

Potential impact of proposed noxious weed treatment at Bluewater Fish Hatchery (MDFWP) on plant species of special concern

Summary: Three state plant species of special concern documented from Bluewater Fish Hatchery are Joe-pye weed (Eupatorium maculatum), swamp milkweed (Asclepias incarnata) and beaked spikerush (Eleocharis rostellata). The first two occur together in open meadow habitat adjoining Big Bluewater Spring and downstream watercourses (see schematic map, next page). They are discontinuous along this linear habitat and do not occur on diversions, slumpbanks, downcut stream reaches, or under deep shade. Swamp milkweed numbers diminish downstream and it is not present in the productive meadows and meadows invaded by Phalaris arundinaceae downstream as is Joe-pye weed. The beaked spikerush is found on saturated marl in small areas adjoining Big Bluewater Spring and is very localized in sparsely-vegetated marl margins of the immediate downstream watercourse.

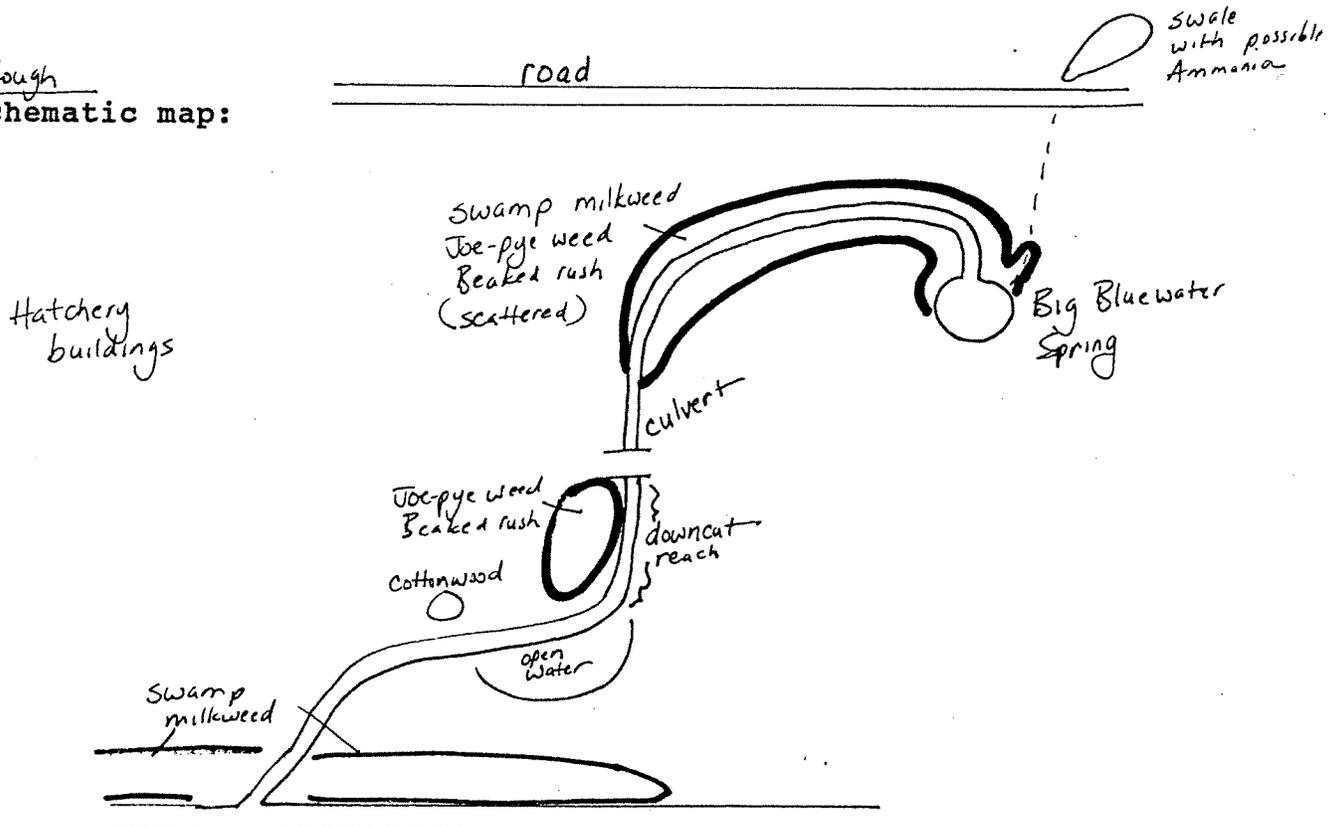
Both meadow species are most numerous immediately below the spring impoundment. This is also the portion of their existing distribution with heaviest invasion of the most serious noxious weed, leafy spurge. The beaked spikerush, by contrast, is a special wetland plant and leafy spurge only encroaches at its habitat margins.

