APPENDIX 1-1—LIST OF TERRESTRIAL VERTEBRATE SPECIES WITHIN THE BOISE, PAYETTE, AND WEISER SUBBASINS AND DESCRIPTIONS OF GLOBAL AND STATE CONSERVATION RANKINGS

Table 1. Wildlife species documented to occur within the Boise, Payette, and Weiser subbasins, including current state and federal status for threatened, endangered, and special status species (source: IBIS 2003; Conservation Status-Idaho Department of Fish and Game, Idaho Conservation Data Center).

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Amphibians					
Tiger salamander	*Ambystoma tigrinum*	G5/S5	X	X	X
Long-toed salamander	*Ambystoma macrodactylum*	G5/S5	X	X	X
Idaho giant salamander	*Dicamptodon aterrimus*	G3/S?	X	X	X
Tailed frog	*Ascaphus truei*	G4/NN4	X	X	X
Great Basin spadefoot	*Scaphiopus intermontanus*	G5/S4	X	X	X
Western toad	*Bufo boreas*	G4/S4	X	X	X
Woodhouse's toad	*Bufo woodhousii*	G5/S3?	X	X	X
Pacific chorus (tree) frog	*Pseudacris regilla*	G5/S5	X	X	X
Columbia spotted frog	*Rana luteiventris*	G4/S3S4	X		X
Northern leopard frog	*Rana pipiens*	G5/S3	X	X	X
Bullfrog	*Rana catesbeiana*	G5/SNA	X	X	X
	Total Amphibians:		**12**	**11**	**12**
Birds					
Common loon	*Gavia immer*	G5/S1B,S2N	X	X	X
Pied-billed grebe	*Podilymbus podiceps*	G5/S4B,S3N	X	X	X
Horned grebe	*Podiceps auritus*	G5/S1?	X	X	X
Red-necked grebe	*Podiceps grisegena*	G5/S3B	X	X	X
Eared grebe	*Podiceps nigricollis*	G5/S4B	X	X	X
Western grebe	*Aechmophorus occidentalis*	G5/S4B	X	X	X
Clark's grebe	*Aechmophorus clarkii*	G5/S2B	X	X	X
American white pelican	*Pelecanus erythrorhynchos*	G3/S1B	X	X	X
Double-crested cormorant	*Phalacrocorax auritus*	G5/S2B	X	X	X
American bittern	*Botaurus lentiginosus*	G4/S4B	X	X	X
Great blue heron	*Ardea herodias*	G5/S2B	X	X	X
Green heron	*Butorides virescens*	G5/SZN	X		X
Great egret	*Ardea alba*	G5/S1B	X	X	X
Snowy egret	*Egretta thula*	G5/S2B	X	X	X
Cattle egret	*Bubulcus ibis*	G5/S2B	X	X	X
Black-crowned night-heron	*Nycticorax nycticorax*	G5/S3B	X	X	X
White-faced ibis	*Plegadis chihi*	G5/S2B	X	X	X
Snow goose	*Chen caerulescens*	G5/SN2	X		X

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Canada goose	*Branta canadensis*	G5/S5B,S5N	X	X	X
Trumpeter swan	*Cygnus buccinator*	G4/S1B,S2N	X		X
Tundra swan	*Cygnus columbianus*	G5/S2N	X		X
Wood duck	*Aix sponsa*	G5/S4B,S1N	X	X	X
Gadwall	*Anas strepera*	G5/S5B,S3N	X	X	X
American wigeon	*Anas americana*	G5/S5B,S5N	X	X	X
Mallard	*Anas platyrhynchos*	G5/S5B,S5N	X	X	X
Blue-winged teal	*Anas discors*	G5/S5B	X	X	X
Cinnamon teal	*Anas cyanoptera*	G5/S5B	X	X	X
Northern shoveler	*Anas clypeata*	G5/S5B,S1N	X	X	X
Northern pintail	*Anas acuta*	G5/S5B,S3N	X		X
Green-winged teal	*Anas crecca*	G5/S4B,S4N	X	X	X
Canvasback	*Aythya valisineria*	G5/S4B,S2N	X	X	X
Redhead	*Aythya americana*	G5/S5B	X	X	X
Ring-necked duck	*Aythya collaris*	G5/S3B	X	X	X
Greater scaup	*Aythya marila*	G5/SNA	X	X	X
Lesser scaup	*Aythya affinis*	G5/S4	X	X	X
Harlequin duck	*Histrionicus histrionicus*	G4/S1B		X	
Bufflehead	*Bucephala albeola*	G5/S3B,S3N	X	X	X
Common goldeneye	*Bucephala clangula*	G5/S3B,S3N	X	X	X
Barrow's goldeneye	*Bucephala islandica*	G5/S3B,S3N	X	X	X
Hooded merganser	*Lophodytes cucullatus*	G5,S2B,S3N	X	X	X
Common merganser	*Mergus merganser*	G5/S5B,S5N	X	X	X
Red-breasted merganser	*Mergus serrator*	G5/SNA	X	X	X
Ruddy duck	*Oxyura jamaicensis*	G5/S5B	X	X	X
Osprey	*Pandion haliaetus*	G5/S5B	X	X	X
White-tailed kite	*Elanus leucurus*	G5/N44	X		X
Bald eagle	*Haliaeetus leucocephalus*	G4/S3B,S4N	X	X	X
Northern harrier	*Circus cyaneus*	G5/S5B,S5N	X	X	X
Sharp-shinned hawk	*Accipiter striatus*	G5/S5	X	X	X
Cooper's hawk	*Accipiter cooperii*	G5/S4	X	X	X
Northern goshawk	*Accipiter gentilis*	G5/S4	X	X	X
Swainson's hawk	*Buteo swainsoni*	G5/S4B	X	X	X
Red-tailed hawk	*Buteo jamaicensis*	G5/S5B,S5N	X	X	X
Ferruginous hawk	*Buteo regalis*	G4/S3B	X	X	X
Rough-legged hawk	*Buteo lagopus*	G5/S4N	X		X
Golden eagle	*Aquila chrysaetos*	G5/S4B,S4N	X	X	X
American kestrel	*Falco sparverius*	G5/S5B,S5N	X	X	X
Merlin	*Falco columbarius*	G5/S1B,S2N	X	X	X
Peregrine falcon	*Falco peregrinus*	G4T3/S1B	X	X	X
Prairie falcon	*Falco mexicanus*	G5/S5B,S3N	X	X	X
Chukar	*Alectoris chukar*	G5/SNA	X	X	X
Gray partridge	*Perdix perdix*	G5/SNA	X	X	X

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Ring-necked pheasant	*Phasianus colchicus*	G5/SNA	X	X	X
Ruffed grouse	*Bonasa umbellus*	G5/S5	X	X	X
Greater sage-grouse	*Centrocercus urophasianus*	G4/S4	X	X	X
Spruce grouse	*Falcipennis canadensis*	G5/S4	X	X	X
Blue grouse	*Dendragapus obscurus*	G5/S5	X	X	X
Sharp-tailed grouse	*Tympanuchus phasianellus*	G4/S3	X	X	X
Wild turkey	*Meleagris gallopavo*	G5/SNA	X	X	X
Mountain quail	*Oreortyx pictus*	G5/S2	X	X	X
California quail	*Callipepla californica*	G5/SNA	X	X	X
Virginia rail	*Rallus limicola*	G5/S5B	X	X	X
Sora	*Porzana carolina*	G5/S5B	X	X	X
American coot	*Fulica americana*	G5/S5B	X	X	X
Sandhill crane	*Grus canadensis*	G5/S5B	X	X	X
Killdeer	*Charadrius vociferus*	G5/S5B,S3N	X	X	X
Black-necked stilt	*Himantopus mexicanus*	G5/S4B	X	X	X
American avocet	*Recurvirostra americana*	G5/S5B	X	X	X
Greater yellowlegs	*Tringa melanoleuca*	G5/S2N	X		X
Solitary sandpiper	*Tringa solitaria*	G5/SNA	X		X
Willet	*Catoptrophorus semipalmatus*	G5/S4B	X	X	X
Spotted sandpiper	*Actitis macularia*	G5/S5B	X	X	X
Upland sandpiper	*Bartramia longicauda*	G5/S1B	X	X	X
Long-billed curlew	*Numenius americanus*	G5/S3B	X	X	X
Western sandpiper	*Calidris mauri*	G5/S2N	X		X
Dunlin	*Calidris alpina*	G5/SNA	X		X
Wilson's snipe	*Gallinago delicata*	G5/N5B,N5N	X	X	X
Wilson's phalarope	*Phalaropus tricolor*	G5/S4B	X	X	X
Franklin's gull	*Larus pipixcan*	G4G5/S2B	X	X	X
Ring-billed gull	*Larus delawarensis*	G5/S2SB,S3	X	X	X
California gull	*Larus californicus*	G5/S2SB,S3	X	X	X
Caspian tern	*Sterna caspia*	G5/S1B	X	X	X
Common tern	*Sterna hirundo*	G5/S1B	X	X	X
Forster's tern	*Sterna forsteri*	G5/S2S3B	X	X	X
Black tern	*Chlidonias niger*	G4/S2B	X	X	X
Rock dove	*Columba livia*	G5/SNA	X	X	X
Mourning dove	*Zenaida macroura*	G5/S5B	X	X	X
Yellow-billed cuckoo	*Coccyzus americanus*	G5/S1B	X	X	X
Barn owl	*Tyto alba*	G5/S3?	X	X	X
Flammulated owl	*Otus flammeolus*	G4/S3B	X	X	X
Western screech-owl	*Otus kennicottii*	G5/S4	X	X	X
Great horned owl	*Bubo virginianus*	G5/S5	X	X	X
Northern pygmy-owl	*Glaucidium gnoma*	G5/S4	X	X	X
Burrowing owl	*Athene cunicularia*	S4/S3S4	X	X	X

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Barred owl	*Strix varia*	G5/S4	X	X	X
Great gray owl	*Strix nebulosa*	G5/S3	X	X	X
Long-eared owl	*Asio otus*	G5/S5	X	X	X
Short-eared owl	*Asio flammeus*	G5/S5	X	X	X
Boreal owl	*Aegolius funereus*	G5/S2	X	X	X
Northern saw-whet owl	*Aegolius acadicus*	G5/S4	X	X	X
Common nighthawk	*Chordeiles minor*	G5/S5B	X	X	X
Common poorwill	*Phalaenoptilus nuttallii*	G5/S4B	X	X	X
Black swift	*Cypseloides niger*	G4/S1B	X	X	X
Vaux's swift	*Chaetura vauxi*	G5/S4B	X	X	X
White-throated swift	*Aeronautes saxatalis*	G5/S4B	X	X	X
Black-chinned hummingbird	*Archilochus alexandri*	G5/S5B	X	X	X
Calliope hummingbird	*Stellula calliope*	G5/S5B	X	X	X
Broad-tailed hummingbird	*Selasphorus platycercus*	G5/S5B	X	X	X
Rufous hummingbird	*Selasphorus rufus*	G5/S5B	X	X	X
Belted kingfisher	*Ceryle alcyon*	G5/S5	X	X	X
Lewis's woodpecker	*Melanerpes lewis*	G4/S4B	X	X	X
Williamson's sapsucker	*Sphyrapicus thyroideus*	G5/S5B	X	X	X
Red-naped sapsucker	*Sphyrapicus nuchalis*	G5/S5B	X	X	X
Downy woodpecker	*Picoides pubescens*	G5/S5	X	X	X
Hairy woodpecker	*Picoides villosus*	G5/S5	X	X	X
White-headed woodpecker	*Picoides albolarvatus*	G4/S2B	X	X	X
Three-toed woodpecker	*Picoides tridactylus*	G5/S3?	X	X	X
Black-backed woodpecker	*Picoides arcticus*	G5/S3	X	X	X
Northern flicker	*Colaptes auratus*	G5/S5	X	X	X
Pileated woodpecker	*Dryocopus pileatus*	G5/S4	X	X	X
Olive-sided flycatcher	*Contopus cooperi*	G4/S4B	X	X	X
Western wood-pewee	*Contopus sordidulus*	G5/S5B	X	X	X
Willow flycatcher	*Empidonax traillii*	G5/S5B	X	X	X
Hammond's flycatcher	*Empidonax hammondii*	G5/S5B	X	X	X
Gray flycatcher	*Empidonax wrightii*	G5/S2B,S2N	X	X	X
Dusky flycatcher	*Empidonax oberholseri*	G5/S5B	X	X	X
Pacific-slope flycatcher	*Empidonax difficilis*	G5/N5B,NZN	X	X	X
Cordilleran flycatcher	*Empidonax occidentalis*	G5/S4B	X	X	X
Say's phoebe	*Sayornis saya*	G5/S5B	X	X	X
Ash-throated flycatcher	*Myiarchus cinerascens*	G5/S3S4B	X	X	X
Western kingbird	*Tyrannus verticalis*	G5/S5B	X	X	X
Eastern kingbird	*Tyrannus tyrannus*	G5/S4B	X	X	X
Loggerhead shrike	*Lanius ludovicianus*	G4/S3	X	X	X
Northern shrike	*Lanius excubitor*	G5/S3N	X		X
Cassin's vireo	*Vireo cassinii*	G5/S?	X		X
Warbling vireo	*Vireo gilvus*	G5/S5B	X	X	X
Red-eyed vireo	*Vireo olivaceus*	G5/S5B	X	X	X

