RAPID ECOLOGICAL ASSESSMENT OF SELECTED STATE LANDS IN SOUTHCENTRAL MONTANA FOR PLANT SPECIES OF SPECIAL CONCERN

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Prepared for:

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Parks Division - Region Five
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This study was conducted by the Montana Natural Heritage Program for the Parks Division of Region Five in the Montana Department of Fish, Wildlife, and Parks. The purpose was to locate or assess the potential for occurrences of Montana Plant Species of Special Concern (**MPSSC**) on selected lands in Region Five. **MPSSC** are those plant taxa listed by the Montana Natural Heritage Program which are "rare, endemic, disjunct, threatened, or endangered throughout their range or in Montana, vulnerable to extirpation from Montana, or in need of further research" (Heidel and Poole 1993). The information yielded by this project will be used by the Department of Fish, Wildlife, and Parks to prepare a weed control management plan Environmental Impact Statement in keeping with the Montana Environmental Protection Act.

Lands administered by Region Five of Montana Fish, Wildlife and Parks Department consist of Fishing Access Sites, Fish Hatcheries, State Parks, and Wildlife Management Areas, spanning six southcentral Montana counties: Big Horn, Carbon, Stillwater, Sweetgrass, Wheatland, and Yellowstone. Most sites are located at relatively low elevations in bottomlands along the Big Horn, Boulder, Musselshell, Stillwater, and Yellowstone rivers and along Rock Creek.

The surface geology at most sites is generally of alluvial origin. Plants occupying alluvial substrates tend to be generalist, as Welsh et al. (1987) have noted for the Utah flora. Thus, the plant species of concern expected at these sites are those which are peripheral in Montana with broader ranges outside the state (e.g. *Eupatorium maculatum* and *Viburnum lentago*). These low elevation settings are historically areas of settlement, extensive habitat conversion and heavy use. The successional nature of the habitat and historic patterns of use make these sites prone to weed invasion.

A few sites are located in foothills adjacent to the major drainages or otherwise include upland habitat. The Pryor Mountains and Big Horn Canyon areas are near some of these Region Five lands and harbor some of the highest known concentrations of endemic **MPSSC** in the state. Endemic species have distribution ranges restricted within state boundaries or within a small area that crosses state boundaries. Thus, endemic plant species of special concern may also be expected at some state sites that have intact upland habitat and proximity to the Big Horn / Pryor Mountain areas.

METHODS

State lands of Montana Department of Fish, Wildlife, and Parks, Region Five were assessed for the potential occurrence of **MPSSC** as listed by Heidel and Poole (1993). A total of twenty-two sites were visited by Jim Vanderhorst (twenty sites) on August 30-September 3, 1993 and by Bonnie Heidel (two sites, Deadman Basin State Park and Selkirk Fishing Access Site) on September 8, 1993. They included thirteen Fishing Access Sites, two Trout Hatcheries, and seven State Parks (Table 1). Region Five lands which were not included in this study include two Wildlife Management Areas and an additional twenty-five Fishing Access Sites.

Before fieldwork, the Montana Natural Heritage Program Biological Conservation Database (BCD) was queried for all occurrences of **MPSSC** in the six counties included in Region Five, producing almost two hundred element occurrence records for sixty-eight **MPSSC** in the six-county area (Table 2). None of the records had been documented on Montana Fish, Wildlife, and Parks lands though some were based on collections in proximity to state lands, with vague locality information. Many of the sixty-eight **MPSCC** are alpine species, and the potential for them to occur at the low elevations covered by this project is remote, so the working target list excluded alpine species (Table 3). Most project area target species are known only from Carbon and/or Big Horn Counties, a reflection of the high degree of endemism centered in the Pryor Mountains and Big Horn Canyon areas. Lesica and Shelley (1991) and other field guides were consulted to determine the ecological niches of these species to further narrow the list of targets.

Due to the late season dates and paucity of background information on the sites, only preliminary surveys could be conducted. The preliminary surveys, or "rapid ecological assessment", involved subjective classification of a site's habitat and dominant vegetation, and assessment of the its suitability for hosting **MPSSC**. In addition, systematic searches were conducted in appropriate habitats for those few **MPSSC** which could be easily identified in late summer. In the sole instance when a **MPSSC** was found at a site, a complete survey of that population was conducted and data were taken on population numbers and boundaries, dominant and associated species, and edaphic site attributes.

This report presents a synopsis for each of the sites visited which describes the dominant native and introduced vegetation, assesses the potential for occurrences of **MPSSC**, and makes recommendations of weed control strategies which minimize the impacts on the native flora. Both common and scientific plant names are used, in keeping with Dorn (1984). Other floras and guides consulted include Dorn (1988), Hitchcock and Cronquist (1973), Welsh et. al. (1987), and Whitson et. al. (1987).

TABLE 1. Location of Fishing Access Sites (FAS), Trout Hatcheries (TH), and State Parks (SP) surveyed by this project.

Site Name	County	Legal Description
Big Horn FAS	Big Horn	T5S R32E S8,9
Bluewater Springs TH	Carbon	T6S R24E S8,9
Boulder Forks FAS	Sweet Grass	T2S R13E S21
Bratten FAS	Sweet Grass	T1S R17E S28
Buffalo Jump FAS	Stillwater	T4S R16E S31
Buffalo Mirage FAS	Yellowstone	T2S R23E S36
Captain Clark FAS	Yellowstone	T4N R19E S27
Chief Plenty Coups SP	Big Horn	T5S R26E S5,6
Cooney SP	Carbon	T4S R20E S25,26,34,35,36
Deadman's Basin SP	Wheatland	T7N R18E S34,35
Fireman's Point FAS	Stillwater	T2S R20E S32
Grant Marsh FAS	Big Horn	T1N R33E S
Grey Bear FAS	Sweet Grass	T1N R13E S35
Greycliff Prairie Dog Town SP	Sweet Grass	T1S R16E S7
Lake Elmo State Park	Yellowstone	T1N R26E S10,15
Manuel Lisa FAS	Yellowstone	T5N R34E S34
Natural Bridge SP	Sweet Grass	T3S R12E S26
Pictograph Caves SP	Yellowstone	T1S R27E S19
Selkirk FAS	Wheatland	T8n R12E S9
Water Birch FAS	Carbon	T6S R20E S7,18
White Bird FAS	Stillwater	T3S R19E S14
Yellowstone River TH	Sweet Grass	T1N R14E S15

RESULTS

Six sites among the twenty-two sites surveyed were found to have significant floristic values or potential for such. These areas are characterized as having known or potential plant species of special concern, or intact plant communities of noteworthy condition or composition. One target species, *Eupatorium maculatum*, was found at Bluewater Springs Trout Hatchery, with potential habitat for other target species at the same site. Three other sites have potential habitat for target species (Chief Plenty Coups State Park, Cooney State Park, Natural Bridges State Park) that also warrant survey work earlier in the growing season. Two more sites have intact natural vegetation of potential state significance (Pictograph Caves State Park, Water Birch Fishing Access Site) though they have low probability of harboring target species. It is recommended that each of these six sites be revisited and surveyed in greater detail at appropriate dates before weed control treatments are applied in places where their vegetation is native.

The remainder of this section, beginning on the page 7, is devoted to synopses of each of the sites visited. These include descriptions of the dominant vegetation, assessment of the potential for occurrences of **MPSSC**, and recommendations for weed control. The most common vegetation at these sites are bottomland types, including woodlands, wetlands, and managed or weedy meadows. There are only a few **MPSSC** from Table 3 which occur in these habitats. The most obvious two are *Eupatorium maculatum* and *Viburnum lentago*, species which could be readily identified at a late season date. Habitats which are more likely to host **MPSSC** are the dryer uplands which are found at a few sites, especially those close to the Pryor Mountains (e.g. Chief Plenty Coups State Park and Bluewater Springs Trout Hatchery). The plants in these habitats were mostly senescent at the late season date of these surveys, thus intensive searching for **MPSSC** was inappropriate.

Site specific results are summarized in Table 4, noting significant floristic values, also characterizing the habitats, degree of weediness, and overall recommendations.

Table 2. Montana Plant Species of Special Concern (MPSSC) known from Big Horn, Carbon, Stillwater, Sweet Grass, Yellowstone, and Wheatland Counties and the habitats where they are found.