Plants have been collected and tentatively identified as scarlet ammannia (Ammannia coccinea) in pre-flowering condition. It was collected from, and may be restricted to, a small brackish swale north of Big Bluewater Spring, on the north side of the road. Leafy spurge has the potential to invade surrounding uplands, but is absent for now in this area, and the swale itself is too alkaline for leafy spurge encroachment.

All four of the above-mentioned state plant species of special concern are currently ranked "S1": critically imperiled. The swamp milkweed was previously reported in Dorn (1984) from Carbon County, but we have been unable to locate specimen information, so the Bluewater Fish Hatchery population is the only record in the state where location is precisely known at present. The Joe-pye weed is known from a total of three records in the state, the other two located to the north and east in Big Horn County. The beaked spikerush is known from seven other locations in the state much farther west, including Flathead, Lake, Madiwon, Sanders and Teton counties (the latter is at Pine Butte Swamp). The scarlet ammannia has been collected three times previously in the state, the most recent being over 50 years ago. It was collected in Garfield and Phillips counties, and somewhere on the "Milk River" in 1853. Note: The first two species might turn out to be more common if we had more information from Carbon County, but they warrant the "S1" rank for the present. They are tracked by the Wyoming Natural Heritage Program, and have been lowered in their Wyoming status based on the number of new records, and their repeated occurrence in altered habitat like road ditches.

The feasibility of various noxious weed control options were not considered, but their potential impacts on the three rare plant species are briefly described. Herbicide application would threaten both meadow species which, like leafy spurge are dicots, except by hand treatment early in the growing season. Most or all potential herbicide application options for leafy spurge are ruled out by the proximity to surface water and the shallowness of the water table in the rare species' habitat. Herbicide application would not affect beaked spikerush, a monocot. Goat grazing could impact all rare species. Most or all potential options for control by goat grazing are precluded in this habitat by its susceptibility to trampling, slumping, and further successional degradation. No threats are likely with insect biocontrol measures, and no native species of Euphorbia were found at the site.

Rough
Schematic map:

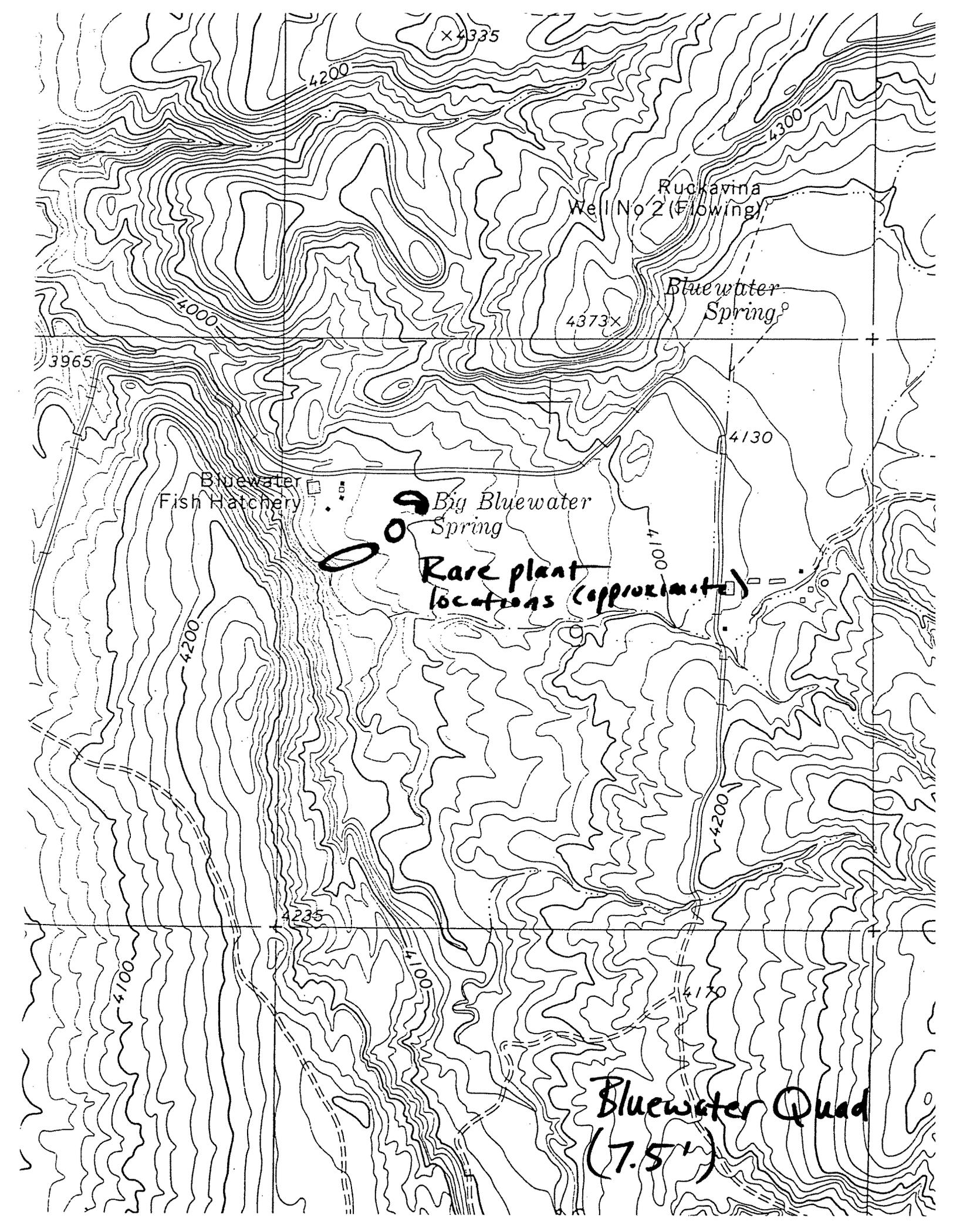


Supporting information:

Plant species of special concern survey forms for Asclepias incarnata and Eupatorium maculatum

Copy of Bluewater topo map (7.5') showing location and extent of Bluewater Fish Hatchery rare plant species

Preliminary species list



x 4335

4

4200

4300

Ruckavina
Well No 2 (Flowing)

Bluewater
Spring

4373x

4000

3965

4130

Bluewater
Fish Hatchery

Big Bluewater
Spring

Rare plant
locations (approximate)

4200

4100

4200

4235

4100

4100

4150

Bluewater Quad
(7.5')

Preliminary list of vascular plants
at Bluewater Fish Hatchery*

<u>Scientific name</u>	<u>Common name</u>
Agropyron dasystachum	Thickspike wheatgrass
Agropyron spicatum	Bluebunch wheatgrass
Allium textile	White prairie onion
(Ammania coccinea)	Scarlet ammannia
Amelanchier alnifolia	Juneberry
Andropogon scoparius	Little bluestem
(Note: This forms a dense sod in localized undisturbed areas near springs, and may have once been the dominant.)	
Androsace septentrionalis	Rockjasmine
Apocynum sibiricum	Dogbane
Arctium minus	Burdock
Arenaria nuttallii	Nuttall's sandwort
Aristida longiseta	Three-awn
Artemisia cana	Silver sage
Artemisia frigida	Fringed sage
Artemisia tridentata	Big sage
Asclepias incarnata	Swamp milkweed
Asclepias viridiflora	Green milkweed
Asclepias speciosa	Showy milkweed
Aster (junciformis)	Rush aster
Astragalus agrestis	Common milkvetch
Astragalus bisulcatus	Two-grooved milkvetch
Astragalus gilviflorus	Tufted milkvetch
Astragalus gracilis	Graceful milkvetch
Astragalus miser var. decumbens	Weedy milkvetch
Astragalus missouriensis	Ground plum
Atriplex canescens	Four-wing saltbush
Betula occidentalis	Water birch
Bouteloua gracilis	Blue grama
Bromus inermis*	Smooth brome
Bromus tectorum*	Cheatgrass
Camelina sativa*	False flax
Cardamine pensylvanica	Bitter cress
Carex aquatilis	Water sedge
Carex aurea	Golden sedge
Carex filifolia	Thread-leaved sedge
Carex lanuginosa	Wooly sedge
Carex spp.	Sedges
Castilleja angustifolia	Paintbrush
Chaenactis douglasii	Chaenactis
Chrysothamnus nauseosus	Rabbitbrush
Cirsium arvense*	Canada thistle
Cirsium flodmanii	Prairie thistle
Clematis ligusticifolia	Western clematis
Commandra umbellatum	Bastard toadflax
Conium maculatum*	Poison hemlock

