by habitat area size
4. Resulting in a series of density estimates by strata
5. Averaged these estimates to get an average density by strata
6. Applied these density estimates to all the areas mapped as occupied habitat

A minimum estimate?



Habitat area = 100m²
Number of cactus = 10
= 0.1 plants/m²

Habitat area = 100m²
Est. number of cactus = 5
= 0.05 plants/m²

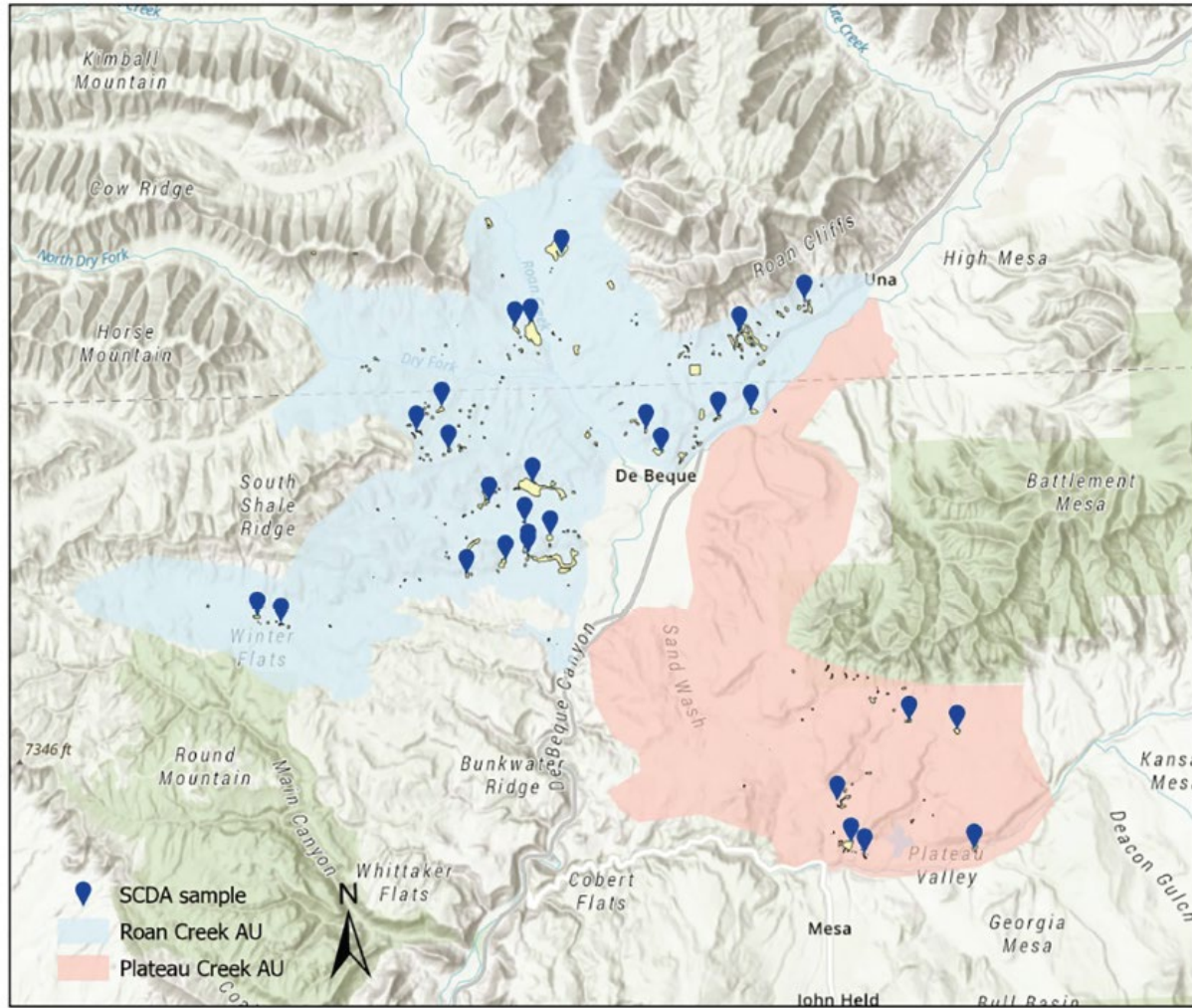


Figure 6. Distribution of 28 Dawson's hookless cactus samples. Polygons indicate the extent of two analytical units used in the Colorado hookless cactus species status assessment (USFWS 2021). The northernmost polygon is Roan Creek, and the southernmost polygon is Plateau Creek.