Adoxa moschatellina	Stillwater	moist woods and rocks, 4,400-5,400'
Agoseris lackschewitzii	Sweet Grass	subalpine wet meadows, 8,500-9,500'
Aquilegia brevistyla	Sweet Grass	open woods, streambanks, 5,000-6,000'
Astragalus aretaides	Big Horn	barrens and gullies, 6,700-7,800'
Astragalus barrii	Big Horn	barrens and gullies, 3,100-3,800'
Astragalus chameleuce	Carbon	sandy desert shrublands, 4,400'
Astragalus geyeri	Carbon	sandy hills and plains, 2,000'?
Astragalus grayi	Big Horn, Carbon	sagebrush grasslands, 3,700-4,200'
Astragalus oreganus	Carbon	desert shrub and sagebrush, 5,000'
Bulbostylis capillaris	Carbon	sandy benches, adventive ?
Camissonia andina	Carbon	grasslands, sagebrush, 3,100-5,400'
Carex gravida	Big Horn	swales and shores, 3,900-4,000'
Carex vallicola	Carbon	moist-mesic slopes, 5,760-7,080'
Castilleja longispica	Carbon	sagebrush, meadows, 4,000-8,000'
Claytonia lanceolata flava	Sweet Grass	meadows
Cleome lutea	Big Horn, Carbon	sandy, disturbed valleys, 4,000'
Conioselinum scopulorum	Big Horn, Carbon	moist woods and meadows, 3,600'
Cryptantha flavoculata	Carbon	dry, gravelly slopes, 4,400-5,400'
Cryptantha scoparia	Carbon	desert hills
Cypripedium calceolus	Stillwater	wet areas, moist woods, 3,000-6,200'
Delphinium andersonii	Carbon	sagebrush grasslands, limestone
Delphinium geyeri	Carbon	open slopes, 4,500-6,500'
Draba fladnizensis	Carbon	alpine, 11,000'
Draba porsildii	Carbon	alpine, 9,000-11,800'
Epipactus gigantea	Carbon	wet area, esp. thermal, 2,900-5,750'
Erigeron allocatus	Big Horn, Carbon	stony, limey soil, 4,400-5,600'
Erigeron eatonii	Sweet Grass	open places, 8,825'
Erigeron flabellifolius	Carbon	alpine talus, 9,200-11,000'
Erigeron formosissimus	Carbon	meadows in mountains, 4,760-8,200'
Eriogonum lagopus	Carbon	sagebrush grasslands, 4,000-4,400'
Eriogonum saluginosum	Carbon	bentonite soil, 4,700'
Eriophorum callitrix	Carbon	alpine
Eupatorium maculatum	Big Horn, Carbon	wet areas, 3,700-4,000'
Gentiana prostrata	Stillwater	alpine
Gentianella tenella	Carbon, Stillwater	alpine, 9,500-10,000'
Gentianopsis simplex	Carbon	wet areas in mountains, 4,400-8,400'
Grayia spinosa	Big horn, Carbon	alkaline basins, 4,500-5,000'
Hemicarpha drummondii	Carbon	wet, sandy areas
Juncus covillei	Sweet Grass	moist areas
Juncus triglumis	Carbon	alpine, 9,800-10,500'
Kobresia macrocarpa	Carbon	alpine, 9,800'
Koenigia islandica	Carbon	alpine, 9,800-10,800'
Leptodactylon caespitosum	Carbon	dry, barren hills, 4,800'
Lesquerella sp. novum	Carbon	limestone, 6,800'
Malacothrix torreyi	Carbon	dry plains and hills, 5,140'
Mentzelia pumila	Carbon	desert shrub and woods, 4,300-5,000'
Mimulus suksdorfii	Carbon	rocky slopes, 4,800-7,100'
Nama densum	Carbon	sandy desert
Papaver kluanensis	Carbon	alpine, 10,800-11,600'
Penstemon caryi	Carbon	grasslands in mountains, 5,900-8,080'
Phippsia algida	Carbon, Stillwater	alpine, 9,800-11,500'
Potentilla plattensis	Big Horn, Carbon	grasslands, 6,000-8,000'
Ranunculus cardiophyllus	Sweet Grass	moist meadows, 5,000-5,900'
Ranunculus gelidus	Stillwater	alpine, 7,200-11,800'
Sagina nivalis	Stillwater	alpine
Salix barrattiana	Carbon	alpine, 6,800-10,500'

Table 2. (cont.)

Salix cascadensis	Sweetgrass	alpine, 9,000-10,000'
Saxifraga apetala	Carbon	subalpine and alpine, 6,000-10,100'
Senecio amplectens	Carbon	alpine talus, 10,000'
Shoshonea pulvinata	Carbon	limestone outcrops, 6,800-7,800'
Solidago sparsiflora	Stillwater	rocky or sandy hills and canyons
Sphaeromeria capitata	Carbon	limestone outcrops, 4,500-5,700'
Stellaria crassifolia	Carbon	meadows, 6,600-10,000'
Stipa lettermanii	Big Horn	open slopes and woods
Sullivantia hapemanii	Big Horn, Carbon	wet, calcareous cliffs, 3,700-4,500'
Thlaspi parviflorum	Carbon	meadows, 7,500-10,000'
Townsendia spathulata	Carbon	limestone, 4,500-6,500'
Viburnum lentago	Big Horn	riparian forest openings

Table 3. Working list of target species for this project (Table 2 with alpine taxa removed)

Adoxa moschatellina	Stillwater	moist woods and rocks, 4,400-5,400'
Aquilegia brevistyla	Sweet Grass	open woods, streambanks, 5,000-6,000'
Astragalus aretoides	Big Horn	barrens and gullies, 6,700-7,800'
Astragalus barrii	Big Horn	barrens and gullies, 3,100-3,800'
Astragalus chameleuce	Carbon	sandy desert shrublands, 4,400'
Astragalus geyeri	Carbon	sandy hills and plains, 2,000'?
Astragalus grayi	Big Horn, Carbon	sagebrush grasslands, 3,700-4,200'
Astragalus oreganus	Carbon	desert shrub and sagebrush, 5,000'
Bulbostylis capillaris	Carbon	sandy benches, adventive ?
Camissonia andina	Carbon	grasslands, sagebrush, 3,100-5,400'
Carex gravida	Big Horn	swales and shores, 3,900-4,000'
Carex vallicola	Carbon	moist-mesic slopes, 5,760-7,080'
Castilleja langispica	Carbon	sagebrush, meadows, 4,000-8,000'
Claytonia lanceolata flava	Sweet Grass	meadows
Cleome lutea	Big Horn, Carbon	sandy, disturbed valleys, 4,000'
Conioselinum scopulorum	Big Horn, Carbon	moist woods and meadows, 3,600'
Cryptantha flavoculata	Carbon	dry, gravelly slopes, 4,400-5,400'
Cryptantha scoparia	Carbon	desert hills
Cypripedium calceolus	Stillwater	wet areas, moist woods, 3,000-6,200'
Delphinium andersonii	Carbon	sagebrush grasslands, limestone
Delphinium geyeri	Carbon	open slopes, thickets, 4,500-6,500'
Epipactus gigantea	Carbon	wet areas, esp. thermal, 2,900-5,750'
Erigeron allocatus	Big Horn, Carbon	stony, limey soil, 4,400-5,600'
Erigeron eatonii	Sweet Grass	open places, 8,825'
Erigeron formosissimus	Carbon	meadows in mountains, 4,760-8,200'
Eriogonum lagopus	Carbon	sagebrush grasslands, 4,000-4,400'
Eupatorium maculatum	Big Horn, Carbon	wet areas, 3,700-4,000'
Gentianopsis simplex	Carbon	wet areas in mountains, 4,400-8,400'
Grayia spinosa	Big horn, Carbon	alkaline basins, 4,500-5,000'
Hemicarpha drummondii	Carbon	wet, sandy areas
Juncus covillei	Sweet Grass	moist areas
Leptodactylon caespitosum	Carbon	dry, barren hills, 4,800'
Malacothrix torreyi	Carbon	dry plains and hills, 5,140'
Mentzelia pumila	Carbon	desert shrub, woodlands, 4,300-5,000'
Mimulus suksdorfii	Carbon	rocky slopes, 4,800-7,100'
Nama densum	Carbon	sandy desert
Penstemon caryi	Carbon	grasslands in mountains, 5,900-8,080'
Potentilla plattensis	Big Horn, Carbon	grasslands, 6,000-8,000'
Ranunculus cardiophyllus	Sweet Grass	moist meadows, 5,000-5,900'
Shoshonea pulvinata	Carbon	limestone outcrops, 6,800-7,800'
Solidago sparsiflora	Stillwater	rocky or sandy hills and canyons
Sphaeromeria capitata	Carbon	limestone outcrops, 4,500-5,700'
Stellaria crassifolia	Carbon	meadows, 6,600-10,000'
Stipa lettermanii	Big Horn	open slopes and woods
Sullivantia hapemanii	Big Horn, Carbon	wet, calcareous cliffs, 3,700-4,500'
Thlaspi parviflorum	Carbon	meadows, 7,500-10,000'
Townsendia spathulata	Carbon	limestone, 4,500-6,500'
Viburnum lentago	Big Horn	riparian forest openings

Big Horn Fishing Access Site

This site occupies bottomlands along the Big Horn River. Although it is in the vicinity of Big Horn Canyon and the Pryor Mountains, areas known for their many endemic and other rare plant species, the site has low potential for hosting **MPSSC**. The native vegetation, most notably sagebrush grasslands (*Artemesia cana/Bouteloua gracilis* ?), has been mostly replaced by weedy hayfields. Cultivated species in these fields include *Agropyron cristatum* (crested wheat), *Bromus inermis* (smooth brome), *Medicago sativa* (alfalfa), and *Melilotus officinale* (sweet clover). Weedy adventive taxa include *Cirsium arvense* (Canada thistle), *Bromus tectorum* (downy brome), *Lactuca serriola* (prickly lettuce), and *Sisymbrium altissimum* (tumble mustard). The understories of the floodplain woodlands are either mowed or weedy. Floodplain thickets along the river are dominated by a mixture of woody natives (*Salix* spp., *Eleagnus commutatus* and *Rhus trilobata*) and exotics (*Eleagnus angustifolia* and *Tamarisk chinensis*). A small swampy area is dominated by *Typha latifolia* (cattails). It was thought that this wetland might be potential habitat for *Eupatorium maculatum* or other sensitive species, but none were found.