* Those species whose scientific names are asterisked are exotic

<i>Convolvulus arvensis*</i>	Bindweed
<i>Cornus stolonifera</i>	Red osier dogwood
<i>Crepis intermedia</i>	Western hawkweed
<i>Cymopterus bipinnatus</i>	Cymopterus
<i>Cynoglossum officinale*</i>	Hound's tongue
<i>Dalea candida</i>	White prairie clover
<i>Descurainia richardsonii*</i>	Flixweed
<i>Distichlis stricta</i>	Saltgrass
<i>Eleagnus angustifolia*</i>	Russian olive
<i>Eleocharis rostellata</i>	Beaked spike rush
<i>Eleocharis</i> spp.	Spike rush
<i>Equisetum arvense</i>	Horsetail
<i>Equisetum laevigatum</i>	Scouring rush
<i>Erigeron caespitosus</i>	Daisy fleabane
<i>Erigeron</i> spp.	Fleabane
<i>Eriogonum ovalifolium</i>	Oval-leaved buckwheat
<i>Erysimum repandum</i>	Wallflower
<i>Eupatorium maculatum</i>	Joe-pye weed
<i>Euphorbia esula*</i>	Leafy spurge
<i>Galium aparine</i>	Cleavers
<i>Glycyrrhiza lepidota</i>	Wild licorice
<i>Haplopappus armerioides</i>	Haplopappus
<i>Hesperis matronalis*</i>	Sweet rocket
<i>Humulus lupulus</i>	Hops
<i>Iva xanthifolia</i>	Poverty weed
<i>Juncus tracyi</i>	Tracy's rush
<i>Juncus</i> spp.	Rush
<i>Juniperus scopulorum</i>	Rocky Mountain juniper
<i>Kochia scoparia*</i>	Russian thistle
<i>Koeleria cristata</i>	Junegrass
<i>Lappula redowski*</i>	Stickseed
<i>Lesquerella alpina</i>	Alpine bladderpod
<i>Lewisia rediviva</i>	Bitterroot
<i>Lilium philadelphicum</i>	Wild lily
<i>Linum perenne</i>	Blue flax
<i>Lycopus (americanus)</i>	Bugleweed
<i>Melilotus officinalis*</i>	Yellow sweetclover
<i>Mentha arvensis</i>	Wild mint
<i>Mirabilis linearis</i>	Four-o'clock
<i>Lactuca serriola</i>	Wild lettuce
<i>Lepidium campestre*</i>	Pepper grass
<i>Nasturtium officinale</i>	Water cress
<i>Onosmodium mollis</i>	Gromwell
<i>Orobanche ludoviciana</i>	Broomrape
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Oxytropis lagopus</i>	Rabbitfoot locoweed
<i>Penstemon nitidus</i>	Penstemon
<i>Phacelia linearis</i>	Phacelia
<i>Phalaris australis*</i>	Reed canary grass
<i>Parietaria pensylvanica</i>	Pellitory
<i>Psoralea (tenuiflora)</i>	Scurf-pea
<i>Poa pratensis</i>	Kentucky bluegrass

