# 1997 Exotic (non native) Plant Survey and Control
# Bryce Canyon National Park

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## Introduction

This report will cover the following species:

- Bromus tectorum L. - Downy brome (cheatgrass)
- Carduus nutans or thoermeri - Musk thistle
- Centaurea repens - Russian knapweed
- Chorispora tenella - Blue mustard*
- Cirsium arvense - Canada thistle
- Cirsium vulgare - Bull thistle
- Descurainia sophia - Flixweed*
- Lappula occidentalis - Western sticktight*
- Salsola iberica - Russian thistle
- Taraxacum officinale - Dandelion*
- Thlaspi arvense L. - Field pennycress*

In 1997, an exotic plant survey was conducted by using the 1996 Exotic Plant Survey and Control summary. This report was completed by Biological Technicians, Henry Bastion and Kevin Shakespear. By field observation, an initial list of exotic plants and their locations were established for future monitoring purposes. See maps for locations of these populations.

The 1997 field season yielded an increase in exotic plant species due to an increased amount of pre-seasonal and seasonal moisture as compared to 1996. As a result of those climatic conditions, five additional exotic species were observed and mapped.*

Through daily field observation, several areas were identified as primary active sources of exotic plant material involving transportation, distribution, and establishment into the park.

1. Soil fill/storage and distribution area on the south side of the mixing circle.
2. Habitat disturbances throughout the park, such as road projects and underground telephone line installation.
3. Maintenance area/machinery.

4. Employee and visitor parking areas.

5. Livestock activities, such as along horse trails and around the horse corrals.

6. NPS land boundary lines.

Discussion of exotic plants, their management techniques and locations.

Russian knapweed (Centaurea repens): The plants were treated with broadleaf herbicide ▮ Rodeo▮ at the late seedling to budding growth stages (phenology). This herbicide was selected due to the wet meadow conditions and native grass species predominance. It dissipates rapidly from water (half-life,7-8 days) by binding to soil particles and via soil microbial degredation. Rodeo is a broadleaf herbicide having zero to minimal affects on grass-type species. Infestation locations:
~ two small patches along the old horse path in the meadow south and west of the mixing circle (Historically, the horse concessionaires had their barns, stables, and corrals located here instead of the present mixing circle location)
~ the main park road intersections
~ visitor parking lot borders and islands

Bull thistle (Cirsium vulgare): The plants were removed by using hand tools and at the rosette, bolting, budding and flowering growth stages. Infestation locations:
~ the mixing circle prairie dog colony (scattered population density)
~ around the cabin near the bull pen (high density population)
~ in the field to the northwest of the horse corrals
~ south of the Rainbow gate along the main park road
~ north of the parking lot behind the lodge
~ the front of the lodge
~ north of the parking area near the Sunrise unit
~ behind various buildings in the maintenance area
~ around the north unit of the girls dorm
~ south of Farview gate along the roadside.

Musk thistle (Carduus nutans or thoermeri): The plants were hand tool eradicated in the rosette, bolting, budding and flowering growth stages. Infestation locations:
~ behind the employee parking in the maintenance area by the buildings.
~ behind the historic Bryce Canyon gas station.

Woolly mullein (Verbascum thapsus): The plants were hand tool eradicated in the rosette, bolting, budding and flowering growth stages. Infestation locations:
~ around the perimeter of the Sunrise and Sunset lodging units.

Canada thistle (Cirsium arvense): The plants were hand tool eradicated in the rosette and bolting stages. However, where the infestation occurred within dense native grass comunities; it was not feasible to remove the thistles mechanically without disrupting the grasses. Since this thistle is known for its' extensive and persistent root system. We recommend follow-up herbicide spot treatment. These areas were not herbicide treated in 1997, since Richard Bryant, the only person in the park with a pesticide license was away on special duty from July until November. Infestation locations:
~ around the perimeter of the Sunrise and Sunset lodging units.

NOTE: The root system of this plant below the soil surface responds to hand tool eradication above the soil surface yeilding root bud stimulation and growth. In essence, this type of attempt to ▮ control▮ the plant only acts like a pruning technique to eventually increase plant growth.

Russian thistle/tumbleweed (Salosola iberica): The plants were hand pulled prior to seed maturity. Infestation locations:
~ around the berm south and east of the new housing units.
~ at the mixing circle in the piles of fill.
~ in the maintenance yard around the buildings
~ by the parking areas for the Sunrise units.