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Gray jay	*Perisoreus canadensis*	G5/S5	X	X	X
Steller's jay	*Cyanocitta stelleri*	G5/S5	X	X	X
Western scrub-jay	*Aphelocoma californica*	G5/S2?	X		
Pinyon jay	*Gymnorhinus cyanocephalus*	G5/S2?	X		
Clark's nutcracker	*Nucifraga columbiana*	G5/S5	X	X	X
Black-billed magpie	*Pica pica*	G5/S5	X	X	X
American crow	*Corvus brachyrhynchos*	G5/S5	X	X	X
Common raven	*Corvus corax*	G5/S5	X	X	X
Horned lark	*Eremophila alpestris*	G5/S5	X	X	X
Tree swallow	*Tachycineta bicolor*	G5/S5B	X	X	X
Violet-green swallow	*Tachycineta thalassina*	G5/S5B	X	X	X
Northern rough-winged swallow	*Stelgidopteryx serripennis*	G5/S5B	X	X	X
Bank swallow	*Riparia riparia*	G5/S5B	X	X	X
Cliff swallow	*Petrochelidon pyrrhonota*	G5/S5B	X	X	X
Barn swallow	*Hirundo rustica*	G5/S5B	X	X	X
Black-capped chickadee	*Poecile atricapillus*	G5/S5	X	X	X
Mountain chickadee	*Poecile gambeli*	G5/S5	X	X	X
Chestnut-backed chickadee	*Poecile rufescens*	G5/S4	X	X	X
Bushtit	*Psaltriparus minimus*	G5/S4	X	X	X
Red-breasted nuthatch	*Sitta canadensis*	G5/S5	X	X	X
White-breasted nuthatch	*Sitta carolinensis*	G5/S4	X	X	X
Pygmy nuthatch	*Sitta pygmaea*	G5/S2S3	X	X	X
Brown creeper	*Certhia americana*	G5/S5	X	X	X
Rock wren	*Salpinctes obsoletus*	G5/S5B	X	X	X
Canyon wren	*Catherpes mexicanus*	G5/S5B	X	X	X
House wren	*Troglodytes aedon*	G5/S5B	X	X	X
Winter wren	*Troglodytes troglodytes*	G5/S5	X	X	X
Marsh wren	*Cistothorus palustris*	G5/S5B	X	X	X
American dipper	*Cinclus mexicanus*	G5/S5	X	X	X
Golden-crowned kinglet	*Regulus satrapa*	G5/S5	X	X	X
Ruby-crowned kinglet	*Regulus calendula*	G5/S5B	X	X	X
Blue-gray gnatcatcher	*Polioptila caerulea*	G5/S3?	X	X	X
Western bluebird	*Sialia mexicana*	G5/S4B	X	X	X
Mountain bluebird	*Sialia currucoides*	G5/S4B	X	X	X
Townsend's solitaire	*Myadestes townsendi*	G5/S5	X	X	X
Veery	*Catharus fuscescens*	G5/S5B	X	X	X
Swainson's thrush	*Catharus ustulatus*	G5/S5B	X	X	X
Hermit thrush	*Catharus guttatus*	G5/S5B	X	X	X
American robin	*Turdus migratorius*	G5/S5B,S3N	X	X	X
Varied thrush	*Ixoreus naevius*	G5/S5B	X	X	X
Gray catbird	*Dumetella carolinensis*	G5/S5B	X	X	X
Northern mockingbird	*Mimus polyglottos*	G5/S1B	X	X	X

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Sage thrasher	*Oreoscoptes montanus*	G5/S5B	X	X	X
European starling	*Sturnus vulgaris*	G5/SNA	X	X	X
American pipit	*Anthus rubescens*	G5/S4B	X	X	X
Cedar waxwing	*Bombycilla cedrorum*	G5/S5B,S3N	X	X	X
Orange-crowned warbler	*Vermivora celata*	G5/S5B	X	X	X
Nashville warbler	*Vermivora ruficapilla*	G5/S5B	X	X	X
Yellow warbler	*Dendroica petechia*	G5/S5B	X	X	X
Yellow-rumped warbler	*Dendroica coronata*	G5/S5B	X	X	X
Black-throated gray warbler	*Dendroica nigrescens*	G5/S3?B	X		X
Townsend's warbler	*Dendroica townsendi*	G5/S4B	X	X	X
American redstart	*Setophaga ruticilla*	G5/S4B	X	X	X
Northern waterthrush	*Seiurus noveboracensis*	G5/S3?	X	X	X
MacGillivray's warbler	*Oporornis tolmiei*	G5/S5B	X	X	X
Common yellowthroat	*Geothlypis trichas*	G5/S5B	X		X
Wilson's warbler	*Wilsonia pusilla*	G5/S5B	X	X	X
Yellow-breasted chat	*Icteria virens*	G5/S5B	X	X	X
Western tanager	*Piranga ludoviciana*	G5/S5B	X	X	X
Green-tailed towhee	*Pipilo chlorurus*	G5/S5B	X	X	X
Spotted towhee	*Pipilo maculatus*	G5/S5B	X	X	X
American tree sparrow	*Spizella arborea*	G5/S3N	X	X	X
Chipping sparrow	*Spizella passerina*	G5/S5B	X	X	X
Brewer's sparrow	*Spizella breweri*	G5/S4B	X	X	X
Vesper sparrow	*Pooecetes gramineus*	G5/S4B	X	X	X
Lark sparrow	*Chondestes grammacus*	G5/S5B	X	X	X
Black-throated sparrow	*Amphispiza bilineata*	G5/S2B	X	X	X
Sage sparrow	*Amphispiza belli*	G5/S4B	X	X	X
Savannah sparrow	*Passerculus sandwichensis*	G5/S5B	X	X	X
Grasshopper sparrow	*Ammodramus savannarum*	G5/S3B	X	X	X
Fox sparrow	*Passerella iliaca*	G5/S5B	X	X	X
Song sparrow	*Melospiza melodia*	G5/S5B,S5N	X	X	X
Lincoln's sparrow	*Melospiza lincolnii*	G5/S5B	X	X	X
White-crowned sparrow	*Zonotrichia leucophrys*	G5/S5B,S4N	X	X	X
Dark-eyed junco	*Junco hyemalis*	G5/S5	X	X	X
Lapland longspur	*Calcarius lapponicus*	G5/SNA	X	X	X
Snow bunting	*Plectrophenax nivalis*	G5/S3N	X		X
Black-headed grosbeak	*Pheucticus melanocephalus*	G5/S5B	X	X	X
Lazuli bunting	*Passerina amoena*	G5/S5B	X	X	X
Bobolink	*Dolichonyx oryzivorus*	G5/S4B	X	X	X
Red-winged blackbird	*Agelaius phoeniceus*	G5/S5B,S3N	X	X	X
Western meadowlark	*Sturnella neglecta*	G5/S5B,S3N	X	X	X
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	G5/S5B	X	X	X
Brewer's blackbird	*Euphagus cyanocephalus*	G5/S5B,S5N	X	X	X

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Brown-headed cowbird	*Molothrus ater*	G5/S5B	X	X	X
Bullock's oriole	*Icterus bullockii*	G5/S5B	X	X	X
Black rosy-finch	*Leucosticte atrata*	G4/S4B,S3N	X	X	X
Pine grosbeak	*Pinicola enucleator*	G5/S4	X	X	X
Cassin's finch	*Carpodacus cassinii*	G5/S5	X	X	X
House finch	*Carpodacus mexicanus*	G5/S5	X	X	X
Red crossbill	*Loxia curvirostra*	G5/S5	X	X	X
White-winged crossbill	*Loxia leucoptera*	G5/S1?	X	X	X
Common redpoll	*Carduelis flammea*	G5/S2N	X	X	X
Pine siskin	*Carduelis pinus*	G5/S5	X	X	X
Lesser goldfinch	*Carduelis psaltria*	G5/S1B	X	X	X
American goldfinch	*Carduelis tristis*	G5/S5	X	X	X
Evening grosbeak	*Coccothraustes vespertinus*	G5/S5	X	X	X
House sparrow	*Passer domesticus*	G5/SNA	X	X	X
		Total Birds:	**243**	**226**	**241**
Mammals					
Masked shrew	*Sorex cinereus*	G5/S5	X	X	X
Preble's shrew	*Sorex preblei*	G4/N4	X	X	X
Vagrant shrew	*Sorex vagrans*	G5/S5	X	X	X
Montane shrew	*Sorex monticolus*	G5/S4?	X	X	X
Water shrew	*Sorex palustris*	G5/S4?	X	X	X
Merriam's shrew	*Sorex merriami*	G5/S2?	X	X	X
Coast mole	*Scapanus orarius*	G5/S1?	X	X	X
California myotis	*Myotis californicus*	G5/S1?	X	X	X
Western small-footed myotis	*Myotis ciliolabrum*	G5/S4?	X	X	X
Yuma myotis	*Myotis yumanensis*	G5/S3?	X	X	X
Little brown myotis	*Myotis lucifugus*	G5/S5	X	X	X
Long-legged myotis	*Myotis volans*	G5/S3?	X	X	X
Fringed myotis	*Myotis thysanodes*	G4G5/S1?	X	X	X
Long-eared myotis	*Myotis evotis*	G5/S3?	X	X	X
Silver-haired bat	*Lasionycteris noctivagans*	G5/S4?	X	X	X
Western pipistrelle	*Pipistrellus hesperus*	G5/S1?	X	X	X
Big brown bat	*Eptesicus fuscus*	G5/S4?	X	X	X
Hoary bat	*Lasiurus cinereus*	G5/S4?	X	X	X
Spotted bat	*Euderma maculatum*	G4/S2	X	X	
Townsend's big-eared bat	*Corynorhinus townsendii*	G4/S2?	X	X	X
Pallid bat	*Antrozous pallidus*	G5/S1?	X	X	X
American pika	*Ochotona princeps*	G5/S5	X	X	X
Pygmy rabbit	*Brachylagus idahoensis*	G4/S3	X	X	X
Nuttall's (mountain) cottontail	*Sylvilagus nuttallii*	G5/S5	X	X	X
Snowshoe hare	*Lepus americanus*	G5/S5	X	X	X
White-tailed jackrabbit	*Lepus townsendii*	G5/S5	X	X	X

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Black-tailed jackrabbit	*Lepus californicus*	G5/S5	X	X	X
Least chipmunk	*Tamias minimus*	G5/S5	X	X	X
Yellow-pine chipmunk	*Tamias amoenus*	G5/S5	X	X	X
Red-tailed chipmunk	*Tamias ruficaudus*	G5/S4	X	X	X
Yellow-bellied marmot	*Marmota flaviventris*	G5/S5	X	X	X
Hoary marmot	*Marmota caligata*	G5/S5	X	X	X
White-tailed antelope squirrel	*Ammospermophilus leucurus*	S5/S4	X	X	X
Merriam's ground squirrel	*Spermophilus canus*		X		X
Piaute ground squirrel	*Spermophilus mollis*	G5/S?	X		X
Belding's ground squirrel	*Spermophilus beldingi*	G5/S4?	X	X	X
Columbian ground squirrel	*Spermophilus columbianus*	G5/S5	X	X	X
Golden-mantled ground squirrel	*Spermophilus lateralis*	G5/S5	X	X	X
Idaho ground squirrel	*Spermophilus brunneus*	G2T2/S2		X	X
Eastern gray squirrel	*Sciurus niger*	G5/SNA	X		X
Red squirrel	*Tamiasciurus hudsonicus*	G5/S5	X	X	X
Northern flying squirrel	*Glaucomys sabrinus*	G5/S4	X	X	X
Idaho pocket gopher	*Thomomys idahoensis*	G4/S4?	X	X	
Townsend's pocket gopher	*Thomomys townsendii*	G4G5/S4?	X	X	X
Great Basin pocket mouse	*Perognathus parvus*	G5/S5	X	X	X
Ord's kangaroo rat	*Dipodomys ordii*	G5/S5	X	X	X
Chisel-toothed kangaroo rat	*Dipodomys microps*	G5/S3?	X		X
American beaver	*Castor canadensis*	G5/S5	X	X	X
Western harvest mouse	*Reithrodontomys megalotis*	G5/S5	X	X	X
Deer mouse	*Peromyscus maniculatus*	G5/S5	X	X	X
Canyon mouse	*Peromyscus crinitus*	G5/S3S4	X	X	X
Northern grasshopper mouse	*Onychomys leucogaster*	G5/S4	X	X	X
Desert woodrat	*Neotoma lepida*	G5/S4	X	X	X
Bushy-tailed woodrat	*Neotoma cinerea*	G5/S5	X	X	X
Southern red-backed vole	*Clethrionomys gapperi*	G5/S5	X	X	X
Heather vole	*Phenacomys intermedius*	G5/S4	X	X	X
Meadow vole	*Microtus pennsylvanicus*	G5/S5	X	X	X
Montane vole	*Microtus montanus*	G5/S5	X	X	X
Long-tailed vole	*Microtus longicaudus*	G5/S5	X	X	X
Water vole	*Microtus richardsoni*	G5/S4	X	X	X
Sagebrush vole	*Lemmiscus curtatus*	G5/S4	X	X	X
Muskrat	*Ondatra zibethicus*	G5/S5	X	X	X
House mouse	*Mus musculus*	G5/SNA	X		X
Western jumping mouse	*Zapus princeps*	S5/S5	X	X	X
Common porcupine	*Erethizon dorsatum*	G5/S5	X	X	X
Coyote	*Canis latrans*	S5/S5	X	X	X
Gray wolf	*Canis lupus*	G4/S1	X	X	X
Red fox	*Vulpes vulpes*	G5/S5	X	X	X