<i>Poa secunda</i>	Sandberg's bluegrass
<i>Poa spp.</i>	Bluegrass
<i>Populus (acuminata)</i>	Lanceleaf cottonwood
<i>Potamogeton foliosus</i>	Pondweed
<i>Prunus virginiana</i>	Chokecherry
<i>Raphanus raphanistrum*</i>	Jointed charlock
<i>Rhus trilobata</i>	Skunkbush sumac
<i>Ribes aureum</i>	Golden currant
<i>Rosa woodsii</i>	Wood's rose
<i>Salix brachycarpa</i>	Short-fruited willow
<i>Salix drummondii</i>	Drummond's willow
<i>Salix exigua</i>	Sandbar willow
<i>Scirpus acutus</i>	Hardstem bullrush
<i>Scirpus americanus</i>	Three-square
<i>Senecio canus</i>	Silvery groundsel
<i>Sisymbrium altissimum*</i>	Tumble mustard
<i>Sisyrinchium angustifolium</i>	Blue-eyed grass
<i>Smilacina stellata</i>	False starry Solomon's seal
<i>Solanum ducamara*</i>	Nightshade
<i>Solanum triflorum*</i>	Nightshade
<i>Solidago missouriensis</i>	Goldenrod
<i>Solidago mollis</i>	Soft goldenrod
<i>Solidago (occidentalis)</i>	Western goldenrod
<i>Sporobolus airoides</i>	Alkali sacaton
<i>Spartina pectinata</i>	Prairie cordgrass
<i>Sphaeralcea coccinea</i>	Scarlet globe mallow
<i>Stanleya tomentosa</i>	Hairy prince's-plume
(The preceding species was recently dropped from the Montana species of special concern list. In Montana, it is found only in Carbon County, where it is relatively widespread.)	
<i>Stipa comata</i>	Needle-and-thread
<i>Stipa viridula</i>	Green needlegrass
<i>Symphoricarpos occidentalis</i>	Western snowberry
<i>Tamarisk chinensis*</i>	Tamarisk
<i>Thalictrum dasycarpum</i>	Meadowrue
<i>Thlaspi arvense*</i>	Penny cress
<i>Toxicodendron rydbergii</i>	Poison ivy
(Note: The extensiveness of the above is taken to indicate a history of grazing.)	
<i>Typha latifolia</i>	Cattail
<i>Urtica dioica</i>	Stinging nettle
<i>Veronica anagallis-aquatica</i>	Water speedwell
<i>Vicia americana</i>	American vetch
<i>Yucca glauca</i>	Yucca
<i>Zannichellia palustris</i>	Horned pondweed
(Note: The preceding is being verified. It has previously been collected in Montana only in Beaverhead County, and it is unusual to find it in running water rather than still water.)	
<i>Zigadenus venenosus</i>	Death camas

PLANT SPECIES OF SPECIAL CONCERN SURVEY FORM
MONTANA NATURAL HERITAGE PROGRAM

1515 E. 6TH AVE., HELENA, MT 59620

DATE OF SURVEY: 6 / 10 / 94 OBSERVER(S): B. Heidel

WORK LOCATION/POSITION TITLE (Forest/District, District/Resource Area of observer(s)): MTNHP

SPECIES SCIENTIFIC NAME: Eleocharis rostellata

LOCATION: (Attach a copy of pertinent 7.5' or 15' topographic map section with locations of populations/subpopulations outlined, one map for each sensitive species described)

USGS QUADRANGLE: Bluewater COUNTY: Carbon

TOWNSHIP: 6S RANGE: 24E SECTION: 9 1/4 SEC.: SW 1/4 of NW 1/4

ADDITIONAL T/R/S, SECTIONS or 1/4 SECS.: _____

ELEVATION (at population center (and range of population if known)): 3990

NATIONAL FOREST/BLM DISTRICT: _____ F.S. DISTRICT/ BLM RESOURCE AREA: _____

LAND OWNERSHIP/MANAGEMENT (if not USFS/BLM): MAFWP

FOREST STAND OR ALLOTMENT NUMBER: _____

DIRECTIONS TO SITE (refer to roads, trails, geographic features, etc.):

Ca. 7 mi NE of Bridger along Bluewater Creek; marked by signs

HABITAT:

VEGETATION STRUCTURE WITHIN POPULATION AREA:

TOTAL TREE COVER (%) 0 TOTAL SHRUB COVER (%) 0

TOTAL FORB COVER (%) 0 TOTAL GRAMINOID COVER (%) 2

TOTAL MOSS/LICHEN COVER (%) 0 TOTAL BARE GROUND COVER (%) 8

ASSOCIATED PLANT COMMUNITY:(list dominant species currently present, include age structure if known):

Sedge meadow

HABITAT TYPE: Unknown - Carex aquatilis?