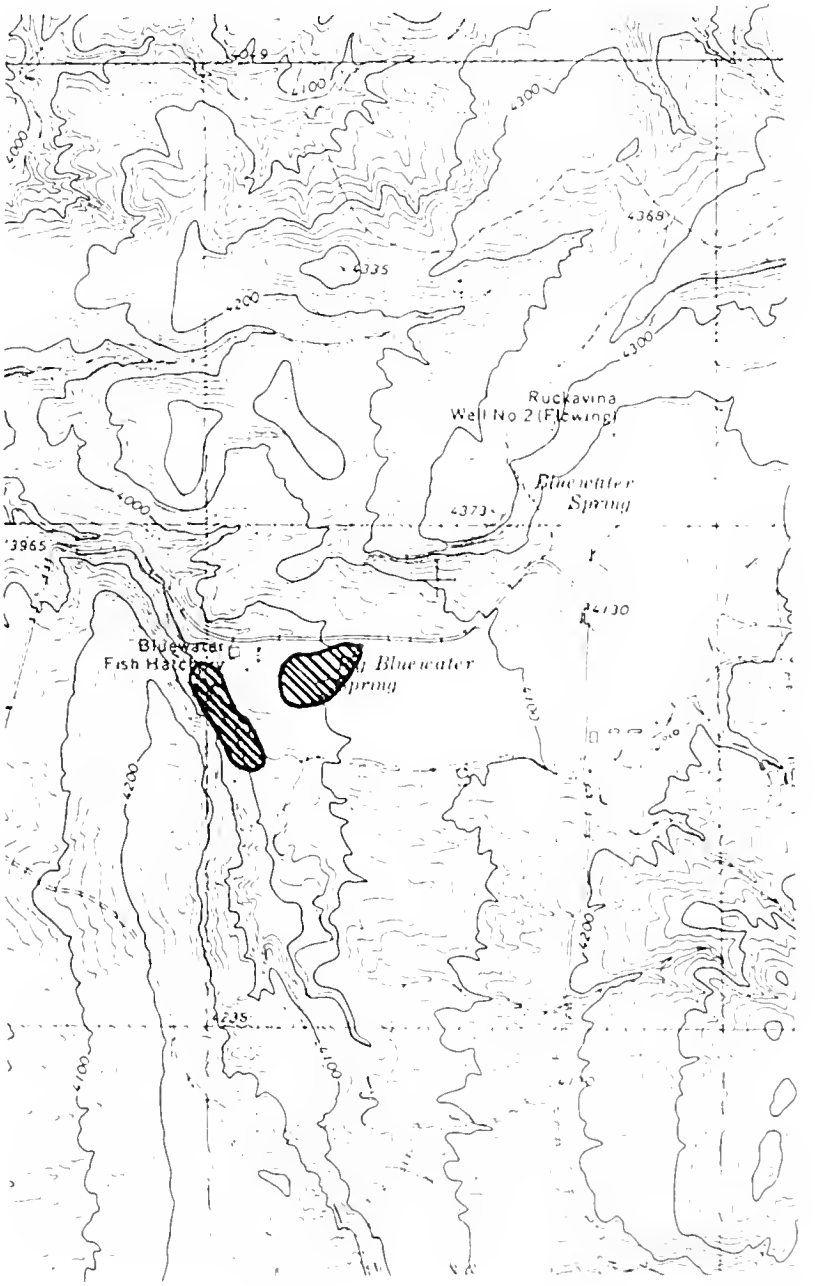
As with many of the lowland fishing access sites, native plant taxa, especially in the open and understory habitats, have been almost entirely replaced by adventives. Precluding expensive and perhaps impossible efforts to reestablish the native communities, the best alternative at many of these sites may be to manage the open areas as mowed turf or hayfields. Weed control at these sites, provided it is aimed at introduced weedy taxa, is not likely to have adverse impact on **MPSSC** or the native flora in general.

Bluewater Springs Trout Hatchery

Located along Bluewater Creek in the foothills of the Pryor Mountains, this site hosts several native plant communities, along with aggressive weeds and at least one **MPSSC**, *Eupatorium maculatum*. For this reason it is strongly recommended that further sensitive plant surveys be conducted before weed control measures are taken and that weed management plans be designed which minimize impacts on species of concern and native communities.

The species of concern, commonly called Joe Pye Weed, is found in the wetland thickets around Big Bluewater Spring and along the creek (Figure 1). Woody dominants in these thickets include *Betula occidentalis* (water birch), *Salix drummondiana* and other *Salix* spp. (willows), *Ribes* spp. (currants), *Cornus stolonifera* (dogwood), *Eleagnus angustifolia* (Russian olive), and *Tamarisk chinensis* (salt cedar). Herbaceous associates include *Solidago canadensis*, *Scirpus acutus*, and *Thalictrum dasycarpum*. Introduced weeds directly associated with the species of concern are *Cirsium arvense* (Canada thistle),

Figure 1. Portion of the USGS Bluewater Quadrangle (7.5 minute series) showing Bluewater Springs Trout Hatchery. The diagonal hatches indicate the location of a population of *Eupatorium maculatum*.



Euphorbia esula (leafy spurge), and *Conium maculatum* (poison hemlock). An Element Occurrence Record which includes additional data for this population is included as Appendix 1 of this report. In addition, slides of the plants and habitat are attached as Appendix 4. Another **MPSSC** previously known nearby from wetlands along the North Fork of Bluewater Creek, *Epipactus gigantea* (giant helleborine), should be searched for at this site.

In addition to these wetlands, other native plant communities are found within the boundaries of the hatchery. Dryer thickets and woodlands are dominated by *Populus* sp. (cottonwoods), *Prunus virginiana* (chokecherry) and *Juniperus scopulorum* (Rocky Mountain Juniper). Sagebrush grasslands with *Artemesia tridentata* and *Elymus spicatus* as codominants, alkaline gullies and barrens, and rock outcrops are habitats here which may potentially host other **MPSSC**, especially considering the proximity of the Pryor Mountains.

Other weedy species found at the hatchery include *Kochia scoparia, Cyanoglossum officinale* (houndstongue), *Lactuca serriola* (prickly lettuce), and *Glycyrrhiza lepidota* (licorice). This last species was reported by hatchery personnel to be increasing at the site in recent years.

Boulder Forks Fishing Access Site

Habitat types at this site along the Boulder River consist of floodplain woodlands, thickets, mudflats and gravel bars, and hay meadows. The woodlands are dominated by *Populus balsamifera* (Balsam Poplar) with an understory of *Crateagus* sp. (hawthorn) and *Alnus incana* (alder) and many native herbaceous elements. The thickets are dominated by *Salix lutea* and *Salix exigua* (willows), and the mudflats by *Phalaris arundinacea* (canary reedgrass). Weeds in these habitats are not a great problem, however, *Arctium minus* (burdock) and *Cirsium vulgare* (bull thistle) were observed. Most of the open ground at this site was historically managed for hay. Cultivated species found in these meadows include *Bromus inermis* (smooth brome), *Dactylis glomerata* (orchardgrass), *Phleum pratense* (timothy), and *Trifolium pratense* (red clover). Weedy species include *Bromus tectorum* (downy brome), *Cirsium arvense* (Canada thistle), *Cyanoglossum officinale* (houndstongue), *Lychnis alba* (white campion), and *Tragopogon dubius* (salsify). The weed problem at this site is not great at this time; leasing the open areas for hay seems an appropriate means of retaining this status and is compatible with recreation. If weed control measures are taken in the woody habitats (although this is not recommended) care should be taken not to disturb the diverse native flora. The potential for **MPSSC** in these habitats is low.

Bratten Fishing Access Site

This area occupies bottomlands along the Yellowstone River. The presence of an old homestead is evidenced by

several introduced tree species including *Populus alba* (white poplar) and species of *Ulmus* (elm) and *Salix* (willow) which accompany the native cottonwoods (*Populus deltoides* and *P. angustifolia*). The open areas beneath and surrounding the trees have been mowed or leased for hay. Introduced cultivated species which dominate these meadows include *Bromus inermis* (smooth brome), *Elymus repens* (quackgrass), *Phleum pratense* (timothy), *Medicago sativa* (alfalfa), *Melilotus officinale* (sweetclover), and *Trifolium pratense* (red clover). Weedy species in the meadows include *Arctium minus* (burdock), *Bromus tectorum* (downy brome) *Capsella bursa-pastoris* (shepherd's purse), *Cirsium arvense* (Canada thistle), *Euphorbia esula* (leafy spurge), and *Lychnis alba* (white campion). Native vegetation at this site is limited to the riverside bars which are dominated by *Salix exigua*, *Equisetum laevigatum*, and *Phalaris arundinacea*. No **MPSSC** are likely to be found at this site.

Buffalo Jump Fishing Access Site

Vegetation at this site along the Stillwater River consists of a small floodplain woodland, riverside reeds, and meadows which are mostly mowed and maintained as picnic and camp areas. The woods are dominated by *Populus balsamifera* (balsam poplar), with an understory dominated by *Prunus virginiana* (chokecherry), *Rosa woodsii* (rose), and *Clematis ligusticifolia* (virgin's bower). *Phalaris arundinacea* (canary reedgrass) occupies moist ground adjacent to the river. Cultivated species in the meadow include *Medicago sativa* (alfalfa), *Melilotus officinale* (sweetclover), *Phleum pratense* (timothy), and *Trifolium pratense* (red clover). A diversity of weeds are found in the woods and mowed area including *Arctium minus* (burdock), *Capsella bursa-pastoris* (shepherd's purse), *Cirsium arvense* (Canada thistle), *Cyanoglossum officinale* (houndstongue), *Glycyrrhiza lepidota* (licorice), *Lepidium virginicum* (peppergrass), *Matricaria matricarioides* (pineapple weed), and *Plantago major* (plantain). Surrounding the mowed area is a narrow (and weedy) vestige of the native plant community which presumably once occupied the site. On the flat this is represented by *Elymus cinereus* (wild rye) dominated grassland (rarely seen during this project), and above by dry slopes with *Artemesia campestris* (common sagewort), *A. frigida* (fringed sage), *Opuntia polycantha* (prickly pear) and *Rhus trilobata* (skunkbrush). It is unlikely that any **MPSSC** occur in these habitats.

Buffalo Mirage Fishing Access Site

This area along the Yellowstone River is occupied by floodplain woodlands, mudflats, and gravel bars and weedy roadsides. The woods are dominated by *Populus deltoides* and *P. angustifolia* (cottonwoods) with a unique (for this project at least) understory dominant shrub, *Rhus trilobata* (skunkbrush). *Eleagnus angustifolia* (Russian olive), *E.*

commutatus (silverberry), and *Rosa woodsii* (rose) are additional understory shrubs. Also alarmingly dominant in the understory is *Euphorbia esula* (leafy spurge), a bad, difficult to control weed; special care should be taken so that control measures do not harm the native woody vegetation. The gravel bars and flats are dominated by *Salix exigua* (willow), *Phalaris arundinaceae* (canary reedgrass), *Rumex crispus* (curly dock), and *Polygonum amphibium* (water smartweed). The weedy roadsides are dominated by introduced grasses, including *Bromus inermis* (smooth brome), *B. tectorum* (downy brome), *Elymus repens* (quackgrass), *Poa pratensis* (Kentucky bluegrass), and *Setaria viridis* (foxtail). *Verbascum thapsus* (mullein) and *Melilotus officinale* (sweetclover) are two more introduced species common along the road. The possibility of **MPSSC** occurring at this site is remote.