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Kit fox	*Vulpes macrotis*	G4/S1	X		X
Black bear	*Ursus americanus*	G5/S5	X	X	X
Raccoon	*Procyon lotor*	G5/S4	X	X	X
American marten	*Martes americana*	G5/S5	X	X	X
Fisher	*Martes pennanti*	G5/S1	X	X	X
Ermine	*Mustela erminea*	G5/S5	X	X	X
Long-tailed weasel	*Mustela frenata*	G5/S5	X	X	X
Mink	*Mustela vison*	G5/S5	X	X	X
Wolverine	*Gulo gulo*	G5/S2	X	X	X
American badger	*Taxidea taxus*	G5/S5	X	X	X
Western spotted skunk	*Spilogale gracilis*	G5/S5	X	X	X
Striped skunk	*Mephitis mephitis*	S5/S5	X	X	X
Northern river otter	*Lutra canadensis*	S5/S4	X	X	X
Mountain lion	*Puma concolor*	G5/S5	X	X	X
Canada lynx	*Lynx canadensis*	G5/S1	X	X	X
Bobcat	*Lynx rufus*	G5/S5	X	X	X
Feral horse	*Equus caballus*	G5/SE	X		X
Rocky Mountain elk	*Cervus elaphus nelsoni*	G5/S5	X	X	X
Mule deer	*Odocoileus hemionus*	G5/S5	X	X	X
White-tailed deer (eastside)	*Odocoileus virginianus ochrourus*	G5/S5	X	X	X
Moose	*Alces alces*	G5/S5	X	X	X
Pronghorn antelope	*Antilocapra americana*	G5/S5	X	X	X
Mountain goat	*Oreamnos americanus*	G5/S3	X	X	X
Rocky Mountain bighorn sheep	*Ovis canadensis*	G4T1/S1	X	X	X
		Total Mammals:	**94**	**87**	**93**
Reptiles					
Mojave black-collared lizard	*Crotaphytus bicinctores*	G5/S2	X	X	X
Long-nosed leopard lizard	*Gambelia wislizenii*	G5/S5	X	X	X
Short-horned lizard	*Phrynosoma douglassii*	G5/S5	X	X	X
Desert horned lizard	*Phrynosoma platyrhinos*	G5/S4	X	X	X
Sagebrush lizard	*Sceloporus graciosus*	S5/S5	X	X	X
Western fence lizard	*Sceloporus occidentalis*	G5/S4	X	X	X
Side-blotched lizard	*Uta stansburiana*	G5/S5	X	X	X
Western skink	*Eumeces skiltonianus*	S5/S5	X	X	X
Western whiptail	*Cnemidophorus tigris*	G5/S4	X	X	X
Rubber boa	*Charina bottae*	G5/S5	X	X	X
Racer	*Coluber constrictor*	G5/S5	X	X	X
Ringneck snake	*Diadophis punctatus*	G5/S1?	X	X	X
Night snake	*Hypsiglena torquata*	G5/S3	X	X	X
Striped whipsnake	*Masticophis taeniatus*	S5/S4	X	X	X
Gopher snake	*Pituophis catenifer*	G5/S5	X	X	X

Common Name	Scientific Name	Conservation Status	Subbasin		
			Boise	Payette	Weiser
Western ground snake	*Sonora semiannulata*	G5/S3	X	X	X
Western terrestrial garter snake	*Thamnophis elegans*	G5/S5	X	X	X
Common garter snake	*Thamnophis sirtalis*	G5/S5	X	X	X
Western rattlesnake	*Crotalus viridis*	G5/S5	X	X	X
		Total Reptiles:	**19**	**19**	**19**
		Total Overall:	**368**	**343**	**365**

Global and State Conservation Ranking Descriptions:
(Idaho Department of Fish and Game, Idaho Conservation Data Center)

The network of Natural Heritage Programs and Conservation Data Centers—which currently consists of installations in all 50 states, several Canadian provinces, and several Latin American and Caribbean countries—ranks the status of plants, animals, and plant communities at the rangewide or global (G-rank) and state (S-rank) levels on a scale of 1 to 5. The rank is based primarily on the number of known occurrences, but other factors—such as habitat quality, estimated number of individuals, narrowness of range of habitat, trends in populations and habitat, and threats to the species—are also considered. The ranking system is meant to exist alongside national and state rare species lists because these lists often include additional criteria (e.g., recovery potential and depth of knowledge) that go beyond assessing threats to extinction.

Components of Ranks:

G Global rank indicator: rank is based on rangewide status
T Trinomial rank indicator: global status is for intraspecific taxa
S State rank indicator: rank is based on status within Idaho
1 Critically imperiled because of extreme rarity or because some factor of its biology makes it especially vulnerable to extinction (typically 5 or fewer occurrences)
2 Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (typically 6 to 20 occurrences)
3 Rare or uncommon but not imperiled (typically 21 to100 occurrences)
4 Not rare and apparently secure but with cause for long-term concern (usually more than 100 occurrences)
5 Demonstrably widespread, abundant, and secure
U Unrankable
H Historical occurrence (i.e., formerly part of the native biota; implied expectation is that it might be rediscovered or possibly be extinct)
X Presumed extinct or extirpated
Q Uncertainty exists about taxonomic status
? Uncertainty exists about the stated rank
NR Not ranked
NA Conservation status rank is not applicable

Examples of Use:

G4T2 = Species is apparently secure rangewide, but this particular subspecies or variety is imperiled.
S2S3 = Uncertainty exists about whether the species or subspecies should be ranked S2 or S3.

Components of State Ranks Specific to Long-Distance Migrants (Bats and Birds):

A Accidental (occurring only once or a few times) or casual (occurring more regularly although not every year) in Idaho; some breeding may have occurred during one or more of the periods in which they were recorded
B Breeding population
M Migrant that occurs only in an irregular, transitory, and dispersed manner; occurrences cannot be predicted from year to year
N Nonbreeding population

Examples of Use:

S4N = Fairly common winter resident
S1B, S5N = Rare breeder but a common winter resident
S2B, SMN = Rare breeder and an uncommon spring and fall transient among which a few remain as local and irregular (in location) winter residents

APPENDIX 1-2—DATA LIMITATIONS

This assessment included the compilation and analysis of many hundreds of individual data sets from a great number of sources; totaling approximately 10 GB of storage in reduced form. While a great number of data sets were compiled, only some were used in the assessments, while others were not used. These determinations were made to illustrate what the authors felt was necessary and reasonable to include in the assessment, while minimizing superfluous data.

The following is a statement of the limitations of some of the spatial data used for analysis in this assessment. It should be noted that this statement may not be entirely complete, however an attempt was made to address all major sources of spatial data such that results from these analyses could be considered holistically. This statement includes the following topics:

- Current Vegetation
- Historic Vegetation
- Invasive Vegetation
- Vegetative Fragmentation
- Disturbance
- Altered Hydrology
- Altered Fire Regime
- Grazing
- Points of Diversion
- Geology
- Ownership
- Fish Distributions
- South West Idaho Eco-Group Data
- Urban Rural Development Class (Urban Sprawl)

Analysis of all spatial products was done utilizing Environmental Research Systems Institute (ESRI) ArcView, ArcMap, and ArcInfo software. It is notable that some coverages were continuous (e.g., vegetation) while others were not spatially continuous (e.g., grazing allotments). The analyses included intersecting and joining spatial layers and cross-tabulating attributes. Areas for polygons were calculated using the XTOOLS extension in ESRI ArcView, and the majority of tabular reports were generated in Microsoft Excel in pivot tables.

1 Current Vegetation Cover

Two data sets describing the current distribution of vegetation categories in the region were available for analysis. The first was a layer produced by ICBEMP, and the second produced by the GAP project. The ICBEMP layer did provide a seamless current vegetation coverage for the region, however after comparative analysis and data exploration, the authors of this project felt the GAP products were more representative, and thus were used in place of ICBEMP when available.

It is essential to consider that, as with any remotely derived product, there is a certain degree of uncertainty within the GAP product. In GAP, spatial and spectral resolutions, temporal constraints, cloud cover, and geometric correction accentuate this uncertainty. Thus, while it is imperative to include basal vegetation for spatial analysis, the GAP data should not be considered an ideal data set from which major decisions should be based. Instead, it should serve as a guideline for development of future projects, which in turn will improve our understanding of vegetative systems. It is important to note that GAP data was used to define the quantity of focal habitats and vegetative species distributions for this assessment.

Very little has been done to serve as a regional accuracy assessment for the GAP derived vegetation layer. In the late 1990's,

field crews from the Bureau of Land Management and Pacific Northwest National Laboratories collected 1,168 field vegetation survey points and performed a first-cut accuracy assessment of the classification of GAP II vegetation in the state of Idaho (Table 1). The results demonstrate that GAP II performs respectably, producing accuracies commonly between 40% and 70%. Unfortunately, there are not a sufficient number of data points to reliably estimate the accuracy of all classes. Analysis of the data presented in Table 1 produces the accuracy summary presented in Table 2. It is notable that the Riparian classification produced an accuracy of zero percent; however, there was only one data point for comparison. It is also of note that this data point was grass, which may or may not be associated with a riparian system.

Table 1. Confidence levels for reference and classified habitat types using GAP II. Overall, 58%; khat 0.403. This table is a calculated product derived from related information provided by the BLM and is presumably very similar to original data.

		Classified							
		Shrub	**Conifer**	**Aspen**	**Juniper Pinyon**	**Grass**	**Riparian**	**Other**	**Totals**
Reference	**Shrub**	344	62	7	5	23	3	2	446
	Conifer	37	231	36	0	0	0	0	304
	Aspen	57	50	28	1	2	1	0	139
	Juniper Pinyon	25	4	0	38	0	0	0	67
	Grass	91	3	5	3	32	0	11	145
	Riparian	0	0	0	0	1	0	0	1
	Other	40	4	0	7	14	0	1	66
	Totals	594	354	76	54	72	4	14	1168

Table 2. Producer's accuracies for specified vegetation categories.

Cover Type	Producers Accuracy
Shrub	58%
Conifer	65%
Aspen	37%
Juniper/Pinyon Pine	70%
Grass	44%
Riparian	0%
Other	7%

The overall accuracy (58%) is the sum of all correct classifications divided by the count of all classifications tested. This calculation provides a broad analysis of the quality of the

data set, but does not represent the quality of any one class. The Producer's accuracies illustrated in Table 2 are the estimated accuracies by class. While it is notable that there is considerable variance between class accuracies, it is also of note that there is also considerable difference between the numbers of field-validated plots (Table 1), which introduces a bias. As sample sizes increase, the certainty that the variance of the sample actually represents the variance of the data set increases. Congalton (1991) indicate that a minimum of 100 field samples per class is necessary to produce a meaningful result for geographically large data sets.

The final calculation is that of Khat, which is a measure of the probability that the resulting overall accuracy is due only to random variability (applied as a Kappa test of independence). A Khat value of 1 implies that there is no possibility that the calculations were due to chance, while a Khat value of 0 dictates that there is great probability of chance classification. The Khat value of the GAP II classification is 0.403, which is notably low and may reduce confidence in the classification.

For the state of Idaho, GAP II vegetation classifications were used. GAP II is a refinement of the original GAP vegetation classification, with finer spatial scale and assumedly higher accuracies. Where necessary, GAP classifications for other states in the region were used (Wyoming, Utah, and Nevada). Unfortunately, the different state projects did not always collaborate on processing methods and classifications systems, which resulted in products with different spatial scales and different names for the same vegetative categories. The boundaries between states are also commonly are expressed as abrupt changes in vegetative structure. Additionally, state boundaries do not always line up according to how different states performed their analyses. At times this resulted in large gaps of missing data between states. Where this occurred, the ICBEMP classification for current vegetation was utilized to fill these holes.

1.1 Data Documentation

Attribute_Accuracy_Report:
Accuracy is estimated at 67.27% (range 53.89% to 93.39%) for northern Idaho based on a scene by scene fuzzy set analysis. For southern Idaho, accuracy is estimated at 69.3% (range 63.6% to 79.3%) based on total percent correct over 9 regions.