ADDITIONAL ASSOCIATED PLANT SPECIES: Carex aquatilis, Carex aurea, Carex lanuginosa, Juncus tracyi

ASPECT (S, SE, NNW, etc.): _____ % SLOPE: 0-2 SLOPE SHAPE (concave, convex, straight, etc.): _____

LIGHT EXPOSURE (open, shaded, partial shade, etc.): open

TOPOGRAPHIC POSITION (crest, upperslope, midslope, lowerslope, bottom, etc.): valley bottom

MOISTURE: (dry, moist, saturated, inundated, seasonal seepage, etc.): saturated

PARENT MATERIAL: tufa SOIL TEXTURE: silt - no soil development

GEOMORPHIC LAND FORM (e.g. glaciated mountain slopes and ridges, alpine glacial valley, rolling uplands, breaklands, alluvial-colluvial-lacustrine (floodplains, terraces etc.), rockslides)

Unique spring system in unglaciated valley

EVIDENCE OF DISTURBANCE: Impoundment, slumping, invasion of weedy and woody species

POPULATION SIZE:

ESTIMATED NUMBER OF INDIVIDUALS (or exact count, if feasible; if plants are spreading vegetatively, indicate number of aerial stems): Over 100+ ; survey incomplete and estimate likely to be very low

NUMBER OF SUBPOPULATIONS (if applicable): Two main areas

SIZE OF AREA COVERED BY POPULATION (acres): less than 1

BIOLOGY:

PHENOLOGY (percentage flowering, fruiting, vegetative): Spikelets are all immature

ANY SYMBIOTIC OR PARASITIC RELATIONSHIPS?: -

EVIDENCE OF DISEASE, PREDATION OR INJURY?: -

REPRODUCTIVE SUCCESS (evidence of seed dispersal and establishment): _____

DOCUMENTATION:

PHOTOGRAPH TAKEN? (if so, indicate photographer and repository): No

SPECIMEN TAKEN? (if so, list collector, collection number, and repository): Yes; immature

IDENTIFICATION (list name of person making determination, and/or name of flora or book used): Dorn (1984)
Hitchcock and Cronquist (1973)

ECODATA PLOT NUMBER (attach photocopied data sheets): -

EO RANK

For the following questions: A-EXCELLENT B-GOOD C-MARGINAL D-POOR

EO QUALITY: (How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of individuals.)

A B C D - Comments:

EO CONDITION: (Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A B C D - Comments:

EO VIABILITY: (What are the long-term prospects for the continued existence of this occurrence at the indicated level of quality?)

A B C D - Comments:

EO DEFENSIBILITY: (Can this occurrence be protected from extrinsic human factors?)

A B C D - Comments:

EO RANK: (Summary of all factors listed above).

A B C D - Comments: P

COMMENTS:

Insufficient information to distinguish between good and marginal

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MONTANA NATURAL HERITAGE PROGRAM

1515 E. 6TH AVE., HELENA, MT 59620

DATE OF SURVEY: 6 / 10 / 94 OBSERVER(S): B. Heidel

WORK LOCATION/POSITION TITLE (Forest/District, District/Resource Area of observer(s)): MTNHP

SPECIES SCIENTIFIC NAME: Eupatorium maculatum

LOCATION: (Attach a copy of pertinent 7.5' or 15' topographic map section with locations of populations/subpopulations outlined, one map for each sensitive species described)

USGS QUADRANGLE: Bluewater COUNTY: Carbon

TOWNSHIP: 60S RANGE: 24 E SECTION: 9 1/4 SEC.: NW 1/4

ADDITIONAL T/R/S, SECTIONS or 1/4 SECs.: SW 1/4 of NW 1/4

ELEVATION (at population center (and range of population if known)): 3990

NATIONAL FOREST/BLM DISTRICT: _____ F.S. DISTRICT/ BLM RESOURCE AREA: _____

LAND OWNERSHIP/MANAGEMENT (if not USFS/BLM): MDFWP

FOREST STAND OR ALLOTMENT NUMBER: -

DIRECTIONS TO SITE (refer to roads, trails, geographic features, etc.):
Ca. 7 mi NE of Bridger along Bluewater Creek; marked by signs