Western sticktight (Lappula occidentalis): The plants were hand-pulled during the flowering growth stage as time permitted. Most of the plants were already at seed maturity and dispersal by the time the staff was alerted to the infestation. Some areas were cleared of the greyish stick-like plant material only to more clearly reveal the hundreds of seedlings geminating at each plant stock base. In a small area by the Sunset Point lodging unit, we hand raked and disturbed the new plant seedlings and planted native grass seed was planted. We speculate that perhaps the plants produce some type of allelopathic response further inhibiting any other plant species to compete for immediate soil surface area/abiotic conditions. This particular characteristic is similar to Spotted Knapweed (Centaurea maculosa). A plant species that has contaminated livestock crops and is the number one weed problem in western Montana. Although Western sticktight or stickseed is present and listed as a vascular plant of BCNP (1993); further consideration and research may yeild insights to ecological plant community shifting that is undesirable to both habitat preservation and visitor satisfaction. Infestation locations:
~ near the new houses in the residential area
~ the mixing circle
~ around the sunrise and sunset lodge units
~ along Park roadsides
~ the meadow south of the road to the mixing circle

Downy brome/cheatgrass (Bromus tectorum L.): The plants here hand-pulled in the flowering growth stage prior to seed maturity. Infestation location:

~ the alcove west of the Lodge
~ the maintenance yard around the buildings and parking lot
~ the northeast corner of the Highway 63/Lodge intersection.
~ along Park roadsides

Field pennycress (thalspi arvense L.): The plants were hand-pulled prior to seed maturity and dispersal. Infestation locations include:
~ the maintenance yard around the buildings and parking lot
~ the mixing circle/bull pen area
~ the parking lot borders for the Sunrise unit
~ the northeast corner of the Highway 63/Lodge intersection.

Dandelion (Taraxacum officinale): The plants were hand-tool eradicated using a pulaski. This plant species has a deep taproot and is difficult to manage or eradicate mechanically. Infestation locations:
~ the maintenance yard around the buildings and parking lot
~ the hillside to the north of Natural Bridge overlook

Recommendations

One of the main sources of exotic species distribution was discovered at the south side of the mixing circle. Exotic plant material (including seeds) was discovered on soil fill stock piles and surrounding areas. We recommend this area be monitored closely since maintenance projects routinely use this fill material throughout the park. Exotic plant infestations in this area of the park can be managed by burning, hand tool eradication and herbicide spot treatments.

In addition to park fill materials holding exotic plants, other mechanisms of transport include humans and domestic livestock. We observed exotic plant materials in the park maintenance yard, visitor and employee parking lots, lodging and housing areas, livestock activity sites, and disturbed areas which include roadsides, campgrounds, and underground telephone line installation areas. When feasible we recommend hand tool eradication followed by native plant re-seeding. Herbicide spot treatments may prove useful by initially lowering the densities of infestation prior or in sequence with hand tool eradication.

In order to address immediate and long range objectives of exotic plant control within the park. We suggest sending resource management employees to a NPS I.P.M. training course. We recommend two resource management employees become herbicide application certified by the state. This may insure that at least one person is available on short notice for spot treatments. We recommend increased public relations with county and state agencies involved with exotic plants. Through NHA, we hope secondary educational programs may include exotic plant education.

List of IPM (Integrated Pest Management) activities which would increase exotic plant awareness:

1. Hold staff meeting to include an exotic plant ID brief by using plant samples.

2. Conduct a weed tour and explain phenology and how it relates to exotic plant source, transport, distribution, and establishment.

3. Extrapolate from field maps, an enlarged wall map of the park to include mylar overlays for each exotic plant and its' location including the life cycle stages. This would track population dynamics for optimal timing of control management techniques.

4. Invite non-profit groups for exotic plant walks and hand tool pulling, targeting those efforts on field infestations. Further using the hands-on/informal discussion approach to exotic plant ecology as an educational tool.

5. Produce "exotic plant updates" on the phenology of specific infestations in the park and tell what management is doing to address the problem via written or verbal (radio) communications.

6. Encourage park employees to report to resource management any locations of exotic plants in the park; make the mylar map system useable and interesting to all.

7. Become a participant of the Colorado Plateau pilot mapping project (exotic weeds); USGS Biological Resources Division, Colorado Plateau Research Station, Northern Arizonz Univ. Flagstaff, AZ.

References

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