Regarding inappropriate uses, it is far easier to identify appropriate uses than inappropriate ones. However, there is a "fuzzy line" that is eventually crossed when the differences in resolution of the data, size of geographic area being analyzed, and precision of the answer required for the question are no longer compatible. Following are several examples:

- Using the data as a "content" map for small areas (less than thousands of hectares), typically requiring mapping resolution at 1:24,000 scale and using aerial photographs or ground surveys.

- Combining GAP data with other data finer than 1:100,000 scale to produce new hybrid maps or answer queries resulting in precise measurements.

- Generating specific areal measurements from the data finer than the nearest thousand hectares. (Minimum mapping unit size and accuracy affect this precision.)

- Establishing exact boundaries for regulation or acquisition.

- Establishing definite occurrence or nonoccurrence of any feature for an exact geographic area. (For land cover, the

percent accuracy will provide a measure of probability.)

- Determining abundance, health, or condition of any feature.
- Establishing a measure of accuracy of any other data by comparison with GAP data.
- Altering the data in any way and redistributing them as a GAP data product.
- Using the data without acquiring and reviewing the metadata and this report.

2 Historic Vegetation Cover

To estimate the relative degree of vegetative change (resulting from habitat or ecosystem fragmentation, urbanization, natural morphology, etc.), it was necessary to analyze a layer of historical natural vegetation cover. The layer used for this analysis was the Kuchler's Potential Natural Vegetation Polygon layer, maintained at ICBEMP. Unfortunately, there is no way to test the accuracy of a layer describing potential natural vegetation. It is assumed that this coverage is a broad overview of what an idealistic vegetative state might be like without any anthropogenic influence. The scale of these data is much larger than the scale of the GAP data used for the distribution of current vegetation. Unfortunately, the availability of regional, contiguous data sets describing potential natural vegetation is very limited, and Kuchler's classification was the best option found for spatial and temporal analysis of vegetation changes.

2.1 Data Documentation

Originator: U.S. Forest Service
Publication Date: 03/15/1995
Title: Kuchler's Potential Natural Vegetation –Polygon
Abstract: Kuchler's Potential Natural Vegetation–Polygon (1964)
Purpose: Used for analysis in Scientific Assessment of the ICBEMP.

Use Constraints

These data were intended for use at the broad-scale, generally the regional, subbasin (4th field HUC) or possibly the subwatershed (6th field HUC) level. The individual listed as contact person can answer questions concerning appropriate use of data.

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3 Invasive Vegetation

This assessment utilizes invasive species from the Idaho State Department of Agriculture and a variety of local agencies in Wyoming. While the Idaho data are statewide and contiguous, there are several limitations. Foremost is that the data were compiled by ISDA but collected by individual county weed control offices, presumably using different mapping techniques. Visual evaluation of this data set demonstrates strong biases in weed distributions as delineated by county boundaries.

The known distributions of invasive species in the State of Idaho is mapped only by dominant invasive by PLSS section. This implies that while a given section may have an abundant population of a particular invasive community, it may also have significant distributions of a second community that is not represented by this data set. Alternatively, presence of a particular invasive species may be over emphasized through the same bias.

Invasive weeds from Wyoming are not by PLSS section, but rather are represented by GPS polygons. While this distribution is more accurate for the weeds that are mapped, it omits weeds that are not inventoried using GPS that are known to exist.

These limitations effective prohibit the use of the data for area calculations or for relative impacts. They are useful to the extent that they demonstrate known occurrences of weeds, but they are by no means representative of the actually distribution of noxious weeds in any areas.

4 Vegetative Fragmentation

Vegetative fragmentation in the scope of this assessment is defined as the relative degree of fragmentation within a vegetative community, regardless of cause. The fragmentation factor utilized in this assessment was derived as part of the ICBEMP assessment.

4.1 Data Documentation

Originator: Interior Columbia Basin Ecosystem Management Project
Title: Similarity/Fragmentation Index for Succession/Disturbance and Vegetation Composition/Structure (ASMNT)
Other Citation Details: /emp/crbdb/crb/h6char/sim.dbf
Online Linkage: http://www.icbemp.gov/spatial/landchar/

Abstract

Similarity index of subwatershed succession/disturbance regime and vegetation composition/structure to historical range of variability pattern. The inverse of this similarity index provides an index of fragmentation. This is a broad-scale index classifying subwatersheds into classes of similarity to the historical landscape regime based on the system developed and described in the landscape assessment. The index is assigned to subwatersheds for the current conditions as a similarity comparison to the historical regime.

Purpose

Used for Supplemental Draft EIS and Integrated Risk Assessment analysis. At the broad-scale, summary of the classes of this variable can be used to identify how much area may be similar to the historical regime or the inverse can be used to estimate departure from the historical regime. In addition, this variable could be summarized at a 4th code HUC level to identify and assess subbasins in a similar manner. These broad-scale data should not be used to target specific subwatershed similarity or departure, since the classification is relative and has a potential error of 20%. Since classes are relative to each other, these data should be used in this context and not as an absolute calculation of conditions. For example, if one subwatershed has a given classification and the adjacent subwatershed has a different classification, the interpretation is that the one subwatershed has much higher probability of its assigned class than the other. Another way to consider this interpretation is that the absolute amount of a given class is unknown at this scale, but these data indicate that one subwatershed has much higher probability than the other of the assigned class.

This index ranks subwatersheds (6th field HUC) from 0 (lowest) to 10 (highest) based on similarity of the succession/disturbance regime, vegetation composition/structure, and landscape pattern to the historical range of variability pattern. Regional and landscape similarities of historical and current vegetation conditions, and succession/disturbance regimes are discussed on page 420 of Hann *et al.* (1997). Multiple input variables and calculations were used to classify this variable into a similarity to the

historical regime. Definition and prediction of this variable is described in Hann *et al.* (1997).

Use Constraints

SIM is a single index calculated for each subwatershed based on the current or future broad- and mid-scale integrated departure from a 400-year pre-EuroAmerican settlement estimate of variation. The index calculation included integration of several variables that are listed in the Capture Methods section. Any summary of these subwatershed data to a finer stratification, such as potential vegetation group (PVG), will contain some error since multiple PVGs occur in any one subwatershed. This variable can be used to assess, identify, or correlate the general similarity or departure from the historical regime. This variable should not be used to summarize refined stratifications or small area absolute amounts similarity or departure, because of the inclusions and the generic nature of this classification.

These data were intended for use at the broad-scale, generally to summarize regional conditions, prioritize subbasins (4th field HUC), or identify large groups of subwatersheds (6th field HUC) that would contain a predominance of the conditions for the class. Data should not be used to target conditions for specific subwatersheds, because of accuracy limitations. The individual listed as the Contact Person can answer questions concerning appropriate use of data.

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Logical Consistency Report

The attributes in this data set are derived from a rule set linked to the intermediate input variables. Because these intermediate input variables are predicted, any one resulting subwatershed variable class has approximately 15 to 25% chance of error into an adjacent class and 5 to 15% chance of error to non-adjacent classes. When classes are summarized at the Basin or groups of subbasins scale, confidence in the class area summary is approximately plus or minus 10%. When classes are summarized at the subbasin scale, confidence in the class area summary is approximately plus or minus 20%. This can be improved to plus or minus 10% by grouping classes into a coarser (3 class; low, moderate, high) classification, which will improve accuracy. The classes are only applicable and accurate when considered in a relative sense to each other.

This variable should not be used to summarize absolute inferences. Confidence in correct classification of any one subwatershed compared to ground truth is estimated to be 65% (2 out of 3 chances of being right). Confidence in composition of the different classes summarized across the basin is estimated at 90% (9 out of 10 chances of being right), 85% for a group of subbasins, 80% for subwatersheds within a subbasin, and 70% for a smaller group (10 to 20) of subwatersheds.

5 Forest Management Activity

For the scope of this assessment, disturbance is defined as the change of a system from its natural state. This is important to consider for a subbasin assessment. The disturbance layer utilized in subbasin planning was derived from the ICBEMP project, and included many attributes. Of these attributes, the authors

selected to only use Forest Management Activity.

Logically it would have been preferable to use GPS or higher resolution field data collections to more accurately represent timber harvest. Large logistical barriers were encountered, however, when attempting to coordinate with several government and private sector agencies as to the extent and type of timber management activities at the subbasin scale within the timeframe of this assessment. Therefore, the ICBEMP layer was utilized as the best available regional estimate of timber management activity through the subbasin.

5.1 Data Documentation

Abstract

Current Disturbance and Activities—The current time period generally reflects the current year (1999) plus or minus 5 years (i.e., 1994–2004). Developed from data and models using administrative unit data from the past 10 years as one input. Reflects the disturbance from 1988 to 1997 (10-year average). Current disturbance and activities include 10 variables of which most are expressed in relative low, moderate, and high classes. The data for these 10 variables for Forest Service and BLM lands came from administrative unit reports and wildfire reports, while data for other lands came from general resource reports and extrapolation of assumptions. Activities are planned treatments, while disturbances include unplanned effects. Planned activities include: livestock grazing measured in relative classes of animal unit months (AUMs) and range allotment restoration and maintenance (RST), which is measured in relative classes of area affected; timber and woodland harvest (HRV) and thinning (THN) measured in relative classes of area treated, while wood product volume (VOL) is measured in an approximate estimate of millions of board feet; and prescribed fire and fuel management (PRS) and prescribed natural fire (PNF), both also measured in relative classes of area treated. Two summary activity variables are provided: forest and woodland management activity (FMA) is a summary of HRV and THN, while fire activity (FAD) is a summary of PRS and PNF. The one unplanned disturbance variable is the amount of wildland fire (wildfire, WLF).

Purpose

The intent of current disturbance and activity data is to provide baseline information useful to understanding current activity and disturbance levels at the broad-scale. Future predictions of this information can be used at the broad-scale to evaluate scenarios or alternatives. The 10 disturbance and activity variables can be used to address an understanding of the relative location and relative amounts of management treatments and disturbance that are occurring currently and how those may change in the future under different scenarios or alternatives.

Use Constraints

All of the disturbance and activity variables are expressed as relative classes, except volume, which is expressed in millions of board feet. The classes are based on relativized indexes generated from actual data on acres of activity or disturbance. Consequently, the classes are only useful in a relative sense, i.e., comparing different areas or summarizing conditions within or across the whole area.

These data were intended for use at the broad-scale, generally to summarize regional levels of activities and disturbance, prioritize or plan subbasin (4th field HUC) outcomes for a given level of activity or disturbance. The individual listed as the Contact Person can

answer questions concerning appropriate use of data

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Attribute Accuracy Report:

The attributes in this data set are derived from a rule set linked to the input of treatment and disturbance acre or volume data. The reported treatment and disturbance data was only spatially specific to the administrative unit. Consequently, this reported data was spatially redistributed through modeling and assumptions to a finer scale. Because of the general nature of the reported data and the extrapolation approach, any one resulting subbasin variable class has approximately 15 to 25% chance of error into an adjacent class and 5 to 15% chance of error to nonadjacent classes. When classes are summarized at the Basin or groups of subbasins scale, confidence in the class area summary is approximately plus or minus 10%. When classes are summarized at the subbasin scale, confidence in the class area summary is approximately plus or minus 20%. The classes are only applicable and accurate when considered in a relative sense to each other. The estimated timber volume has plus or minus 10% accuracy at the basin or groups of subbasin scale, which declines to plus or minus 20% for just one subbasin.

This variable should not be used to summarize absolute inferences. Confidence in correct classification of any one subbasin compared to ground truth is estimated to be 65% (2 out of 3 chances of being right). Confidence in composition of the different classes summarized across the basin is estimated at 90% (9 out of 10 chances of being right), 85% for a group of subbasins, 80% for subwatersheds within a subbasin, and 70% for a smaller group (10 to 20) of subwatersheds.

6 Altered Hydrology

As part of this subbasin assessment, it is necessary to evaluate the relationships between humans and the effect that they have on hydrologic systems. This is a very large and sweeping concept that may be impacted by factors ranging from construction of dams to urban sprawl, road construction, and timber harvest. ICBEMP performed a multivariate analysis of this type and derived an estimate of the relative impact that anthropogenic activity has effected regions in the Columbia River Basin. In this assessment, we utilized this factor, called the Hydro Human Impact factor, in our analysis.

6.1 Data Documentation

Abstract

Hydrologic Impacts Index. The hydrologic impacts index reflects the cumulative impacts from human associated developments of cropland agriculture, mining, dams, and roads. This is a broad-scale index classifying subwatersheds into classes from very low to very high relative probability of amounts of these impacts. The index is assigned to subwatersheds based on the presence or absence of substantial amounts of cropland, mines, and dams, and from road density classification.

Purpose

Used for Supplemental Draft EIS and Integrated Risk Assessment analysis. Can be used to assess the cumulative impacts from cropland, mines, dams and roads on hydrologic systems. At the broad-scale, summary of the classes of this variable can be used to identify how much area may have relatively high or low amounts of impacts.. In

addition, this variable could be summarized at a 4th code HUC level to identify subbasins with levels of impact.. These broad-scale data should not be used to target specific subwatershed hydrologic or soil problems, since the very low to high type of classification is relative and has a potential error of 20%. Since classes are relative to each other, these data should be used in this context and not as an absolute calculation of conditions.