HABITAT:

VEGETATION STRUCTURE WITHIN POPULATION AREA:

TOTAL TREE COVER (%) 0 TOTAL SHRUB COVER (%) 1

TOTAL FORB COVER (%) P TOTAL GRAMINOID COVER (%) 3

TOTAL MOSS/LICHEN COVER (%) _____ TOTAL BARE GROUND COVER (%) 6

ASSOCIATED PLANT COMMUNITY:(list dominant species currently present, include age structure if known):
dominated by unidentified grasses - Calamagrostis?

HABITAT TYPE: _____

ADDITIONAL ASSOCIATED PLANT SPECIES: _____

ASPECT (S, SE, NNW, etc.): _____ % SLOPE: 0-2 SLOPE SHAPE (concave, convex, straight, etc.): _____

LIGHT EXPOSURE (open, shaded, partial shade, etc.): open to partial shade

TOPOGRAPHIC POSITION (crest, upslope, midslope, lowerslope, bottom, etc.): valley bottom

MOISTURE: (dry, moist, saturated, inundated, seasonal seepage, etc.): moist; with saturated layer close to surface

PARENT MATERIAL: tufa SOIL TEXTURE: loam - fertile, calcareous

GEOMORPHIC LAND FORM (e.g. glaciated mountain slopes and ridges, alpine glacial valley, rolling uplands, breaklands, alluvial-colluvial-lacustrine (floodplains, terraces etc.), rockslides) _____

EVIDENCE OF DISTURBANCE: Unique spring system in unglaciated valley
Impoundment, invasion of weedy and woody species, slumping

POPULATION SIZE:

ESTIMATED NUMBER OF INDIVIDUALS (or exact count, if feasible; if plants are spreading vegetatively, indicate number of aerial stems): Over 1000 stems; typically 2-10 stems per clump (individual)

NUMBER OF SUBPOPULATIONS (if applicable): Suitable habitat is discontinuous, but there are three main areas.

SIZE OF AREA COVERED BY POPULATION (acres): less than 5

BIOLOGY:

PHENOLOGY (percentage flowering, fruiting, vegetative): All individuals are over a month from flowering

ANY SYMBIOTIC OR PARASITIC RELATIONSHIPS?: -

EVIDENCE OF DISEASE, PREDATION OR INJURY?: -

REPRODUCTIVE SUCCESS (evidence of seed dispersal and establishment): The variation in stems / clump may reflect mixed age structure

DOCUMENTATION:

PHOTOGRAPH TAKEN? (if so, indicate photographer and repository): See Vanderhorst photo

SPECIMEN TAKEN? (if so, list collector, collection number, and repository): Vanderhorst (5155)

IDENTIFICATION (list name of person making determination, and/or name of flora or book used): Dorn (1984)

ECODATA PLOT NUMBER (attach photocopied data sheets): -

EO RANK

For the following questions: A-EXCELLENT B-GOOD C-MARGINAL D-POOR

EO QUALITY: (How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of individuals.)

A B C D - Comments:

EO CONDITION: (Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A B C D - Comments:

EO VIABILITY: (What are the long-term prospects for the continued existence of this occurrence at the indicated level of quality?)

A B C D - Comments: Habitat is invaded by leafy spurge, Canada thistle

EO DEFENSIBILITY: (Can this occurrence be protected from extrinsic human factors?)

A B C D - Comments:

EO RANK: (Summary of all factors listed above).

A B C D - Comments:

COMMENTS:

This large, vigorous population is in a setting limited by woody invasion, and invaded by weeds.