Captain Clark Fishing Access Site

This is a very weedy bottomland site along the Yellowstone River. The area is divided by fences and by a slough into three sections. The area across the slough was not accessed for this project, but from a distance seems to be mostly cottonwoods and willow thickets. The two sections on the road side of the slough are mostly meadows with some cottonwoods and thickets. One section was heavily trampled and grazed by cattle (illicitly ?) with little vegetation surviving except the dominant introduced forage *Elymus hispidus* (intermediate wheatgrass), which oddly was not touched by livestock (perhaps it was over-mature for palatability), a native species of *Symphoricarpos* (snowberry), and the weeds *Sisymbrium loeselii* (tumble mustard) and *Hordeum jubatum* (foxtail barley). The heavily impacted thickets in this grazed section are dominated by *Salix exigua* (willow) with a vine understory of *Vitis riparia* (wild grape) and introduced *Solanum dulcamara* (blue bindweed). The ungrazed meadows are dominated by a rank growth of weedy natives and exotics including *Cirsium arvense* (Canada thistle), *Iva xanthifolia* (marsh elder), *Medicago sativa* (alfalfa), *Melilotus alba* and *M. officinale* (sweetclovers), and *Verbascum thapsus* (mullein). Except for the woodlands across the slough, the native flora at this site is very limited and there is little potential for occurrences of **MPSSC** (none have been reported in Yellowstone county). A weed management plan is badly needed. Grazing does not seem compatible with recreation, however, leasing the meadows for hay would be acceptable, and may help reduce the weed problem.

Chief Plenty Coups State Park

The vegetation of this park includes native habitats, hay fields, and areas managed as mowed turf. The native habitat consists of wet bottomlands and dry, rocky uplands. The bottomlands are dominated by cottonwoods (*Populus deltoides* and *P. balsamifera*), box elder (*Acer negundo*), and shrubs

including water birch (*Betula occidentalis*), currants (*Ribes* spp.), dogwood (*Cornus stolonifera*), and chokecherry (*Prunus virginiana*). These wetlands have a diverse understory of native grasses, sedges, rushes, and forbs with scattered exotic weeds including Canada thistle (*Cirsium arvense*), Poison Hemlock (*Conium maculatum*), houndstongue (*Cyanoglossum officinale*), licorice (*Glycyrrhiza lepidota*), prickly lettuce (*Lactuca serriola*) and sow thistle (*Sonchus uliginosus*). The dry uplands consist of shrublands dominated by sagebrush (*Artemesia cana*), snakeweed (*Gutierrezia sarothrae*), hawthorn (*Crataegus* sp.), wild plum (*Prunus americana*), and skunkbrush (*Rhus glabra*), grasslands dominated by blue bunchgrass (*Elymus spicatus*) and blue grama (*Bouteloua gracilis*) with Spanish bayonet (*Yucca glauca*) and prickly pear (*Opuntia polycantha*), and rock pavement with common sagewort (*Artemesia campestris*), fringed sage (*Artemesia frigida*), and creeping juniper (*Juniperus horizontalis*) growing in the cracks. Weeds are not well established in these uplands, however, some species were observed including downy brome (*Bromus tectorum*) and the noxious spotted knapweed (*Centaurea maculosa*).

Considering the park's diverse native flora, a high potential for occurrences of **MPSSC** (partly due to the proximity of the Pryor Mountains), and the presence of a spring and gravesites which Native Americans consider spiritual sites, it is recommended that weed control be carefully implemented. The park would benefit from a complete botanical survey of its natural areas both for determining the presence or absence of **MPSSC** and for its interpretive value; as a beginning, a list of plant taxa identified at the park by this project is provided in Appendix 2 of this report. A few small tree and brush "islands" within the area maintained as turf have severe infestations of Canada thistle and poison hemlock; these spots should be treated. However, it is recommended that the natural and spiritual areas of the park not be treated with chemicals, at least until a more detailed botanical survey can be conducted at an earlier point in the growing season and input from the Crow people is considered. Figure 2 is a map of the park which delineates the areas of concern.

Cooney State Park

Although it is one of the largest sites visited during this project, Cooney has relatively little native habitat. This is confined to the sagebrush (*Artemesia cana, A. tridentata*)/grassland (*Bouteloua gracilis, Elymus spicatus, Oryzopsis hymenoides, Stipa comata*) slopes on the unroaded north side of the reservoir, and to the narrow corridor of willow (mostly *Salix exigua*) thickets surrounding the inlet on the south side (see Figure 3). No **MPSSC** were located or are suspected in the willow thickets, but the sagebrush grasslands were not thoroughly searched and may have some potential for hosting species of concern; a survey at an earlier date in the

Figure 2. Map of Chief Plenty Coups State Park. Diagonal hatches designate the areas of concern discussed in the text warranting survey or other consideration.

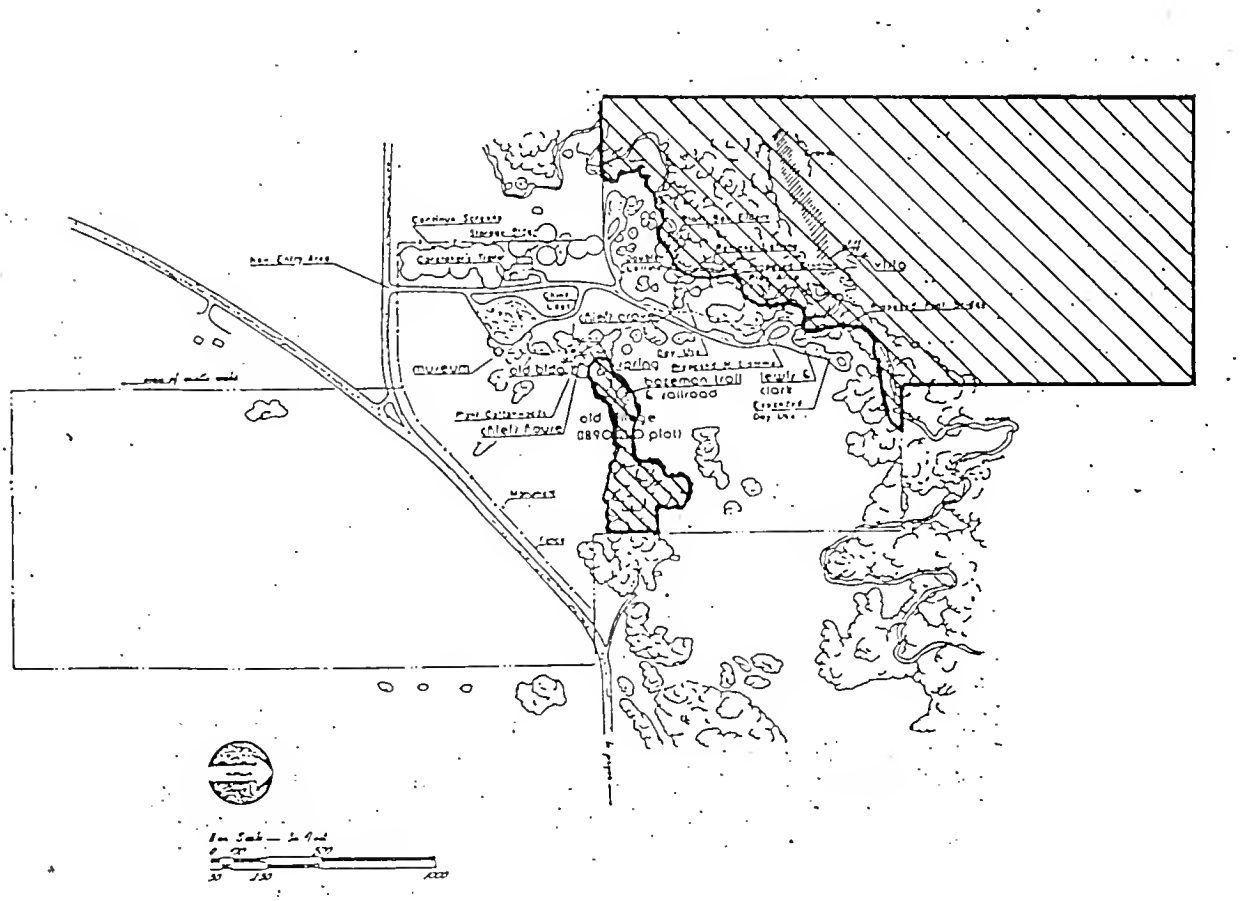
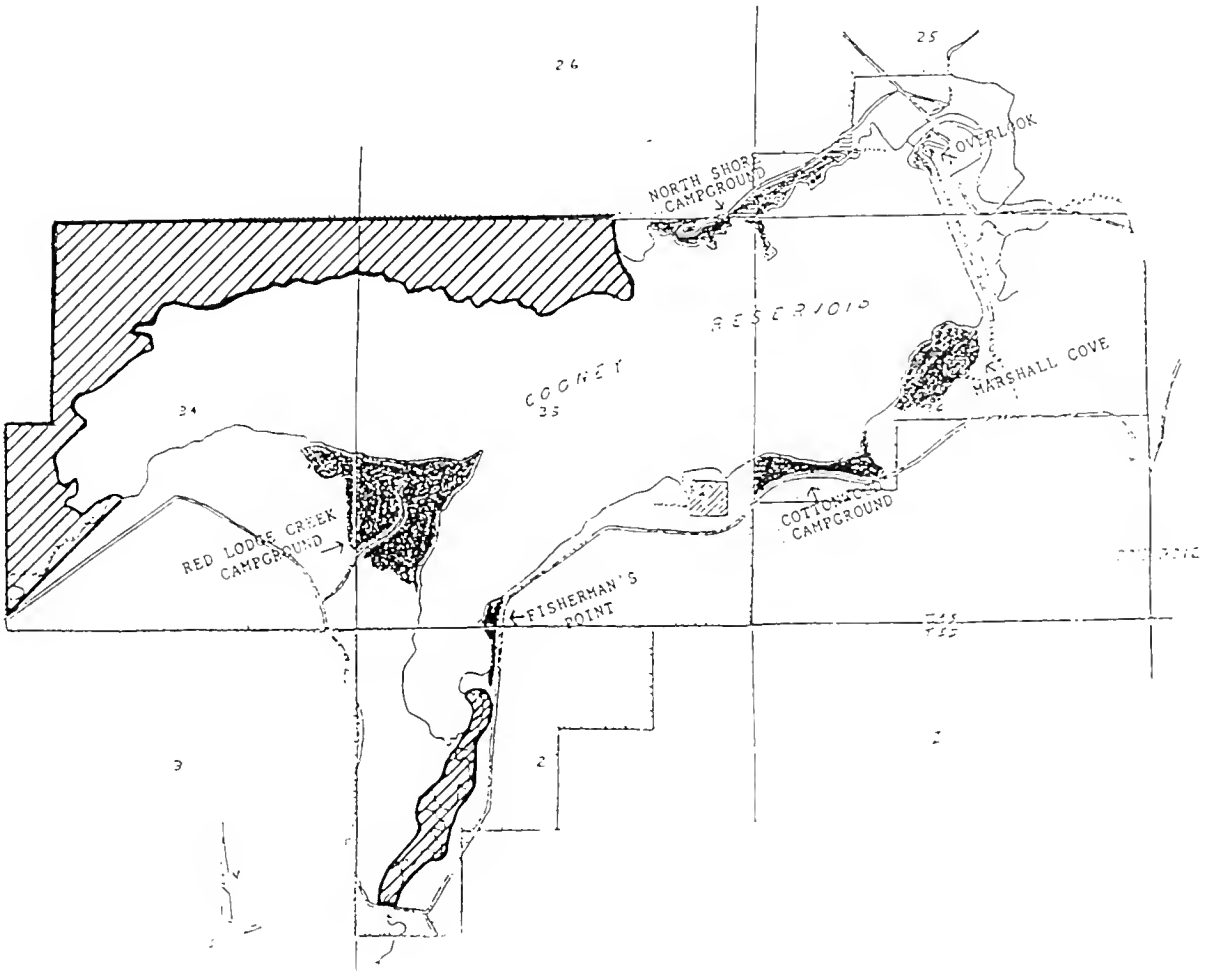