For example, if one subwatershed has a very high rating and the adjacent subwatershed has a low rating, the interpretation is that the one subwatershed has much higher probability of impact than the other. Another way to consider this interpretation is that the absolute amount of impact is unknown at this scale, but these data indicate that one subwatershed has much higher probability than the other.

These data were used for Supplemental Draft EIS and Integrated Risk Assessment analysis. The hydrologic impacts index was derived using 4 variables from the Watershed Characterization theme (ID #797, export name ATRINTRP): Cropland, Mines, Dams, and Road Class. See auxiliary metadata file (HII.PDF) to define the assignment process for the Dominant Impact variable and the Hydrologic Impact Index.

The rule set used to classify this variable into very low (L), low (L), moderate (M), or high (H) hydrologic impact index is based on logical relationships (Jenny 1980, Alexander 1988, Jensen *et al.* 1997, Megahan 1991, Rockwell 1998, Oregon State University 1993, U.S. Department of Agriculture 1993). These relationship assume that as the presence and amount of impacts of cropland, mines, dams, and roads increase the impact to hydrologic systems and soil processes accumulate through time.

The spatial distribution of the high and very high classes is concentrated in the areas of the Basin with cropland and high density roads or cropland. In contrast, the very low and low are concentrated in the areas of wilderness and roadless or rangeland with low road density. The moderate category tends to follow the areas with intermediate conditions.

Use Constraints

These data were intended for use at the broad-scale, generally to summarize regional conditions, prioritize subbasins (4th field HUC), or identify large groups of subwatersheds (6th field HUC) that would contain a predominance of the conditions for the class. Data should not be used to target conditions for specific subwatersheds, because of accuracy limitations. The individual listed as the Contact Person can answer questions concerning appropriate use of data.

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Attribute Accuracy Report

The attributes in this data set are derived from a rule set linked to the intermediate input variables. Because these intermediate input variables are predicted, any one resulting subwatershed variable class has approximately 15 to 25% chance of error into an adjacent class and 5 to 15% chance of error to non-adjacent classes. When classes are summarized at the Basin or groups of subbasins scale, confidence in the class area summary is approximately plus or minus 10%. When classes are summarized at the subbasin scale, confidence in the class area summary is approximately plus or minus 20%. This can be improved to plus or minus 10% by grouping classes into a coarser (3

class: low, moderate, high) classification, which will improve accuracy. The classes are only applicable and accurate when considered in a relative sense to each other.

This variable should not be used to summarize absolute inferences. Confidence in correct classification of any one subwatershed compared to ground truth is estimated to be 65% (2 out of 3 chances of being right). Confidence in composition of the different classes summarized across the basin is estimated at 90% (9 out of 10 chances of being right), 85% for a group of subbasins, 80% for subwatersheds within a subbasin, and 70% for a smaller group (10 to 20) of subwatersheds.

7 Altered Fire Regime

Ecosystems-at-risk (EAR) integrates ignition probability, fire weather hazard, and fire regime condition class (FRCC), based on the probability of severe fire effects. FRCC is a very large and complex data set that essentially represents how much damage might be done to any particular area in the event of a fire. Analysis of this type aids in the understanding of ecosystem health and sustainability, and when combined with data indicating how likely an area is to burn, assists in identifying areas in immanent danger of dramatic habitat changes.

7.1 Data Documentation

Entity and Attribute Overview

The fire regime condition class codes, short descriptions, and explanations follow:

Code	FRCC Description
1	Low departure—Fire regimes are within their historical range and the risk of losing key ecosystem components is low.
2	Moderate departure—At least one fire interval has been missed, or exotic species have altered native species composition (e.g., cheatgrass and blister rust). There is a moderate risk of losing key ecosystem components should a fire occur.
3	High departure—Several fire intervals have been missed, or exotic species have substantially altered native species composition (e.g., cheatgrass and blister rust). There is a high risk of losing key ecosystem components should a fire occur.
4	Moderate grass/shrub—Moderate departure in shrubland or grassland systems. At least one fire interval has been missed, or exotic species have substantially altered native species composition (e.g., cheatgrasss and blister rust). There is moderate risk of losing key ecosystem components should a fire occur.
8	Agriculture
9	Rock/barren
10	Urban
11	Water
12	Snow/ice
13	No information

We used three condition classes to qualitatively rank the departure from the historical fire-regimes. To a large extent, fire-regime condition classes were derived from a comparison of the historical fire regime and the current fire severity. To derive condition class, we simply assessed the transition between our projected current fire severity and the historical fire regime of a given site. If the evidence suggested that fire severity had changed by at least one class, then we would conclude that the condition class has a value that exceeds Class 1. In other words, we would infer that the fire effects would be something other than the effects expected if

the structure and composition reflected the historical range of conditions. The greater the departure, the greater the probability that key components would be lost if a wildfire occurred.

Assumptions

We made many assumptions prior to developing the modeling rules to derive fire regime condition class:

1. The current fire severity, and consequently the condition class could only increase as a result of fire exclusion.

2 Condition Class 1 occurred if there had been no detectable change in fire severity between the historical fire regime and the current fire severity.

3. Although fire exclusion has likely resulted in an increase of the duff depth, and consequently future fires will probably be more severe, the resolution of our base data did not allow us to make inferences concerning duff depths.

4. Fire exclusion has not measurably changed fire severity of the communities within the MS3, SR1, and SR2 fire regimes. Our inability to detect change within these fire regimes is more of a function of an inappropriate scale - changes within these regimes (as well as MS2) are much better detected at a landscape scale, rather than at a stand scale. The attributes representing stand structure and composition in our database were not refined enough to detect change within these historical fire regimes.

We adjusted the FRC within the (western hemlock), abla4 (Subalpine Fir type 4), pial (whitebark pine), and laly (alpine larch) Potential Natural Vegetation (PNV) types to account for the potential effects of blister rust on western white pine and whitebark pine. The adjustment made to FRCC was relative to canopy cover. For example, if canopy cover = 3 (roughly 40–70%), the FRCC was changed from low to moderate. If canopy cover = 4 (roughly >70%), then FRCC was changed from low to high. We also adjusted the FRCC when broadleaf cover types occurred in coniferous forest PNVs. Since fire would likely be beneficial to aspen, the FRCC was changed to low.

Purpose

These data were designed to characterize broad scale patterns of fire regime departures for use in regional and subregional assessments. The departure of the current condition from the historical base line serves as a proxy to the potential of severe fire effects. In applying the condition class concept, we assume that historical fire regimes represent the conditions under which the ecosystem components within fire-adapted ecosystems evolved and have been maintained over time. Thus, if we projected that fire intervals and/or fire severity has changed from the historical conditions, we would expect that fire size, intensity, and burn patterns would also be subsequently altered if a fire occurred. Furthermore, we assumed that if these basic fire characteristics have changed, then it is likely that there would be subsequent effects to those ecosystem components that had adapted to the historical fire regimes. As used here, fire regime condition classes reflect the probability that key ecosystem components may be lost should a fire occur. Furthermore, a key ecosystem component can represent virtually any attribute of an ecosystem (for example, soil productivity, water quality, floral and faunal species, large-diameter trees, snags, etc.).

General Limitations

These data were designed to characterize broad scale patterns of fire-regime departures for use in regional and subregional assessments. Any decisions based on these data should be supported with field verification, especially at scales finer than 1:100,000. Although the resolution of the FRCC theme is 90-meter cell size, the expected accuracy does not warrant their use for analyses of areas smaller than about 10,000 acres (for example, assessments that typically require 1:24,000 data).

FRCC is based upon information associated to stands, i.e., stand level information. Since fire processes operate at a landscape level, it seems logical that FRCC should be derived at a landscape level instead of a stand level. However, we need to run vegetation simulation models to derive historical range of variability, which would allow FRCC to be modeled at landscape levels.

The derivation of FRCC for grassland and shrubland settings is overly simplistic at this time. Currently, there is little empirical data concerning fire regimes in non-forested settings.

Source Data

http://www.fs.fed.us/r1/cohesive_strategy/datafr.htm

8 Grazing

Two spatial coverages characterizing grazing in the subbasin were utilized in this assessment. The first was a grazing allotment coverage acquired from the ICBEMP website, used to determine type of domestic grazing. It was used because it provided contiguous grazing information compiled from various sources. The grazing data from this coverage is limited in that some records may be old our otherwise outdated, spatial accuracies are variable, and current allotment status is not always documented. These issues are not easily surmounted given the number of contributing source agencies and variability in data collection / record management. This layer was used to calculated percentages of areas grazed by animal type by watershed.

The second coverage used to evaluate grazing in the subbasin was an uncharacteristic grazing layer, also downloaded from the ICBEMP website. This layer is an indicator of the effect of grazing on a natural system, as compared to the predicted potential status of the natural system with only native ungulate grazing and browsing. This layer was used to generate the High, Moderate, and Low categories used in Appendix 3-1.

8.1 Data Documentation—Animal Type

Publication Date: 05/15/1995
Abstract: Range Allotments—Idaho
Purpose: Provide information on locations of grazing on federal lands, type of livestock, and seasonal use.

Use Constraints

These data were intended for use at the broad-scale, generally the regional, subbasin (4th field HUC), or possibly the subwatershed (6th field HUC) level. The individual listed as Contact Person can answer questions concerning appropriate use of data.

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Attribute Accuracy Report

Topology and attributes for this theme were manually checked by comparing plots of the

processed data against original materials. Attribute accuracy information for source materials were not collected since acquisition of source data pre-dated FGDC metadata standards.

Completeness Report

Capture Method: Received digital files or manuscripts. Projections usually UTM (zone 10, 11, 12) or State Plane. Scales 1:24,000 to 1:126,720. Tabular data received in database format or hardcopy. Agencies/field units consulted for edits/data as needed.

Not all agencies submitted data. Received data from: Boise NF, Caribou NF, Challis NF, Clearwater NF, Idaho Panhandle NF, Nez Perce NF, Payette NF, Salmon NF, Sawtooth NF, Targhee NF, Wallowa-Whitman NF, BLM-Boise, BLM-Burley, BLM-Coeur d'Alene, BLM-Idaho Falls, BLM-Salmon, BLM-Shoshone, USFWS, Nat'l Park Service. Allotment number links the spatial and tabular data. Pastures (smaller divisions) are included in some places, but the tabular data applies at the allotment level. In merging the coverages, precedence was given to the most accurate coverage. The merged coverage was edited (eliminating slivers, etc.) and then clipped to state and CRBA boundaries to create seven state coverages.

8.2 Data Documentation—Uncharacteristic Grazing

Originator: Interior Columbia Basin Ecosystem Management Project
Title: Current Year Uncharacteristic Livestock Grazing
Other Citation Details: /emp/crbdb/crb/dst/bdbulg.dbf
Online Linkage: http://www.icbemp.gov/spatial/landchar/
Time Period of Content: 5/1/1999
Status: Progress: Complete

Purpose

The objective is to understand the cycles and relationships of current native ungulate regimes as it affects vegetative communities, as compared to the characteristics of natural (historical) ungulate regimes of the Pre-European settlement without the influence of livestock grazing.

Abstract

Uncharacteristic livestock grazing has effects outside of the normal range of effects that occurred in the historical (natural) system. The normal range is considered to be within the 400-year historic range of variability minimum +25% and maximum –25%. The 400-year period includes the variation that is predicted to occur within the recent and current climate without influence of Euro-American settlement influence. The historical regime accounts in general for influences of native species adaptations and soil development for the past 10 to 15 thousand years since the last glacial period. Some native species adaptations have evolved over the last 1 to 3 million years in response to changing paleoecological climates and disturbances.

Current time period generally reflects the current year (1999) plus or minus 5 years (i.e., 1994–2004). Developed from data and models using administrative unit data from the past 10 years as one input. Reflects the disturbance from 1988 to 1997 (10-year average).

Use Constraints

These data were intended for use at the broad-scale, generally the regional, subbasin (4th field HUC), or possibly the subwatershed (6th field HUC) level. The individual listed as contact person (Becky Gravenmier) can

answer questions concerning appropriate use of data.

Attribute Definition

Description = Current Uncharacteristic Livestock Grazing Classification

VH: ≥ 0.900000001 to ≤ 1.0.

Very high probability of uncharacteristic livestock grazing in the subwatershed.

H: > 0.549471265 to 0.0.

High probability of extensive uncharacteristic livestock grazing effects in the subwatershed with considerable cumulative effects from high stocking levels in the early to mid 1900s. This level of uncharacteristic livestock grazing would likely result in negative effects to both upland and riparian systems, unless mitigated with distribution mgt. Spatial distribution highly correlated with the dry shrub PVGs.

M: ≥ 0.049981819 to < 0.549471264.

Moderate probability of extensive uncharacteristic livestock grazing effects in the subwatershed. This level of uncharacteristic livestock grazing could result in negative effects, particularly on riparian systems in steep, complex terrain, unless mitigated with distribution mgt. Spatial distribution highly correlated with the dry shrub, cool shrub, and moist forest.

L: ≥ 0.0000000002 to < 0.049981818.