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DATE OF SURVEY: 6/10/94

OBSERVER(S): B. Heidel

WORK LOCATION/POSITION TITLE (Forest/District, District/Resource Area of observer(s)): MTNHP

SPECIES SCIENTIFIC NAME: Asclepias incarnata

LOCATION: (Attach a copy of pertinent 7.5' or 15' topographic map section with locations of populations/subpopulations outlined, one map for each sensitive species described)

USGS QUADRANGLE: Bluewater

COUNTY: Carbon

TOWNSHIP: 6S RANGE: 24E SECTION: 9 1/4 SEC.: SW 1/4 of NW 1/4

ADDITIONAL T/R/S, SECTIONS or 1/4 SECs.:

ELEVATION (at population center (and range of population if known)): 3990

NATIONAL FOREST/BLM DISTRICT: F.S. DISTRICT/ BLM RESOURCE AREA:

LAND OWNERSHIP/MANAGEMENT (If not USFS/BLM): MDFWP

FOREST STAND OR ALLOTMENT NUMBER:

DIRECTIONS TO SITE (refer to roads, trails, geographic features, etc.):

Ca. 7 mi NE of Bridger along Bluewater Cr. ; marked by signs

HABITAT:

VEGETATION STRUCTURE WITHIN POPULATION AREA:

TOTAL TREE COVER (%) 0

TOTAL SHRUB COVER (%) 1

TOTAL FORB COVER (%) P

TOTAL GRAMINOID COVER (%) 3

TOTAL MOSS/LICHEN COVER (%)

TOTAL BARE GROUND COVER (%) 6

ASSOCIATED PLANT COMMUNITY:(list dominant species currently present, include age structure if known):

dominated by unidentified grasses - Calamagrostis ?

HABITAT TYPE:

ADDITIONAL ASSOCIATED PLANT SPECIES:

ASPECT (S, SE, NNW, etc.): % SLOPE: 0-2 SLOPE SHAPE (concave, convex, straight, etc.):

LIGHT EXPOSURE (open, shaded, partial shade, etc.): open to partial shade

TOPOGRAPHIC POSITION (crest, upperslope, midslope, lowerslope, bottom, etc.): valley bottom

MOISTURE: (dry, moist, saturated, inundated, seasonal seepage, etc.): moist, with shallow groundwater table

PARENT MATERIAL: tufa SOIL TEXTURE: loam - fertile, calcareous

GEOMORPHIC LAND FORM (e.g. glaciated mountain slopes and ridges, alpine glacial valley, rolling uplands, breaklands, alluvial-colluvial-lacustrine (floodplains, terraces etc.), rockslides)

Unique springs system in unglaciated valley

EVIDENCE OF DISTURBANCE: Impoundment, invasion of woody and woody species, slumping

POPULATION SIZE:

ESTIMATED NUMBER OF INDIVIDUALS (or exact count, if feasible; if plants are spreading vegetatively, indicate number of aerial stems): Over 500+

NUMBER OF SUBPOPULATIONS (if applicable): One main area

SIZE OF AREA COVERED BY POPULATION (acres): less than 2

BIOLOGY:

PHENOLOGY (percentage flowering, fruiting, vegetative): All inflorescences are at least 3 weeks ^{before} ~~long~~ flowering

ANY SYMBIOTIC OR PARASITIC RELATIONSHIPS?: -

EVIDENCE OF DISEASE, PREDATION OR INJURY?: -

REPRODUCTIVE SUCCESS (evidence of seed dispersal and establishment): _____

DOCUMENTATION:

PHOTOGRAPH TAKEN? (if so, indicate photographer and repository): No. Photo taken elsewhere available.

SPECIMEN TAKEN? (if so, list collector, collection number, and repository): No. Fish Hatchery personnel may be able to take collection in flower

IDENTIFICATION (list name of person making determination, and/or name of flora or book used): Dorn (1984)

ECODATA PLOT NUMBER (attach photocopied data sheets): -

EO RANK

For the following questions: A-EXCELLENT B-GOOD C-MARGINAL D-POOR

EO QUALITY: (How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of individuals.)

A B C D - Comments:

EO CONDITION: (Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A B C D - Comments:

EO VIABILITY: (What are the long-term prospects for the continued existence of this occurrence at the indicated level of quality?)

A B C D - Comments:

EO DEFENSIBILITY: (Can this occurrence be protected from extrinsic human factors?)

A B C D - Comments:

EO RANK: (Summary of all factors listed above).

A B C D - Comments:

COMMENTS:

This large population is limited in extent by woody invasion, and in habitat invaded by weeds