Figure 3. Map of Cooney State Park. Diagonal hatches designate areas with native vegetation.



growing season is recommended before herbicides are applied in these natural areas. However, weed control efforts will, undoubtedly, be concentrated in the developed areas of park. The vegetation of these areas consists of shoreline dominated by cottonwoods (*Populus deltoides*), willows (*Salix exigua* and others), sedges (including *Carex lanuginosa*), and cattails (*Typha latifolia*), meadows dominated by introduced grasses (*Agropyron cristatum, Bromus inermis, Elymus hispidus*) and legumes (*Medicago sativa, Melilotus officinale*), and mowed picnic and camp areas. Weeds in the developed areas include downy brome (*Bromus tectorum*), spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgaris*), licorice (*Glycyrrhiza lepidota*), erect cinquefoil (*Potentilla recta*), and salsify (*Tragopogon dubius*).

Deadman's Basin State Park

This developed water recreation site centered around an impoundment fed by diversion is located in an open, intermontane setting. No **MPSSC** are known from these settings in Wheatland County, but there have been almost no botanical studies in the county except in the Little Belt Mountains to the north. Records of **MPSSC** known from the Little Belts and of sand loving **MPSSC** with highly sporadic distributions statewide were considered, but none of these species were found and the probability of them occurring here is low to none; the site is too low and dry for the Little Belt species and has little development of a sand loving flora. Native habitat in the park in good condition includes ungrazed mixed grass prairie dominated by *Carex filifolia* (thread leaved sedge) and *Stipa comata* (needle and thread) and sparsely vegetated sandstone outcrops. In addition, the artificial wetland habitat created below the impoundment has low plant diversity but appears to benefit wildlife. Noxious weed infestations including patches of *Centaurea maculosa* (spotted knapweed) and *Cirsium arvense* (Canada thistle) are mostly limited to developed areas (picnic areas, boat launches, and roadsides) but have potential to spread over much of the park. Control efforts for knapweed need to involve local landowners because there are very severe infestations in surrounding private tracts (e.g. west of the Highway 12 exit to the park). A list of plant species identified at the park is included as Appendix 3 to this report.

Fireman's Point Fishing Access Site

This site along the Stillwater River near its confluence with the Yellowstone contains both bottomland and upland habitats. The dominant trees in the bottoms are *Populus balsamifera* (cottonwood) and *Acer negundo* (boxelder). The understory is dominated by shrubs including *Eleagnus commutatus* (silverberry), *Prunus virginiana* (chokecherry), and species of *Rosa* (rose) and *Symphoricarpos* (snowberry). Wet

areas directly adjacent to the river and ditch are inhabited by *Phalaris arundinacea* (canary reedgrass) and *Salix exigua* (willow). The uplands are steep, dry, rocky slopes with scattered *Pinus ponderosa* (ponderosa pine) and shrubs including *Artemesia cana* (silver sagebrush), *Chrysothamnus nauseosus* (rabbitbrush), *Juniperus scopulorum* (Rocky Mountain juniper), and *Yucca glauca* (Spanish bayonet). Although weeds are not presently a great problem at this site the following were seen (mostly around the parking lot): *Arctium minus* (burdock), *Bromus inermis* (smooth brome), *Centaurea maculosa* (spotted knapweed), *Cirsium arvense* (Canada thistle), *Cyanoglossum officinale* (houndstoungue), *Euphorbia esula* (leafy spurge), *Glycyrrhiza lepidota* (licorice), *Melilotus alba* and *M. officinale* (sweetclovers), and *Sonchus uliginosus* (sowthistle). At least two of these, knapweed and spurge, are extremely aggressive; steps should be taken to control them before they get out of hand. Although this site contains a large area of relatively pristine native habitat, the likelihood of finding **MPSSC** is low; the only ones known from Stillwater County are found in the alpine or in moist woods.

Grant Marsh Fishing Access Site

This is another very weedy site in bottomlands along the Bighorn River. The vegetation consists of floodplain woodlands, rank weedy meadows, and wetlands around sloughs. The woodlands are dominated by cottonwoods (*Populus deltoides*) and have a disturbed understory dominated by ragweed (*Ambrosia artemesifolia*), Canada thistle (*Cirsium arvense*), licorice (*Glycyrrhiza lepidota*), and white sweetclover (*Melilotus alba*). The meadows are dominated by exotics and weedy natives including goosefoot (*Chenopodium* sp.), field bindweed (*Convulvus arvensis*), intermediate wheatgrass (*Elymus hispidus*), foxtail barley (*Hordeum jubatum*), marsh elder (*Iva xanthifolia*), kochia (*Kochia scoparia*), prickly lettuce (*Lactuca seriola*), alfalfa (*Medicago sativa*), sweetclover (*Melilotus alba*), tumble mustard (*Sisymbrium loeselii*), and mullein (*Verbascum thapsus*). The wetlands are somewhat less weedy (although sowthistle, *Sonchus uliginosus*, is well established) and are dominated by Russian olive (*Eleagnus angustifolia*), rushes (*Juncus* spp.), curley dock (*Rumex crispus*), bull rushes (*Scirpus* spp.), goldenrod (*Solidago canadensis*), salt cedar (*Tamarisk chinensis*), and cattails (*Typha latifolia*). It was thought that this was potential habitat for *Eupatorium maculatum* and sensitive *Carex* species but none were found. It is unlikely that these or any other **MPSSC** inhabit these wetlands. This site needs a comprehensive weed control strategy and reclamation to less objectionable types of vegetation, but this will not be easily achieved.

Grey Bear Fishing Access Site

Vegetation at this site along the Yellowstone River consists of woodlands with openings, small meadows and

extensive wetlands. The dominant tree is *Populus acuminata* (lance-leaved cottonwood). The understory of the woods is either shrubby, dominated in dryer areas by *Eleagnus commutatus* (silverberry), *Juniperus scopulorum* (Rocky Mountain juniper), and *Symphoricarpos* (snowberry), and in wetter areas by *Cornus sericea* (dogwood) and *Salix lutea* (willow), or open, dominated by introduced grasses and legumes. Species represented in these open understories and in the small meadows include *Agropyron cristatum* (crested wheatgrass), *Bromus inermis* (smooth brome), *Elymus hispidus* (intermediate wheatgrass), *Elymus repens* (quackgrass), *Medicago sativa* (alfalfa), *Melilotus alba* and *M. officinale* (sweetclovers). Weeds in these habitats include *Centaurea maculosa* (spotted knapweed), *Cirsium arvense* (Canada thistle), *Cyanoglossum officinale* (houndstoungue), *Glycyrrhiza lepidota* (licorice), *Lactuca seriola* (prickly lettuce), *Sisymbrium loeselii* (tumble mustard), *Sonchus uliginosus* (sowthistle), *Tanacetum vulgare* (tansy), *Tragopogon dubius* (salsify), and *Verbascum thapsus* (mullein). The low wetlands are dominated by native plants including shrubs, *Cornus stolonifera* (dogwood) and *Salix exigua* (willow), grasses, *Phalaris arundinacea* (canary reedgrass) and *Phragmites australis* (common reed), rushes, *Juncus balticus*, and cattails, *Typha latifolia*. *Conium maculatum* (poison hemlock) is the most common weed in the wetlands. Although no **MPSSC** are suspected at this site, the wetlands are a high quality native habitat which should not be disturbed; however, weed control is appropriate in the disturbed woods and meadow areas.