Estimated macroplot totals

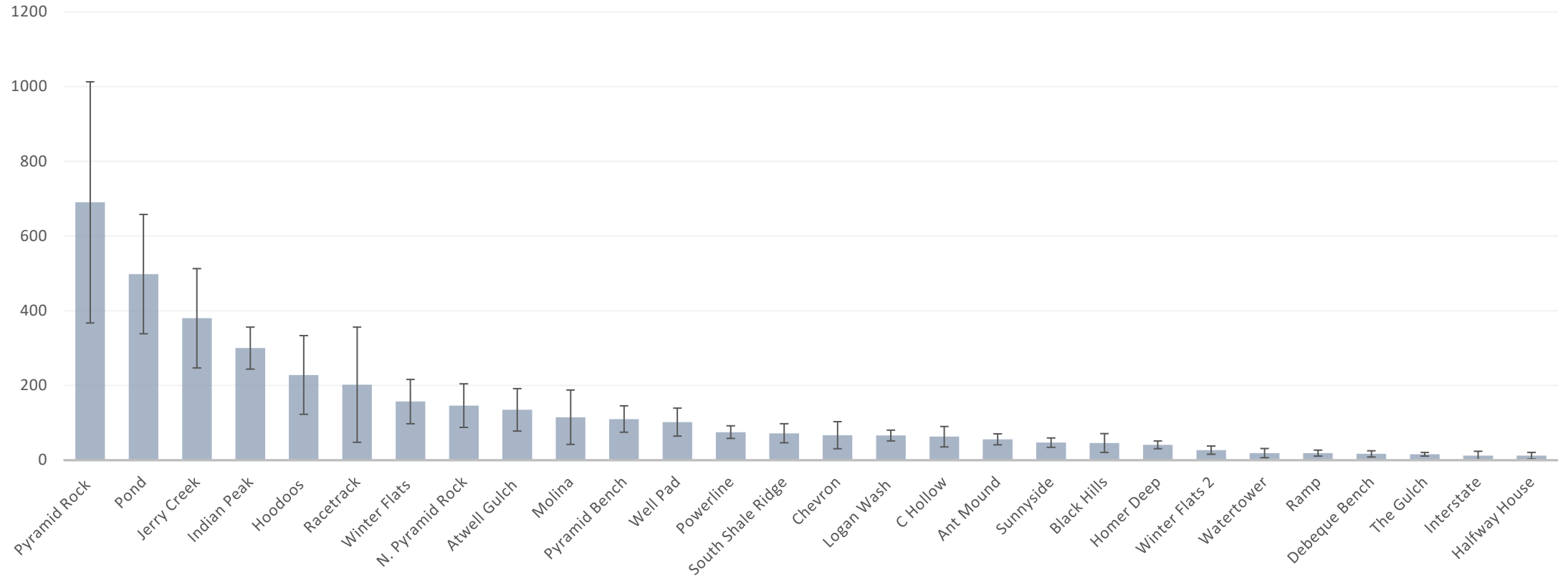


Table 3. Output statistics resulting from the ratio estimation procedure using the estimated totals from the 28 macroplots.

	Stratum				
	Very large	Large	Moderate	Small	Very small
n sampled	3	1	4	15	5
Density (plants/m ²)	0.0001	0.0025	0.0040	0.0034	0.0183
Standard error	0.00002	N/A	0.00262	0.00104	0.00764
Area (m ²)	1,824,984.5	120,662.5	691,277.3	734,210.0	634,036.9
Estimated number of plants	227	300	2,744	2,514	11,577

= 17,362 plants

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- Carol Dawson
- John Willoughby