RARE PLANTS OF BRYCE CANYON NATIONAL PARK, UTAH

FREDERICK J. PEABODY DEPARTMENT OF BIOLOGY UNIVERSITY OF SOUTH DAKOTA VERMILLION

SUMMARY OF RESEARCH PROJECT ACCOMPLISHMENTS

The list of rare and potentially rare plants in Bryce Canyon National Park was refined. A literature survey has been completed in order to determine plant species that have been considered rare, and also plant species that are potentially rare. Refer to original proposal for citations.

The herbarium at Brigham Young University was used to verify the identification of all specimens collected during the previous season within the boundaries of the park. Distribution and abundance patterns for all species collected was evaluated to determine if any other species should be considered as rare.

Continued progress was made to determine distribution and abundance of rare plant species in Bryce Canyon National Park.

Plant records of the small herbarium in the park were consulted and notation was made of the location and date of collection of each rare plant specimen.

Additional plant records of the research herbarium at Brigham Young University were consulted and notation was made of the location and date of collection of each rare plant specimen.

Permanent plots that were established during the previous field season were visited during this year's field work phase. Repair of permanent plot sites was required at the Chinese Wall location along the Fairyland Loop Trail. During the previous field season five of the six species listed as rare were found in the park (Table 1). During this field season the sixth species was located and permanent plots have been established.

Relative abundance values of all six rare species indicates that some are more rare than others.

Geographic location of populations of all six rare species (Table 2) indicates that they are very closely correlated with edaphic factors, primarily substrate parent material. It is also noted that some of the species are commonly found along and even on heavily used trails. This may have some impact on management decisions relating to trail expansion and alternative trail usage patterns.

Another objective of the season was to characterize habitat parameters of rare plant populations in Bryce Canyon National Park.

Field notations were made on each rare plant population to determine temporal, edaphic, topographic, and biotic components. Phenology, soil parent material, root substrate material, aspect of slope, percent of slope, and associated species were noted for each rare plant population.

In an effort to develop a long-term monitoring program for these populations in Bryce Canyon National Park permanent plots have been established for each rare plant population. The relative abundance of rare plants in each plot has been measured. This will provide a means of tracking the general health of rare plant populations 50

through time.

SIGNIFICANT FINDINGS

All six rare plant species were found in localities where they had been previously collected (Table 2). This verifies that they continue to exist within the park under current usage regimes.

Permanent plots have been established for all six rare plant populations found (Table 2). From preliminary surveys it is possible that some of the species previously considered to be rare are more abundant than originally estimated.

Appropriate habitat may exist for inclusion in the rare plant listing of additional species that are found in regions of similar habitat outside of the National Park boundaries.

From preliminary surveys it is possible that rare plant populations are restricted to areas of the park that are currently experiencing very heavy use from foot and horse traffic. There has been some limited success at locating rare plant populations at some distance from these areas. Continued surveys in more remote regions of the park may uncover additional rare plant populations.

PROBLEMS THAT IMPEDE PERFORMANCE AND CORRECTIVE ACTIONS

Because of the ruggedness of the terrain, locating rare plant populations at some distance from established trails will involve more backpacking time and more preliminary detailed mapping. It was hoped that maps produced by the G.I.S. would be able to provide better predictors of potential areas of rare plant populations. Since the G.I.S. is currently undergoing reorganization, it was not possible to obtain the needed maps. We hope that G.I.S. maps will be available during the next field season so that back-country search time can be as efficient as possible. Lacking G.I.S. maps, researchers will use standard 7.5 minute topographic quadrangles.

WORK TO BE PERFORMED DURING REMAINING REPORTING PERIOD

Data from all plots and all species will be compiled in order to determine the current status of the distribution of each rare plant species in the park. Abundance measures and cover class values for each species will be computed.

Lists of edaphic, topographic, and biotic determinants for each rare plant species will be compiled.

Park habitats, as indicated on topographic maps and preliminary G.I.S. maps, will be evaluated for the possible occurrence of rare plant populations. A list of potential new localities will be compiled for survey attempts during the next two field seasons.

♦ EXECUTIVE SUMMARY

Published papers in professional journals or research reports made to governmental agencies that specifically address the occurrence and distribution of rare plants in Bryce Canyon National Park have been consulted. A composite listing of all such taxa has been made.