Greycliff Prairie Dog Town State Park

The habitat of this park is inherently weedy due to constant rodent disturbance. Weed control is, therefor, probably futile except for spot treatment around picnic tables and along the road and trails. The prairie dogs themselves keep the weeds down by using them as a food source. Chemicals which might be poisonous to the wildlife (at all levels of the food chain) at this site should be avoided. The dominant native plant species around the dog diggings is *Artemesia frigida* (fringed sage). Weeds observed include *Arctium minus* (burdock), *Bromus tectorum* (downy brome), *Carduus nutans* (musk thistle), *Cirsium arvense* (Canada thistle), *Convulvulus arvensis* (field bindweed), *Glycyrrhiza lepidota* (licorice), *Hyoscyamos niger* (henbane), *Verbena bracteata* (prostrate vervain), and *Verbascum thapsus* (mullein). On the hills to the east of the prairie dog colony is relatively undisturbed native vegetation dominated by shrubs including *Artemesia tridentata* (big sagebrush), *Juniperus scopulorum* (Rocky Mountain juniper), *Prunus virginiana* (chokecherry), and *Rhus trilobata* (skunkbrush), and bluebunch wheatgrass, *Elymus spicatus*. Although the potential for **MPSSC** in this habitat is low, there is a high diversity of native plants and relatively

few weeds; thus weed control should be aimed only at carefully chosen targets.

Lake Elmo State Park

The native flora at this park in the greater Billings area has been almost entirely replaced by introduced and weedy species, in fact it is difficult to determine what the original vegetation was like. Much of the area has been planted with pasture forbs and grasses including *Agropyron cristatum* (crested wheatgrass), *Bromus inermis* (smooth brome), *Medicago sativa* (alfalfa), *Melilotus alba* (sweetclover) and *Trifolium pratense* (red clover). Weeds in the park include *Centaurea maculosa* (spotted knapweed), *Centaurea repens* (Russian knapweed), *Cirsium arvense* (Canada thistle), *Convulvulus arvensis* (field bindweed), *Glycyrrhiza lepidota* (licorice), *Kochia scoparia* (kochia) and *Salsola kali* (tumbleweed). Native taxa are mostly isolated, not part of intact systems. Native *Acer negundo* (boxelder) and *Populus deltoides* (cottonwood) grow along the lakeshore along with exotic woody species like *Eleagnus angustifolia* (Russian olive) and *Malus domestica* (apple). Wet alkaline flats are occupied by a mixture of native and exotic species including *Aster falcatus* (creeping white prairie aster), *Chenopodium* spp. (goosefoots), *Hordeum jubatum* (foxtail barley), *Scirpus* spp. (bullrushes), *Tamarisk chinensis* (salt cedar), and *Typha latifolia* (cattails). The predominance of members of the Chenopodiaceae (goosefoot family) and other salt tolerant plants are evidence of alkaline soils. No **MPSSC** are likely to inhabit the park.

Manuel Lisa Fishing Access Site

Vegetation at this small area along the Bighorn River at its confluence with the Yellowstone consists of floodplain woodlands and mudflats, and disturbed sagebrush grasslands. The woods are dominated by cottonwoods (*Populus deltoides*) and Russian olive (*Eleagnus angustifolia*), and have an understory of weeds and disturbed sand. The mudflats are dominated by canary reedgrass (*Phalaris arundinaceae*), bullrushes (*Scirpus* sp.), and blue vervain (*Verbena hastata*). The sagebrush grassland, dominated by big sagebrush (*Artemesia tridentata*) and blue grama (*Bouteloua gracilis*) has a diversity of native herbs but is also very weedy. Exotic species at this site include smooth brome (*Bromus inermis*), Russian knapweed *Centaurea repens*), Canada thistle (*Cirsium arvense*), foxtail barley (*Hordeum jubatum*), kochia (*Kochia scoparia*), alfalfa (*Medicago sativa*), sweetclovers (*Melilotus alba* and *M. officinale*), and salt cedar (*Tamarisk chinensis*). There is little potential here for occurrences of **MPSSC**.

Natural Bridge State Park

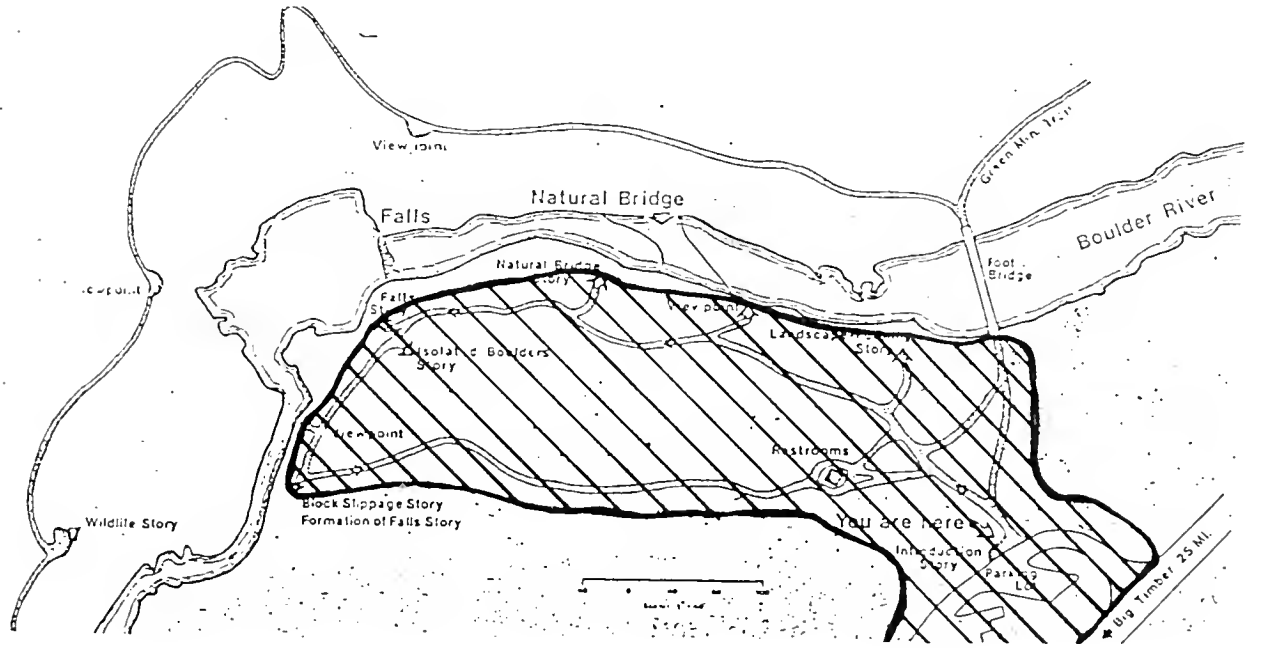
Vegetation at this park is quite diverse, relatively pristine, and unlike that of any of the other sites visited

during this project. Habitats range from relatively dry montane grasslands on the flats above the canyon walls to wetter forests and shady canyon walls, and include ecotones between these extremes. The flora of the upper rock walls and canyon rim is characterized by limestone loving plants such as *Chielanthes feei* (lipfern), *Happlopappus acaulis* (cushion goldenweed), and *Selaginella densa* (selaginella). The woodlands range from moist *Pseudotsuga menziesii* (Douglas fir) dominated forests with an understory of *Physocarpus malvaceous* (ninebark) and mosses, to dryer more open woods with a mixture of *Pseudotsuga* and *Pinus flexilis* with an understory of shrubs and grasses. These dry woods grade into pristine grasslands, (perhaps the most significant botanical feature of the park), dominated by *Elymus spicatus* (bluebunch wheatgrass), *Festuca idahoensis* (Idaho fescue), *Oryzopsis hymenoides* (indian ricegrass), and *Stipa comata* (needle and thread). These grasslands host a large number of native plant species. Wetter montane meadows in juxtaposition with the *Pseudotsuga* forests are dominated by forbs such as *Campanula rotundifolia* (harebell), *Geranium* spp. (geraniums), *Monarda fistulosa* (bee balm), *Helianthella quinquenervis* (little sunflower), and *Perideridia gairdneri* (yampah). Weeds are not a big problem at the park except around the parking area, trails, and picnic tables where the following exotic species were seen (some of them undoubtedly planted): *Alyssum desertorum* (alyssum), *Bromus inermis* (smooth brome), *Bromus secalinus* (cheat), *Bromus tectorum* (downy brome), *Dactylis glomerata* (orchardgrass), *Glycyrrhiza lepidota* (licorice), *Lactuca seriola* (prickly lettuce), *Melilotus officinale* (sweetclover), *Phleum pratense* (timothy), *Sisymbrium altissimum* (tumble mustard), *Lychnis alba* (white campion), and *Verbascum thapsus* (mullein). Although no **MPSSC** were located there may be some potential of the wetter forests hosting *Cypripedium calceolus* or *Adoxa moschatellina*, species found in these habitats elsewhere in Stillwater County. Due to the high quality native habitats in the park it is suggested that weed control be confined to the weedy developed areas (Figure 4) where a carefully implemented program (including seeding with **native** species) could help enhance the native flora. A complete floristic inventory of the park would be useful for determining the status of the above mentioned **MPSSC** and as a tool for public interpretation of this scenic area.

Pictograph Caves State Park

This is another example of a park with a significant (if not pristine) native plant community. Located along sandstone rimrock, the site has a spectrum of microhabitats ranging from shady and cool to open and hot. The cliffs host tree species including *Acer negundo* (boxelder), *Pinus ponderosa* (ponderosa pine), and *Populus deltoides* (cottonwood) with a somewhat troublesome understory of *Clematis ligusticifolia* (virgin's bower), *Hummulus lupulus* (hops), and *Toxicodendron rydbergii*

Figure 4. Map of Natural Bridge State Park showing developed areas (map does not show the entire park). Diagonal hatching indicates area with significant levels of exotic plants (weeds and seeded species). Chemical weed control should be limited to carefully identified targets **within** this area.



(poison ivy). The more open areas are sagebrush (*Artemesia cana*) grasslands (*Bouteloua gracilis, Elymus cinereus, Oryzopsis hymenoides, Stipa comata*) with a diversity of native herbs and shrubs. Weeds, besides the viney *Clematis* and *Humulus*, are concentrated around the parking and picnic areas and around the archeological digs and include *Arctium minus* (burdock), *Alyssum desertorum* (alyssum), *Ambrosia artemesifolia* (ragweed), *Bromus tectorum* (downy brome), *Cirsium arvensis* (Canada thistle), *Marrubium vulgare* (horehound), and *Melilotus alba* (sweetclover). No **MPSSC** were found or are known from elsewhere in Yellowstone County.