Low probability of uncharacteristic livestock grazing in the subwatershed. It is unlikely that this level of uncharacteristic livestock grazing would cause extensive effects, but in steep, complex terrain could result in negative impacts on riparian systems. Spatial distribution highly correlated with the dry forest, moist forest, and cool shrub PVGs.

N: < 0.0000000001

Almost no probability of uncharacteristic livestock grazing in the subwatershed. Spatial distribution highly correlated with agricultural, urban lands, and moist forest.

9 Points of Diversion

The PODs summed in tables are actually water rights with surface water irrigation PODs associated with them. It consists of the Snake River Basin Adjudication recommended rights, the claims they are or will be processing, and any other licensed and permitted rights currently recognized. There can be more than one POD associated with a water right and vice versa, so the count is an estimate. Also, because the amount of water that can be diverted at any one time depends on available water and many other factors, no diversion rates or volumes have been given. Models are being developed for this, but these can only be verified and used in areas where there is a substantial effort at gauging the flow.

Points of diversion in across the basin may be in various states of adjudication. Until adjudicated, much of these data are as of date of the claim application in the late 1980s. Many POD locations are only accurate to the quarter-quarter or QQQ section. PODs for the state of Idaho are currently being adjudicated, and inventories are changing rapidly. It is notable that these points were acquired from IDWR in November 2003, and the database may have altered significantly since.

Diversion Rates

Also, because the amount of water that can be diverted at any one time depends on available water and many other factors, no diversion rates or volumes have been given. Models are being developed for this, but these can only be verified and used in areas where there is a

substantial effort at gauging the flow. *MIKE Basin Surface Water Budget Modeling*, as well as projects by USBR, IDWR, and DHI, Inc., are examples of quantifying the amount of available water being diverted. PHabSim is an additional software approach that evaluates the effects on aquatic species.

10 Geology

Major geological features are important at the subbasin scale whereas they influence stream and slope stability, topography, stream incision, vegetative structure, and other factors. While much of the areas encompassed in creation of this assessment is mapped at a high resolution for geologic features, these records are scattered amongst several academic and governmental organizations, and many are not in formats easily utilized. Therefore, a major lithology coverage maintained by ICBEMP was used for this assessment. This coverage was intended for large scale (> 1:1000000) analysis, however for this application it was the best available data source, and since not direct decisions will be made based on high discritization of this layer, its relatively coarse resolution is considered acceptable.

10.1 Data Documentation

Citation Information

Originator: U.S. Geological Survey
Publication Date: 11/03/1995
Title: Major Lithology
Other Citation Details:
/emp/crbv/crb/min/lithm
Online Linkage:
http://www.icbemp.gov/spatial/min/

Abstract

Classification of Geologic Map Units According to their Major Lithology—The major lithologies classifications were used for the component Scientific Assessment portion of the project. Both the biophysical and economic sections utilize information provided in this data set.

Use Constraints

These data were intended for use at the broad-scale, generally the regional, subbasin (4th field HUC), or possibly the subwatershed (6th field HUC) level. The individual listed as Contact Person can answer questions concerning appropriate use of data.

Contact Information

Contact Person: Bruce Johnson
Contact Organization: U.S. Geological Survey
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bjohnson@galileo.wr.usgs.gov
Native Data Set Environment: Computer Operating System: SUN/ARC/INFO
Filename: /emp/crbv/crb/min/lithm, Native File Size: 27.12 Mb, Export File Size: 50.22 Mb

Data Quality Information:

Topology and attributes for this theme were manually checked by comparing plots of the processed data against original materials. Attribute accuracy information for source materials were not collected since acquisition of source data pre-dated FGDC metadata standards.

State geologic maps digitized by scanning Washington, Idaho, and Montana from paper sources and Wyoming, Utah, Nevada, and California from stable base material made from publication mylars. Maps edgematched at state lines. Montana had an RMS error on transform of 965m, the rest had RMS errors<190m. Map units for each state were classified by expert team. Using the

classifications, the maps were dissolved, unioned, slivers eliminated at state lines, then dissolved again. Classifications were then modified considering other geologic knowledge.

11 Ownership

Political components to this subbasin assessment are important whereas they commonly reflect land use practices and, in the case of private vs. public lands, ownership impacts the ability for management agencies to access areas for inventory or remediation purposes. For this reason, ownership was considered in this analysis at a broad scale using regional land ownership categories maintained by ICBEMP.

11.1 Data Documentation

Use Constraints

These data were intended for use at the broad-scale, generally the regional, subbasin (4th field HUC), or possibly the subwatershed (6th field HUC) level. The individual listed as Contact Person can answer questions concerning appropriate use of data.

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Attribute Domain Values

Enumerated Domain Value: 0

Enumerated Domain Value Definition: NOT ATTRIBUTED

Enumerated Domain Value: 11

Enumerated Domain Value Definition: FOREST SERVICE

Enumerated Domain Value: 20

Enumerated Domain Value Definition: DEPT OF DEFENSE

Enumerated Domain Value: 90

Enumerated Domain Value Definition: TRIBAL LAND

Enumerated Domain Value: 1

Enumerated Domain Value Definition: PRIVATE

Enumerated Domain Value: 80

Enumerated Domain Value Definition: STATE LAND

Enumerated Domain Value: 12

Enumerated Domain Value Definition: AGRICULTURAL RESEARCH SERVICE

12 Fish Distributions

Estimation of fish distributions and populations is not a trivial science and has serious ramifications. It is important to note that, in this assessment, the best attempt possible was made to generate an objective and representative snapshot as to the current status of fish populations and distributions. There is obviously some degree of inherent error on both spatial and temporal scales, however it is felt that the analyses included in this assessment are representative of the most current and best estimation of distribution and status. More specific comments are referenced in the assessment text, and the authors are available for comment on their approaches.

Where appropriate, fish densities were calculated at survey locations for bull trout and redband trout. Densities were drawn from the number of fish surveyed (electrofishing) divided by the reach length, and then normalized by for distribution within the range of analyses (i.e. bull trout densities were relative to samples within the Boise, Payette and Weiser subbasins). Because fish density distributions are often strongly skewed toward lower densities, normalization provides a method to statistically separate low from nominal and high densities. For this assessment, low fish densities are ½ standard deviation below the mean, nominal densities are –1/2 to 1/2 standard deviations from the mean, and high densities are greater than ½ standard deviation above the mean of the normalized distribution. Normalization of data ideally forces distributions to mimic a Gaussian distribution, however due to the strong skew of fish densities, the resulting histogram is not normal in appearance. It is, however, more normal than it was before the transform and allows the data to be displayed more effectively.

In estimating bull trout abundance, data were collected from multi-pass electrofishing surveys conducted within after and including 1998. Data had to be georeferenced and include an estimate of transect length. Data were obtained from the Boise National Forest, Bureau of Reclamation, the USFS Rocky Mountain Research Station and IDFG.

Bull Trout estimates in the Boise, Payette, and Weiser subbasins were made only for measured streams occurring within documented Bull Trout Local Populations. Each stream was assigned a hydrographic order using an automated ArcINFO algorithm. Only major streams were used (we subset the hydrographic data to exclude any stream with no name or any stream named 'Unnamed Stream'). Population densities and frequency of occurrence was summarized by stream order using fish survey data (count of fish and reach length). Fish presence, absence and density information was then extrapolated to the remaining streams based on stream order and the frequency statistics of sample points for each respective stream order.

13 Southwest Idaho Ecogroup Data

In 2001, the Southwest Idaho Ecogroup, made up of the Boise, Payette and Sawtooth National Forests, produced a series of ecoregional assessments for southwestern Idaho. As part of this assessment, they compiled a large amount of spatial data relative to subbasin planning and performed many high-quality analyses. While this was an excellent project, the study areas for their assessment and those for subbasin planning do not overlap, making it difficult to incorporate much of their product into subbasin planning assessments. An attempt was made to use their data as a reference to either substantiate or negate the findings of the authors in this subbasin assessment. However, large-scale implementation of their findings was very difficult to address.

Water quality integrity and geomorphic integrity were two figures that did incorporate the SWIEG data by replacing Inland West Watershed Initiative (IWWI) calls with the SWIEG calls in the 6th field HUCs covered by SWIEG. Fire perimeters and years compiled by SWIEG were also used.

14 Urban Rural Development Class (Urban Sprawl)

An assessment of how urbanization and urban sprawl are affecting natural systems could be an integral part of subbasin planning. In an attempt to constrain the effects of urban areas and their proximity to natural resources, we analyzed the Urban Rural Development Class

layer maintained by ICBEMP. This layer provides a very sweeping picture of the geographic and intensity effects of population centers on nearby systems. This layer is based on a variety of older data; it is notable that there is more current information available. However, this layer was the only known source that assessed impacts of this type on a basin scale. It was not used for detailed analysis.

14.1 Data Documentation

Originator: Interior Columbia Basin Ecosystem Management Project
Publication Date: 05/30/1997
Title: Urban / Rural Classes
Other Citation Details: /emp/crbg/crb/demog/rurbclass
Online Linkage: http://www.icbemp.gov/spatial/demog/

Abstract

Urban Rural Development Class. A classification of influence to lands within the ICBEMP from human-created developments.
Purpose: Used as one of the measures of human influence at the landscape level in the Scientific Assessment of the ICBEMP.

This theme is a general correlate for developments such as housing, roads, industry, utilities, and assorted human-created developments. Classes range from low influence to very high influence for all lands within the Basin.

Use Constraints

These data were intended for use at the broad-scale, generally the regional, subbasin (4th field HUC), or possibly the subwatershed (6th field HUC) level. The individual listed as Contact Person can answer questions concerning appropriate use of data.

Attribute Accuracy Report

This is a data set resulting from modeling or analysis. The accuracy of the attributes is dependent on the accuracy of source materials as well as the statistical accuracy of the modeling process. Attribute accuracy information for source materials were not collected since acquisition of source data pre-dated FGDC metadata standards.

Logical Consistency Report

Not applicable to raster data.

Completeness Report

These data are as complete as the source data maps: Towns DCW-1:1M Point (export name BVBTOWNB) and Road Density Predicted (export name BGBRDDN).

Originator: Intermountain Fire Science Lab - Missoula, MT
Publication Date: 02/29/1996
Title: Road Density (Predicted)
Other Citation Details: /emp/crbg/crb/culture/roaddens
Online Linkage: http://www.icbemp.gov/spatial/culture/

Originator: Census Bureau
Publication Date: 09/18/1995
Title: Towns—100k (Point)
Other Citation Details: /emp/subv/crb/demog/towns
Online Linkage: http://www.icbemp.gov/spatial/demog/

Process Description

Reclass Urban Pop Wildland Interface very high to high and very low to low; take category of towns (Yakima, Tri Cities, Spokane, Missoula, Boise, Caldwell) & assign very high class to all areas w/in 60 miles of center w/predicted road density ≥ moderate.

Attribute Domain Values

Enumerated Domain Value: 2

Enumerated Domain Value Definition: LOW—Influence from Human-Created Developments

Enumerated Domain Value: 3

Enumerated Domain Value Definition: MODERATE—Influence from Human-Created Developments

Enumerated Domain Value: 5

Enumerated Domain Value Definition: VERY HIGH—Influence from Human-Created Developments

Enumerated Domain Value: 4

Enumerated Domain Value Definition: HIGH—Influence from Human-Created Developments

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APPENDIX 1-3—RARE AND SENSITIVE VEGETATION IN THE BOISE, PAYETTE, AND WEISER SUBBASINS

Rare and endemic vegetation is a good indicator of the stability of a natural system. This assessment makes the assumption that rare and threatened vegetation at a point prior to the introduction of anthropogenic effects was sustainable in a natural state. Thus, if a vegetative species is now threatened, it is likely to be highly coorelated to changes in its habitat due to human activities. The authors of the assessment did not write the content of this appendix. Rather, this appendix was generated directly from texts of existing literature, including the Idaho Conservation Data Center (IDCDC) website (accessed in April 2003) and Atwood et al. (2000).

In the Boise, Payette, and Weiser subbasins, there are 33 documented species of rare vegetation (Table 1). Of these, 16 have detailed records developed by the sources listed above and are included in this appendix.

Table 1. Global (G1–G3) or State (S1–S2) rare or sensitive species in the Boise, Payette, and Weiser subbasins (IDCDC 2003).