Herbarium records at the museum in Bryce Canyon National Park and at Brigham Young University have been consulted. Notation has been made of the distribution of each rare plant taxon, the time of anthesis, ecological parameters (when indicated), and associated species.

Distribution pattern of known rare plant populations have been noted. Based on herbarium and literature records, specific localities within the park have been surveyed for rare plant populations.

Additional areas, i.e. those for which no herbarium records exist, have been made known to the researchers by park personnel. These have been noted on maps and surveyed for rare plant populations.

Twenty-seven (27) permanent plots have been established so that the same areas can be monitored for succeeding years. For each plot notation has been made of which rare plant species occurs there and the relative abundance of rare plants within a given area.

Metal stakes with identification tags have been placed to mark the plot. At each stake location a rectangular plot has been described using meter

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tapes and compass headings. The number of plants of each species of rare plant taxon occurring within the plot was counted. Notation was made of the general condition of rare plants, i.e. if they were flowering, fruiting, desiccated, etc.

Most rare plant populations surveyed during this field season are in proximity to established trails and roadways. For each population notation has been made of distance to nearest trail or other human/animal influence that may have a detrimental effect on the general health of the population.

PRELIMINARY RESULTS

In addition to the six species listed as endangered or threatened on the Federal Register (Categories 1 and 2) we have been able to identify other rare species in the vicinity of the park that occur on substrates similar to those found within the park. Some of these habitats will be able to be surveyed in the course of this study and the occurrence of any rare species will be reported.

Field work conducted during June and August of 1992 has identified locations for rare plant populations within the boundaries of the park. All six plant taxa listed on the Federal Register as either Category I or II have been located and mapped during this field season.

Twenty-seven permanent plots have been established that contain populations of six rare species of plants. Most of these plots are in areas that have been identified previously as containing rare plants. The density of rare plants in a given plot appears to be dependent on the nature of the substrate and on the biological considerations of plant growth form. These permanent plots will be monitored by researchers for the duration of this study. Continued monitoring will be conducted by park personnel.

Current threats to rare plant populations appears to originate from trampling by human foot traffic. Since many of the rare plant populations are located close to trails, and the plants occur on highly friable substrates, some populations are in danger of being buried by soil and talus on eroded slopes. There may be some danger to rare plant populations along cattle driveways, but more sampling is needed to determine actual and potential impacts.

INTERPRETATION

Research on the rare plant survey of Bryce Canyon National Park is proceeding on schedule. Researchers have located all six rare plant taxa that occur in the park. Permanent plots have been established to monitor the general health of these populations on a continuing basis.

Preliminary results indicate that all six of the rare plant taxa exist is stabilized populations in at least some area of the park. Certain areas, mostly those subject to detrimental periodic human impact, have weakened populations. It appears that the greatest limiting factor to rare plant population health, at least at this time, is related to vagaries in weather patterns.

It is expected that an additional field seasons will result in the:

-location of additional sites of rare plant populations

- -continued monitoring of established
- permanent plots
- -placement of additional permanent plots for all species

-evaluation of current and potential threats to rare plant populations

-formulation of recommendations to park personnel on suggested protocol for the preservation of rare plan populations 52

Table 1. List of additional rare plant species possibly found within park boundaries. (According to Welsh, S.L. personal communication).

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- 1. Astragalus limnocharis var. tabulaeus
- 2. Cymopterus minimus
- 3. Eriogonum aretoides
- 4. Eriogonum panguicense var. panguicense
- 5. Lepidium montanum var. neeseae
- 6. Oxytropis oreophila var. jonesii
- 7. Physaria chambersii var. sobolifera
- 8. Ranunculus acris var. aestivalis
- 9. Spiranthes diluvialis
- 10. Heterotheca jonesii

Name	Relative		
	Number of Plots	Abundance m ² per plant [*]	
Category 1 and 2 species:			
1. Castilleja parvula var. revealii	4	4.7970	
2. Cryptantha ochroleuca	2	2.1883	
3. Pediomelum pariense	8	0.2282	
4. Penstemon bracteatus	5	22.9091	
5. Silene petersonii var. minor	4	0.4601	
6. Heterotheca jonesii	4	0.1876	
Additional rare species:			
6. Townsendia montana var. minima	5	1.4733	
7. Oxytropis oreophila var. jonesii	2	0.5150	