Selkirk Fishing Access Site

Habitat at this unusually large fishing access site along the Musselshell River includes oxbow wetlands and adjoining uplands. Vegetation consists of three more or less natural types but none of these are pristine; these are 1) mixed grass prairie uplands dominated by *Elymus smithii* (western wheatgrass) and *Stipa comata* (needle and thread) and invaded by *Poa pratensis* (Kentucky bluegrass) which are idle and productive but recovering from overgrazing and depauperate in forbs, including a portion with a high component of *Ceratoides lanata* which may represent an uncommon plant association, 2) unstable, sparsely vegetated silt slopes with a diverse pioneer community which has, however, been disturbed by construction of an irrigation channel and invaded by *Centaurea maculosa* (spotted knapweed), and 3) floodplains with oxbow wetlands choked by *Typha latifolia* (cattails) and open forests and thickets dominated by *Populus angustuifolia* (cottonwood) and *Salix bebbiana* (willow) respectively, with understories dominated by exotic species. In addition to knapweed two other noxious weeds seen were *Cyanoglossum officinale* (houndstongue) and *Hyoscyamus niger* (henbane). No **MPSSC** are known from Wheatland County, none were found at the site, and none are suspected.

Water Birch Fishing Access Site

The floodplain woodlands which occupy most of this area along Rock Creek are among the most extensive and most pristine visited during this project. However, no **MPSSC** are known from this kind of habitat, at least in Carbon County. The woodlands are dominated by *Populus balsamifera* (cottonwood) with a few *Populus tremuloides* (quaking aspen) and have a brushy understory with *Alnus incana* (alder), *Cornus stolonifera* (dogwood), *Prunus virginiana* (chokecherry), and species of *Crataegus* (hawthorn), *Rosa* (rose) and *Symphoricarpos* (snowberry). Oddly, no water birch (*Betula occidentalis*) was seen. A few exotic species are scattered in the woods but are nowhere aggressively weedy; these include *Centaurea maculosa* (spotted knapweed), *Chrysanthemum leucanthemum* (ox-eye daisy), *Cirsium arvense* (Canada thistle), *Dactylis glomerata* (orchardgrass), *Glycyrrhiza lepidota*

(licorice), *Melilotus* spp. (sweetclovers), *Sonchus uliginosus* (sowthistle), and *Trifolium pratense* (red clover). Additional floodplain habitat includes gravel bars characterized by *Ranunculus gmelinii* (buttercup) and the exotic *Myosotis scirpoides* (forget-me-not) and mudflats dominated by *Carex urtriculata* (sedge) and species of *Juncus* (rushes) and *Scirpus* (bullrushes). Weeds are a problem in the open camping, picnic and parking areas adjacent to the highway and railroad tracks where heavy infestations of *Berteroa incana* (berteroa), *Bromus tectorum* (downy brome), and *Centaurea maculosa* (spotted knapweed) are found along with lesser weeds such as *Lactuca serriola* (prickly lettuce), *Tragopogon dubius* (salsify), and *Verbascum thapsus* (mullein). It is recommended that broad treatment of weeds be confined to these developed areas (Figure 5).

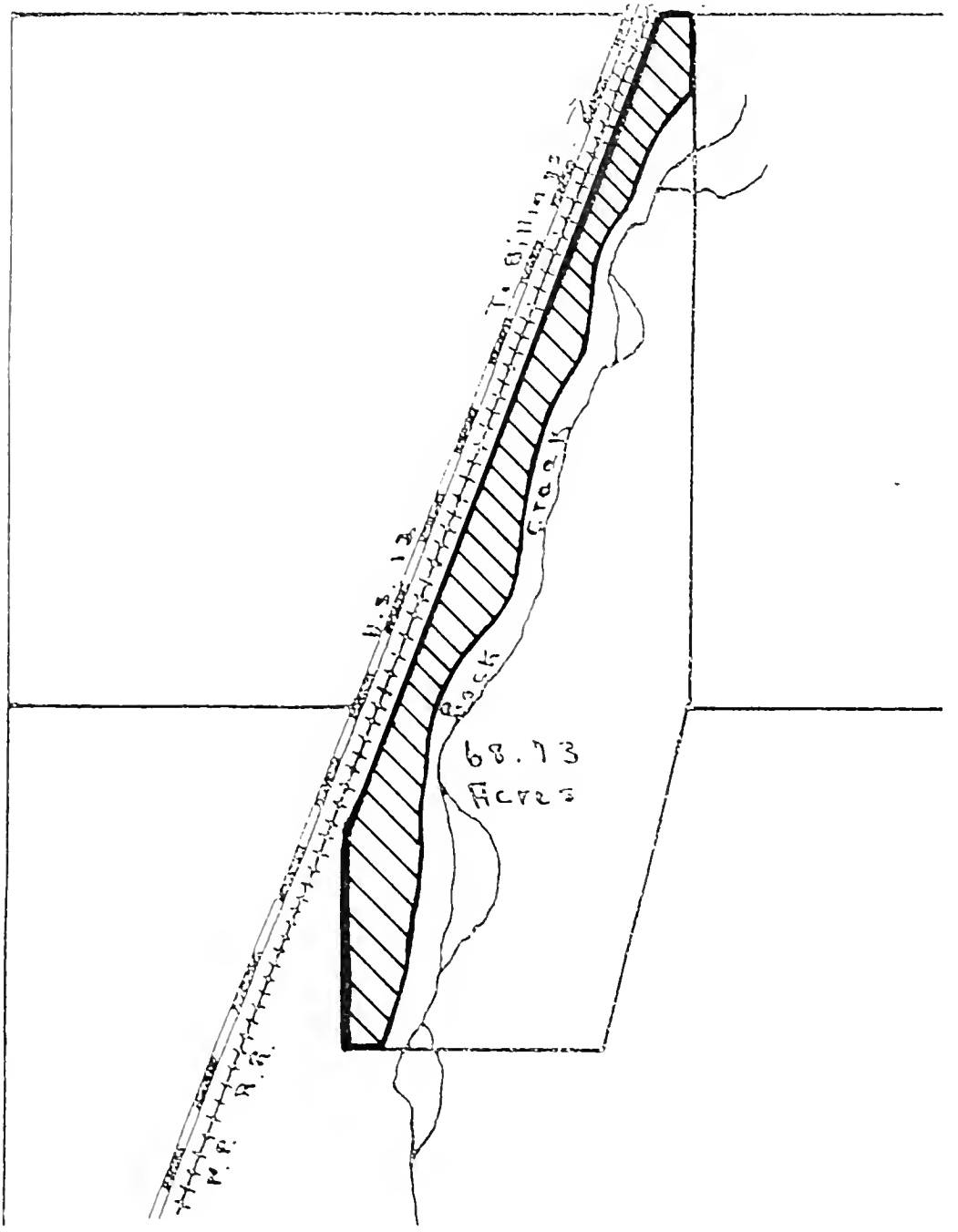
White Bird Fishing Access Site

Vegetation at this site along the Stillwater River consists of relatively pristine floodplain woodlands and wetlands and meadows in small openings managed for camping and picnicking. The woods are dominated by *Acer negundo* (box elder) and *Populus balsamifera* (cottonwood), with an understory of shrubs including *Cornus stolonifera* (dogwood), *Eleagnus commutatus* (silverberry), *Juniperus scopulorum* (Rocky Mountain juniper), and *Symphoricarpos* sp. (snowberry). Swampy areas are dominated by *Phalaris arundinacea* (canary reedgrass) and *Salix exigua* (willow). The meadows are dominated by introduced pasture species including *Bromus inermis* (smooth brome), *Dactylis glomerata* (orchardgrass), *Medicago* spp. (alfalfas), *Melilotus* spp. (sweetclovers), *Phleum pratense* (timothy), and *Trifolium pratense* (red clover). Weeds include *Berteroa incana* (berteroa), *Centaurea maculosa* (spotted knapweed), *Cirsium arvense* (Canada thistle), *Euphorbia esula* (leafy spurge), *Glycyrrhiza lepidota* (licorice), and *Verbascum thapsus* (mullein). No **MPSSC** were found or are expected at this site.

Yellowstone River Trout Hatchery

This site in Big Timber is almost entirely a managed landscape. Most of the area is mowed turf, however, there is a small plantation of *Picea* (spruce), and a small swampy area with aquatic plants such as *Epilobium ciliatum* (willow-herb), *Lemna minor* (duckweed), and *Typha latifolia* (cattail). Weeds at the site include *Arctium minus* (burdock), *Cirsium arvense* (Canada thistle), *Malva neglecta* (mallow)and *Solanum dulcamara* (nightshade). The potential for **MPSSC** is low. Precautions should be taken so that the wetlands are not polluted with toxic herbicides.

Figure 5. Map of Water Birch Fishing Access Site. Diagonal Hatching indicates area with heavy infestations of weeds. Broad weed control measures should be confined to this area.



CONCLUSION

Although an attempt was made by this project to assess Region Five lands for **MPSSC**, the results should not be considered definitive or complete. Even when intense plant searches are conducted at appropriate times of the year, some targets are probably inevitably overlooked. In this case the searches were neither intense nor, in most cases, conducted at an appropriate time. Because of this, some precautions should be taken.

Certain areas should be revisited for more intense surveys earlier in the growing season before weed control measures are taken. The areas where this has been recommended were chosen based on the presence of significant native plant communities and geographical proximity to known occurrences of **MPSSC**. At most sites, however, the areas with severe weed problems (where control should be focused first) are not native communities. Bluewater Springs Trout Hatchery is an exception which will require development of a special weed control strategy.

Weed control should be aimed at carefully chosen targets and based on positive weed identification. Too often weed crews have sprayed populations of sensitive species. This has not been limited to small or inconspicuous species; during the summer of 1993 populations of *Penstemon lemhiensis* and *Veratrum californicum*, two large, showy, sensitive species which cannot be mistaken for any weeds, were sprayed on public lands in Montana. Besides **MPSSC**, the general native flora should also be spared from weed control measures; if native plants are killed openings are left for weeds. Members of weed crews need to be familiar with their targets.