Common Name	Scientific Name	BMO	LBO	MFP	NFP	NMB	PAY	SFB	SFP	WEI	A*
Aase's onion	*Allium aaseae*		X				X			X	Y
Swamp onion	*Allium madidum*				X					X	
Rush aster	*Aster junciformis*				X						Y
Packard's milkvetch	*Astragalus cusickii* var. *packardiae*						X				Y
Mulford's milkvetch	*Astragalus mulfordiae*		X							X	Y
Beautiful bryum	*Bryum calobryoides*					X					
Bug-on-a-stick	*Buxbaumia viridis*				X						
Cusick's camas	*Camassia cusickii*						X			X	
Indian valley sedge	*Carex aboriginum*									X	
Pale sedge	*Carex livida*								X		Y
Mt. Shasta sedge	*Carex straminiformis*								X		
Earth lichen	*Catapyrenium congestum*		X								
Mahala-mat ceanothus	*Ceanothus prostratus*									X	Y
Cusick's false yarrow	*Chaenactis cusickii*		X								
Shining flatsedge	*Cyperus rivularis*		X				X				
Silverskin lichen	*Dermatocarpon lorenzianum*									X	
Idaho douglasia	*Douglasia idahoensis*			X		X			X		Y
Giant helleborine	*Epipactis gigantea*	X		X	X	X	X	X	X	X	Y
Calcareous buckwheat	*Eriogonum ochrocephalum* var. *calcareum*						X				
Green keeled cotton-grass	*Eriophorum viridicarinatum*				X						Y
Bugleg goldenweed	*Haplopappus insecticruris*							X			
Snake River goldenweed	*Haplopappus radiatus*						X			X	Y
Slick spot peppergrass	*Lepidium papilliferum*		X				X				Y
Idaho bitterroot	*Lewisia kelloggii*	X		X	X	X		X	X	X	
Squaw apple	*Peraphyllum ramosissimum*									X	Y
Sierra sanicle	*Sanicula graveolens*				X						
Tobias' saxifrage	*Saxifraga bryophora* var. *tobiasiae*				X						Y

Biennial princesplume	*Stanleya confertiflora*									X	Y
Stylocline	*Stylocline filaginea*		X					X			Y
American wood sage	*Teucrium canadense* var. *occidentale*		X							X	Y
Wovenspore lichen	*Texosporium sancti-jacobi*		X								
Douglas' clover	*Trifolium douglasii*				X					X	
Plumed clover	*Trifolium plumosum* var. *amplifolium*									X	

A* = Detailed records included in this appendix.

Allium aaseae—Aase's onion

Liliaceae (Lily family)

General Description—*Allium aaseae* onion is an early spring-flowering member of the lily family. It is perennial with an underground bulb that is usually buried at least a couple inches below ground level in mature individuals. Bulb coat reticulations may or may not be evident. The scape is round to slightly flattened, not winged. The two linear, channeled leaves are 1–4 mm wide, at least twice as long as the scape and typically lying on the ground when observed in the field early in the season. Its six similar-looking tepals are pink, often richly so, but fading to white, 6–9.5 mm long, and with entire to obscurely or strongly denticulate margins. Stamens are shorter than the tepals, the undehisced anthers and pollen are yellow.

Technical Description—Bulb ovoid, outer coats brownish, usually with obscure reticulations, the cells of which are transversely elongate and intricately contorted, the inner coats white to pink or reddish; scape (3) 5–11 (15) cm long, terete or slightly flattened, not winged; leaves two per scape, linear, channeled, 1–3 (4) mm wide, entire or the margins obscurely denticulate, 2 or more times longer than the scape, green (i.e., not withering) at anthesis, tending to be deciduous at maturity; bracts of the inflorescence 2 (3), ovate, obtuse to acuminate; umbel 5- to 25-flowered, pedicels shorter than or equal the perianth; perianth segments (6) 7–9.5 mm long, lanceolate to elliptic, entire to erose to obscurely or strongly denticulate with minute glandular teeth, erect, flaring at the tips, bright pink, fading with age or pressing, rarely white; stamens 1/2–2/3 as long as the perianth; anthers yellow, pollen yellow; ovary crestless or with three minute 2-lobed central processes, style included, stigma punctate, entire, capsule crestless (McNeal 1993).

Diagnostic Characteristics—There are several onion species occurring within and near the range of *A. aaseae*. *A. aaseae* is most likely to be confused with *A. simillimum*, especially at mid-elevations in the Boise Foothills, where their distributions nearly overlap. Populations with purple-mottled anthers may actually be hybrids between the two species. The following key, adopted from McNeal's (1993) key to the onions of southwestern Idaho, can be used to distinguish the two:

Allium simillimum. Perianth segments white with green or reddish midveins, sometimes flushed with pink; anthers purple or mottled purple and white, pollen white or grayish; denticulations, particularly on the inner perianth segments obvious under a hand lens and regularly distributed on the distal 2/3 of the segment; occurring above 4200 feet elevation on various substrates.

Allium aaseae. Perianth segments bright pink with rarely a white individual in an otherwise pink population; anthers yellow, pollen yellow, denticulations irregular in number and distribution on perianth segments, often missing on plants from Rebecca Sand Hills RNA; usually restricted to lacustrine sands of the Glenns Ferry Formation, generally below 3700 ft., except in Cartwright Canyon where occurring up to 5100 ft. elevation.

Infraspecific Taxa—There are no infraspecific taxa recognized for *Allium aaseae***.**

Identification of This Taxon in Idaho—The bright pink flowers, yellow anthers, and restriction to course sandy substrates, generally below 3700 feet elevation, will distinguish *Allium aaseae* from the congener it is most likely to be confused, *A. simillimum* (dwarf onion). Additionally, the linear leaves of *A. aaseae* are at least twice as long as the scape, and typically lying on the ground when

observed early in the spring. On well-developed plants, the leaves are also often much more succulent-looking than found in *A. simillimum*.

Hybridization involving *A. aaseae* has been suspected at least since the late 1970s. Recent research indicates hybridization is likely occurring between *A. aaseae* and *A. simillimum* at some populations. A recent taxonomic study by McNeal (1993) has determined *A. aaseae* to be a distinct and valid species from *A. simillimum*. A genetic-based study by Smith (1995) substantiates McNeal's conclusion.

Status

Global—*Allium aaseae* is endemic to southwestern Idaho. Population sizes vary from less than 100 to more than 35,000 plants. A rangewide population estimate for *A. aaseae* is 400,000 plants. This is a conservative number for a number of reasons: 1) the full extent of a number of occurrences is unknown, and it is very likely additional plants occur in unsurveyed suitable habitat; 2) no population estimates are available for five occurrences and their contributions remain uncounted in the above rangewide tally; 3) for populations or subpopulations estimated at 10,000+ plants, only 10,000 were added to the tally; 4) although the majority of areas likely to support plants have been searched, some places, especially on private lands remain unsurveyed; 5) plants that are not flowering are difficult to see and their numbers are likely underestimated during field investigations. This conservative estimate of 400,000 plants reflects increased survey work for this species over the years. For instance, in 1978, Holsinger (1978) estimated less than 15,000 individuals rangewide, while ten years later Moseley and Caicco (1989) estimated 260,000 plants for 57 location sites. For the 68 occurrences of *A. aaseae*, 17 (26%) are estimated to contain more than 10,000 individuals, 33 (49%) are estimated between 1000–10,000 plants, 12 (17%) are estimated between 100–1000 plants, and only one (1%) at fewer than 100. Abundance information is unknown in five (8%) instances.

Until the U. S. Fish and Wildlife Service recently revised their candidate system, *Allium aaseae* was a federal category 1 candidate for listing under the Endangered Species Act. Under the revised system, it is no longer a federal candidate species. *A. aaseae* is a BLM Sensitive Species for Idaho. NatureServe (see http://www.natureserve.org/.), the parent organization for Natural Heritage Programs and Conservation Data Centers, ranks *A. aaseae* as G3, a rank that includes taxa that are globally rare or uncommon, but not imperiled. Because *A. aaseae* is endemic to Idaho, the state rank (S3) equals the global rank (G3). The Idaho Native Plant Society includes *A. aaseae* on its list of globally rare plant taxa with a priority of 11, indicating threats are of low magnitude and non-imminent.

Substantial reduction in habitat and populations has occurred due to past land uses, although the exact amount is unknown. The main factors contributing to the serious conservation concern for *A. aaseae* are its limited distribution, its restricted habitat requirements, and its location adjacent to a major population center making it subject to numerous threats (Moseley and Caicco 1989). Across its range, the sandy foothill habitats supporting *A. aaseae* have been subject to four main land uses since European settlement: urban/suburbanization; livestock grazing; sand mining; and recreational uses, such as ORVs (off-road vehicle), equestrians, hikers, and mountain bikers. As a consequence of urban development in the Boise Foothills, portions of at least seven (11%) occurrences (007, 008, 020, 021, 033, 063, 064) have been destroyed by housing

development projects in recent years. Twenty-two (34%) additional occurrences (004, 010, 011, 012, 013, 014, 019, 022, 023, 029, 030, 032, 036, 042, 047, 050, 054, 060, 061, 062, 065, 066) are known to occur at least partly on private land and in locations potentially subject to development, although future plans for these parcels are unknown. Additional private properties may also be subject to various future development. Segments of populations at the Hidden Hollow landfill (026, 027, 056, 057) may be potentially threatened over the long-term due to landfill expansion. Portions of other populations have also been lost over the years to sand mining, landfill activities and other disturbances. This permanent habitat loss and fragmentation resulting from urban developments, especially in the Boise Foothills, has accelerated in recent years, and is expected to continue. It also represents the most serious and probably difficult to resolve threat facing *A. aaseae*.

The effects of livestock grazing on *Allium aaseae* are mainly indirect, principally the ecological decline of foothills habitat. Invasion by weedy annuals is largely the result of past disturbances associated with intensive livestock grazing and increases in fire frequency patterns. Livestock grazing is expected to remain a widespread land use throughout the range of *A. aaseae*. Due to its early phenology, small and low growth habit, and typical occurrence in microsites with sparse associated forage, *A. aaseae* is less prone to direct livestock impacts than many other native plants. Livestock use is not expected to result in the direct loss of onion habitat. However, in response to indirect effects such as fostering the invasion of cheatgrass (*Bromus tectorum*), storksbill (*Erodium cicutarium*), medusahead wildrye (*Taeniatherum caput-medusae*), rush skeleton weed (*Chondrilla juncea*) and other weeds, habitat quality will likely remain in decline for a long time in many places.

Management of the BLM's five ACECs is designed to minimize impacts from livestock in these designated areas. Occurring mainly in the Pearl Mining District near Emmett, sand mining has destroyed or fragmented segments of several populations. Recreational impacts are generally local, although they may be more extensive where more concentrated or destructive. Portions of one occurrence (022) in Hulls Gulch has been destroyed by 4-wheel drive roads and associated destructive land rehabilitation actions. Portions of the large Sand Hollow population (034) are within the Little Gem Motorcycle Club area and have been impacted by off-trail riding disturbances. Four-wheel drive roads and ORV use are known to threaten at least parts of several other populations (such as 003, 014, 021 and 065). There is more uncertainty regarding potential impacts in other places within or near 4-wheel drive road and ORV-use areas. Other recreational users potentially threaten local sections of populations in the Hulls Gulch (011, 014, 022, 060), Military Reserve Park (006, 025, 058, 059), Camelsback Reserve Park (009) and other places as well (021, 065). As the population of the Boise area continues to grow, so will recreational demands and conflicts in the foothills.

Public land managing agencies, notably the BLM, have taken several steps for the conservation of *Allium aaseae*. Portions of five populations are located within BLM ACECs (Cartwright Canyon, Sand-capped Knob, Sand Hollow, Willow Creek, and Woods Gulch), which were designated in 1993, primarily to protect Aase's onion. In addition, a disjunct population of Aase's onion near Weiser is located within the Rebecca Sand Hill RNA. These ACECs support some of the largest and most extensive populations known. Due to the establishment of the ACECs and the protection they afford, the long-term persistence of Aase's onion in the western half of its distribution now appears secure.

The eastern half of its distribution remains vulnerable, however, especially in light of urban development patterns and the preponderance of private lands in the Boise Foothills. The BLM has also sponsored several Challenge cost-share projects to investigate and clarify the taxonomic disposition of *Allium aaseae* (McNeal 1993, Smith 1995), and has completed extensive field surveys to define its range and abundance. Other entities such as the Boise National Forest, Ada County, and Boise City have funded additional survey work in the Boise Foothills area (Moseley and Caicco 1989; Mancuso and Moseley 1991; Moseley et al. 1992).

The majority of *Allium aaseae* populations occur on private land, however, and subject to few conservation options. Conservation agreements involving private entities have not been pursued to any great degree. A proposed Conservation Agreement between the U. S. Fish and Wildlife Service and the City of Boise has been at a standstill for a prolonged period. When and if this Conservation Agreement is completed, and plans implemented, populations within Military Park Reserve (006, 025, 058, 059) and Camelsback Reserve (009) should be better protected than at present. One success involves Unimin Mining Corporation, which has been sponsoring propagation research for several years. Mixed ownership patterns and the preponderance of private lands throughout the range of *Allium aaseae* indicates cooperation, coordination, and innovation will be important for the species long-term viability. A lack of on-the-ground commitment from the private sector would be a serious drawback to the conservation of rare plants in the Boise Foothills. If this proves to be the case, populations on public land will be invaluable for the long-term persistence of Aase's onion and other rare plants found in the Boise Foothills.

Idaho—The Idaho Native Plant Society places *Allium aaseae* in the globally rare category of the state's rare plant list.