Despite these potential dangers, it is acknowledged that weed infestations are generally more detrimental to native plant species and communities than appropriate weed control measures. Many, if not most, of the sites visited during this project host severe infestations of weeds which warrant immediate control actions. A summary of the results and recommendations of this report is presented in Table 4 which follows.

Table 4. Summary of site specific results and recommendations.

SITE	DEGREE OF WEEDINESS	NATIVE COMMUNITIES	CONFLICTS, INCLUDING MPSSC	RECOMMENDATIONS
Big Horn	high	wetlands and thickets	none, low probability for species of concern	proceed with weed control
Bluewater Springs	high	sagebrush grassland, desert shrub, alkaline barrens, rock outcrops, and wetlands	weeds in association with *Eupatorium maculatum*, potential for other species of concern	delay weed control until conflicts are resolved, return for detailed survey
Boulder Forks	low-moderate	floodplain woodlands	none, low probability for species of concern	continue haying, weed control OK in developed areas
Bratten	moderate	floodplain woodlands, thickets and bars	none, low probability for species of concern	continue haying, weed control OK in developed areas
Buffalo Jump	moderate	small woodlot, remnant grasslands and shrublands	none, low probability for species of concern	continue mowing or hay, weed control OK in developed area
Buffalo Mirage	high (leafy spurge)	floodplain woodlands, thickets, and bars	none, low probability for species of concern	develop weed control strategy for spurge which minimizes impact on woody natives
Captain Clark	high, overgrazing by trespassing cattle?	floodplain woodlands and bars	none, low probability for species of concern	remove cattle from site, lease for hay, proceed with weed control.
Chief Plenty Coups	high in spots within developed areas	floodplain woodlands and thickets, sagebrush, desert shrub, grasslands, rock outcrop	spiritual spring and grave sites, native plant communities, potential for species of concern	weed control OK in developed area, needs further survey work in native areas
Cooney	high	sagebrush grasslands, streamside willow thickets	none in developed areas (most of the site), potential for species of concern in native sagebrush grasslands	proceed with weed control in developed areas, further survey needed in native areas
Deadman's Basin	high in developed areas	mixed grass prairie, sandstone outcrops	none, probability low for species of concern	proceed with weed control, coordinate with adjacent landowners
Fireman's Point	low	floodplain woodlands, Ponderosa pine slopes	none in developed area, native communities on slopes	weed control OK in parking area
Grant Marsh	high	floodplain woodlands, wetlands	chemical effects on wetlands, potential low for species of concern	mow or lease for hay, proceed with weed control except in wetlands

SITE	DEGREE OF WEEDINESS	NATIVE COMMUNITIES	CONFLICTS, INCLUDING MPSSC	RECOMMENDATIONS
Grey Bear	moderate	floodplain woodlands and thickets, extensive wetlands	chemical effects on wetland wildlife and flora	weed control OK in developed areas, stay out of wetlands
Greycliff Prairie Dog Town	high	naturally disturbed area, sagebrush grasslands	chemical effects on wildlife	weed control probably futile except along road and around picnic tables due to constant rodent activity
Lake Elmo	high	minimal, alkaline thickets and meadows	none, probability low for species of concern	proceed with weed control
Manuel Lisa	high	floodplain woodlands, mudflats, sagebrush grasslands	none, probability low for species of concern	proceed with weed control
Natural Bridge	low-moderate	conifer forest, grasslands, meadows, limestone outcrops	pristine native plant communities, potential for species of concern	weed control OK in developed area, further survey for species of concern and of plant communities may be warranted
Pictograph Caves	moderate, confined to developed area and archeological digs	grasslands, sagebrush grasslands, woodland, sandstone outcrops	native plant communities	weed control OK in developed area
Selkirk	high	mixed grass prairie, unstable slopes, wetlands, thickets, woodlands	none, probability low for species of concern	proceed with weed control
Water Birch	moderate (-high in developed area)	extensive floodplain woodlands	high quality native vegetation but low probability for species of concern	proceed with weed control in developed area
White Bird	moderate	floodplain woodlands, wetlands	none, probability low for species of concern	proceed with weed control in developed area, mow?
Yellowstone River Hatchery	low	small swamp, area mostly developed	chemical effects on wetland	continue management as developed landscape

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APPENDIX 1

October 20, 1993

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: EUPATORIUM MACULATUM VAR BRUNERI
Common Name: JOE-PYE WEED

Global rank: G5TU Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PDAST3P141.003
Element occurrence type:

Survey site name: BLUEWATER HATCHERY
EO rank: B
EO rank comments: WEEDS PLENTIFUL BUT POPULATION SEEMS COMPETITIVE.

County: CARBON

USGS quadrangle: BLUEWATER

Township:	Range:	Section:	TRS comments:
006S	024E	09	W2

Precision: S
Survey date: 1993-08-31 Elevation: 3980 - 4000
First observation: 1993-08-31 Slope/aspect: LEVEL
Last observation: 1993-08-31 Size (acres): 10

Location:
FROM FROMBERG ON US HWY 310, TRAVEL 9 MILES SOUTHEAST ON COUNTY ROAD FOLLOWING SIGNS TO BLUEWATER HATCHERY AND FISHING ACESS. POPULATION IS AROUND BIG BLUEWATER SPRING AND ALONG CREEK.

Element occurrence data:
1000+ AERIAL STEMS, 100% LATE FLOWERING AND EARLY FRUIT. HIGH-DENSITY POPULATION; LARGE PLANTS.

General site description:
SATURATED BOTTOM, PARTIAL SHADE, CLAY SOILS. WETLAND THICKET, WITH BETULA OCCIDENTALIS, SALIX DRUMMONDIANA, SALIX SPP., CORNUS STOLONIFERA, SCIRPUS SP., EUPHORBIA ESULA, THALICTRUM DASYCARPUM, SOLIDAGO SP., CIRSIUM ARVENSE, CONIUM MACULATUM, TAMARISK CHINENSIS, TYPHA LATIFOLIA, ELEAGNUS ANGUSTIFOLIA.

Land owner/manager:
BLUEWATER SPRINGS TROUT HATCHERY
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:
EIS FOR WEED CONTROL ON MT DEPT. OF FISH, WILDLIFE AND PARKS LANDS IS BEING PREPARED (FALL, 1993). POPULATION SHOULD BE CONSIDERED WHEN PLANNING WEED CONTROL IN VICINITY.

Information source: VANDERHORST, J. 1993. [MTNHP SENSITIVE SPECIES SURVEY OF REGION 5, CONDUCTED FOR MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS.]

Specimens: VANDERHORST, J. (5155). 1993.

APPENDIX 2

List of vascular plant species identified at Chief Plenty Coups State Park on August 31, 1993, their common names, and habitats where they occur.

Acer negundo	boxelder	riparian woodlands
Artemesia campestris	common sagewort	rocks
Artemesia cana	siver sagebrush	sagebrush grasslands
Artemesia frigida	fringed sage	rocks and sagebrush
Astragalus adsurgens	locoweed	sagebrush grasslands
Astragalus drummundii	locoweed	sagebrush grasslands
Beckmannia syzigachne	sloughgrass	riparian grasslands
Betula occidentalis	water birch	riparian thickets
Bouteloua gracilis	blue grama	dry grasslands
Bromus tectorum	downy brome	disturbed grasslands
Centaurea maculosa	spotted knapweed	disturbed areas
Cirsium arvense	Canada thistle	disturbed areas
Cornus stolonifera	dogwood	riparian thickets
Conium maculatum	poison hemlock	wet, disturbed areas
Cyanoglossum officinale	houndstongue	disturbed areas
Elymus spicatus	bluebunch wheatgrass	sagebrush grasslands
Epilobium paniculatum	willow herb	dry hills
Glycyrrhiza lepidota	licorice	disturbed areas
Gutierrezia sarothrae	snakeweed	sagebrush grassland
Helianthus rigidus	sunflower	rocks and sagebrush
Juniperus horizontalis	creeping juniper	rocks
Lactuca serriola	prickly lettuce	disturbed areas
Liatris punctata	blazing star	sagebrush grasslands
Melilotus officinale	sweetclover	disturbed areas
Phleum pratense	timothy	hayfields
Populus balsamifera	balsam poplar	riparian woodlands
Populus deltoides	plains cottonwood	riparian woodlands
Prunus americana	wild plum	dry shrublands
Prunus virginiana	chokecherry	thickets
Psoralea tenuiflorum	scurf-pea	sagebrush grasslands
Rhus trilobata	skunkbrush	dry shrublands
Selaginella densa	spike moss	rocks and sagebrush
Solidago nemoralis	goldenrod	rocks
Solidago rigida	goldenrod	rocks
Sonchus uliginosus	sow thistle	wet, disturbed areas
Yucca glauca	Spanish bayonet	dry grasslands

APPENDIX 3

List of vascular plant species identified at Deadmans Basin State Park on September 8, 1993

Agropyron cristatum
Artemisia cana
Artemisia frigida
Artemisia tridentata
Aster ericoides
Astragalus gilviflorus
Astragalus missouriensis
Astragalus spathulatus
Bidens cernua
Bromus inermis
Bromus tectorum
Carex filifolia
Centaurea maculata
Ceratoides lanata
Chaenactis douglasii
Chrysothamnus nauseosus
Cirsium arvense
Elymus hispidus (Agropyron intermedium)
Elymus spicatus (Agropyron spicatum)
Grindelia squarrosa
Gutierrezia sarothrae
Helianthus annua
Hymenopappus acaulis
Koeleria cristata
Liatris punctata
Lygodesmia juncaea
Melilotus officinalis
Muhlenbergia cuspidata
Oryzopsis hymenoides
Petlostemum purpureum
Phlox hoodii
Psoralea lanceolata
Sisyrhinchium montanum
Sitanion hystrix
Stipa comata
Stipa viridula