Distribution

Global—Aase's onion is endemic to southwestern Idaho, occurring in the foothills around Boise and arcing northwest to near Emmett, an aerial distance of approximately 18 miles. In the Boise Foothills, the easternmost populations are known from the Hulls Gulch and lower Cottonwood Creek areas, while the Freezeout Hill vicinity near Emmett contains the westernmost foothill populations. Disjunct populations have recently been confirmed from near the towns of Payette and Weiser, northwest of the species' main range. Populations previously reported from the Danskin Mountains, east of Boise are really *Allium simillimum*. Populations are located in Ada, Boise, Gem, Payette, and Washington counties.

Idaho—See Global DisHabitat

Elevation (Global)—2700 to 5100 feet

Elevation (Idaho)—2700 to 5100 feet

Global—Aase's onion is restricted to a narrow range of habitat conditions. It occurs on open, relatively barren, xeric, gentle to very steep, sandy slopes, generally with a southerly aspect, but ranging from east to west. It is usually associated with relatively sparsely vegetated bitterbrush (*Purshia tridentata*) or bitterbrush/sagebrush (*Artemisia tridentata*) communities. One or several bunchgrasses such as red threeawn (*Aristida longiseta*), bluebunch wheatgrass (*Agropyron spicatum*), squirreltail (*Sitanion hystrix*), needle-and-thread (*Stipa comata*), Sandberg's bluegrass (*Poa sandbergii*), Indian ricegrass (*Oryzopsis hymenoides*) and sand dropseed (*Sporobolus cryptandrus*) are often closely associated. Aase's onion sites

are often bordered by *Artemisia tridentata* ssp. *wyomingensis* or ssp. *tridentata*/bunchgrass-dominated communities. Commonly associated species include *Eriophyllum lanatum, Balsamorhiza sagittata, Achillea millefolium, Phacelia heterophylla,* and *Eriogonum ovalifolium*. A number of exotic species may be abundant, especially *Bromus tectorum, Erodium cicutarium,* and *Taeniatherum caput-medusae*.

Allium aaseae populations in the Boise Foothills often occur in close proximity to *Astragalus mulfordiae* and/or *Lepidium papilliferum*, two other rare, regional endemic plants. These three rare species largely share the same conservation concerns and problems. On a local scale, *Allium aaseae* can be very common. At some sites it is one of the dominant forbs in early spring. When considering its sagebrush-bitterbrush/steppe and foothill grassland habitats rangewide, however, it is a minor constituent.

Most populations are restricted to the alluvial soils of the Glenns Ferry Formation. This sandy substrate is of granitic origin and typically coarse textured, well-drained and relatively deep (Packard 1979, Prentice 1988). In the Boise Foothills, all populations occur on one of three sand-dominated geologic units: Pierce Gulch Formation Sand, Terteling Springs Formation Sand and Sandstone, and Terteling Springs Formation Sandy Sediments (Beck 1988). A large majority of Boise Foothill populations occur on three soil mapping units of Beck (1988): Quincy-Lankbush complex, Payette-Quincy complex, and Haw-Lankbush complex. Rarely, populations or portions of populations occur on other soil types, namely, Lankbush-Brent sand loam, Ada gravelly sand, and Searless-Rock outcrop complex. All known populations except for the two in Cartwright Canyon occur between 2700–4300 feet elevation, with the great majority below 3700 feet. Cartwright Canyon populations occur at 4950 and 5100 feet, and possibly indicate that soil characteristics such as texture are more important than elevation in determining the distribution of *Allium aaseae* (McNeal 1993).

Idaho—See Global Habitat comments.

Ecology

Global—There is little quantitative data regarding the effects of herbivores, disease, competition, hybridization or allelopathy on population viability. No native plant species appear to substantially compete with *Allium aaseae* for moisture, and only red three-awn seems to compete for space (Prentice 1988). Two exotic winter annuals, cheatgrass and storksbill, apparently are important interspecific competitors. Vigor of *Allium aaseae* populations can be reduced where these weeds are prolific (Prentice 1988). Livestock grazing on *Allium aaseae* is minimal, although indirect effects, such as habitat degradation and trampling are more serious. Deer have been observed feeding on *Allium aaseae* in early spring and chukars are known to eat bulbs later in the spring. The most serious insect pest seems to be an unknown seed predator that bores into and devours inner portions of the seed (Prentice 1988). A rust is common on populations in the Woods Gulch area, and maybe other places as well. The deep-seated bulb of *Allium aaseae* would survive wildfires. Hybridization and introgression are likely occurring between *Allium aaseae* and the more widespread *A. simillimum* (Smith 1995).

Idaho—See Global Ecology comments.

Reproduction

Global—*Allium aaseae* reproduces from both seed and bulb division. Seed viability from different sites is variable, as is often the case in wild pant populations. The mean viability

from four sites studied by Prentice (1988) was 55%. The number of seeds per pound is estimated to be 622,000 (Prentice 1988). Seed production is also variable from year-to-year (Prentice 1989). The pollination biology of *Allium aaseae* is unknown, although it has been reported to have no specific pollinators, and flowers visited by many types of insects (Bolin and Rosentreter 1986). This species flowers early in the season and likely makes use of any insect taxa active at this time of year. Seed dispersal mechanisms are unknown, but probably at least partly relies on the dried, detached umbel being blown around (Packard 1979).

Idaho—See Global Reproduction comments.

Phenology (Idaho)—Seed germination typically begins in late winter when snow melts, soil moisture increases and temperatures are cool. In late February, seedling roots emerge and the cotyledon, with the seed coat at the end of the single leaf, pushes up through the soil. The bulb begins to develop when the leaf is 1–2 cm long. It starts as a tiny bump on the root about 1.5 cm below the surface. The plant continues to grow until the leaf withers due to increasing moisture and temperature stresses. First- and second-year plants produce only one leaf, the bulb does not divide, nor produce flowers. Presence of a second leaf indicates an older individual, and appearance of a third and eventually a fourth leaf indicates the bulb is dividing (Prentice 1988, 1989).

Established plants (from bulbs) begin root growth and emerge in late winter (generally late February–early March, but in some years as early as late January). In mature bulbs, flower buds develop at ground level between the two leaves soon after emergence, and *Allium aaseae* is one of the first native plants to flower in the Boise Foothills (Prentice 1989). Anthesis varies from plant to plant, but seems to peak in early spring in most years. Higher-elevation populations flower later than lower sites. In dry years, flowers are quite ephemeral, and may scarcely last a week, while during wet springs flowering plants can be found into May. Seeds can usually be found by late March (Packard 1979). Plants are dormant much of the year, generally from about May until February.

Management

Global—Populations occur on private, City of Boise, Ada County, State Department of Lands, and BLM lands, often in mixed ownership. For the 68 known *Allium aaseae* occurrences, 31 (46%) occur solely on private land, while five (7%) are restricted to City of Boise land, two (3%) to Ada County land, four (6%) to State land, and two (3%) to BLM land. Where land ownership is mixed, 14 occurrences (20%) are on private and BLM land, one (2%) is on BLM and State land, one (2%) is on BLM and Ada County land, and 8 (12%) are on private and some other entity or mix of entities (Ada County, State, BLM). Lands under private ownership dominate for *Allium aaseae*. Fifty-two (76%) of the known occurrences are at least partly on private land. The other principal landowner is the BLM, with 18 (26%) occurrences at least partially on land they administer.

In 1993, an amendment to the BLM's Cascade Resource Management Plan designated six Areas of Critical Environmental Concern (ACECs) to specifically protect populations of *Allium aaseae*. The six ACECs are Cartwright Canyon (037), Sand-capped Knob (049), Sand Hollow (034), Willow Creek (039), Woods Gulch (053) and Hulls Gulch. Recent taxonomic analysis has revealed the Hulls Gulch population to be the closely related taxon *Allium simillimum*, or a more likely, a hybrid. One disjunct population (018) of *Allium aaseae* near Weiser is located within the BLM's Rebecca Sand Hills Research

Natural Area (RNA), and is therefore protected. For the five BLM ACECs containing *Allium aaseae*, a monitoring plan has been prepared in consultation with the USFWS. Monitoring plots have been established and baseline trend and habitat data was collected in 1991, 1992, 1994 (Bureau of Land Management 1992).

Populations on City of Boise, and BLM land occur within areas already, or scheduled to be at least partly dedicated to the conservation of *Allium aaseae*. A Conservation Agreement for the conservation of *Allium aaseae* on Boise City lands is pending between the U. S. Fish and Wildlife Service and Boise City Park Department. This Agreement will potentially affect populations in Military Reserve Park (006, 025, 058, 059), Camelsback Reserve (009) and lower Hulls Gulch (011).

A Cooperative Agreement between the BLM and Unimin Corporation regarding the propagation of *Allium aaseae* was signed in 1987. Portions of the Unimin Corporation sand mining operations near Emmett support an extensive population of *Allium aaseae* (015). Propagation and related research is ongoing, even though Unimin now owns the land (it was patented in 1993).

In 1992, the Idaho Conservation Data Center completed a contract with Boise City Planning and Zoning to conduct rare plant inventories in the Boise Foothills. This study provided rare plant population and habitat information, one of several information gaps hindering formulation of a comprehensive foothill planning document. Presently, the Boise Foothills Plan is under review by the Planning and Zoning Commissions of both Boise City and Ada County. The adoption of a final Foothills Plan has been delayed several times and continues to be controversial. It is unclear when this Plan will be finalized. At this stage, it is also unclear how strong the Plan will be regarding rare plant conservation, but early indications are not encouraging in this regard (a policy statement supporting the protection of rare plant populations is expected, but there may be little concerning techniques/options of how to do so). During the several years interim between completion of the inventory and expected Plan adoption, there apparently has been no consistent policy for the protection of rare plants such as *Allium aaseae* in foothill areas scheduled for development.

There is also a MOU currently being drafted addressing the implementation of consistent and uniform regulations and management for the foothills area. This MOU will likely include City of Boise, Ada County, Idaho Department of Lands, State Department of Agriculture, Agricultural Research Service, U.S. Forest Service, BLM, Idaho Department of Fish and Game and other entities. What emphasis or role this will have concerning rare plant conservation is unknown. Due to the nature of the 1872 General Mining Law, management options and regulations are limited regarding sites on public land supporting mining claims. The commercial quality of Glenns Ferry Formation sand deposits, especially around Emmett, will likely ensure sand mining will continue within the range of *Allium aaseae*. A draft Habitat Conservation Assessment (Mancuso 1995) and Conservation Strategy (Mancuso 1995) have been prepared for *Allium aaseae* as part of the Idaho Conservation Effort.

Idaho–See Global Management comments.

Inventory

General Comments (Idaho)—

1986 to Present: The BLM and Unimin Mining Corporation have conducted field surveys associated with ongoing propagation and life history studies in the Emmett area (Prentice 1988, 1989).

1986 to Present: The BLM has conducted intensive surveys for *Allium aaseae* throughout its range, predominantly on BLM land. The most thorough surveys took place in 1987 and 1988. Periodic, less intensive field surveys continue, often as part of project clearances and related work.

1987: The Conservation Data Center, under contract from Ada County Solid Waste Management, determined the status and distribution of *Allium aaseae* on county land in Seaman Gulch, an area used as a county landfill (Moseley and Caicco 1989).

1991: The Conservation Data Center, Idaho Native Plant Society, and Friends of Military Reserve mapped the distribution and abundance of *Allium aaseae* in Military Reserve Park, Boise.

1991: The Idaho Native Plant Society, Wetlands Coalition, and Golden Eagle Audubon mapped the distribution and abundance of *Allium aaseae* in lower Hulls Gulch, Boise.

1991: The Idaho Native Plant Society and Conservation Data Center mapped the distribution and abundance of *Allium aaseae* in Camelsback Reserve Park, Boise.

1991: The Conservation Data Center, as a cooperative Challenge cost-share project with the Boise National Forest, conducted a status survey for *Allium aaseae* on the Boise National Forest (Mancuso and Moseley 1991).

1992: The Conservation Data Center, under contract from Boise City Planning and Zoning Department, conducted field surveys for *Allium aaseae* throughout much of the Boise Foothills as one part of a rare plant and riparian inventory for the area (Moseley et al. 1992).

1993: Dr. Dale McNeal (University of the Pacific), in a cooperative Challenge cost-share project between the Conservation Data Center and BLM (and involving U. S. Fish and Wildlife Section 6 funding), conducted field work in association with his taxonomic investigation of *Allium aaseae* (McNeal 1993).

1994: Dr. Jim Smith (Boise State University) revisited a number of sites to support his genetic study of the *Allium aaseae*. This was another cooperative Challenge cost-share project with the BLM (Smith 1995).

1995: The Conservation Data Center conducted field investigations in the disjunct, Weiser and Payette portions of the species range. This was also part of a cooperative Challenge cost-share project with the BLM.

Inventory Needs (Idaho)—There have been many field surveys for *Allium aaseae* over the years, and its limited distribution is well documented. Portions of the Boise foothills have never been thoroughly searched due to the large amount of private land in some areas. There is also additional unsurveyed habitat in the Weiser/Payette area, especially across the Snake River in Oregon.

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Author: M. Mancuso
Updated: 1996-04-29
Produced by The Nature Conservancy, the Natural Heritage Network, and the Idaho Conservation Data Center. tribution comments.

Allium aaseae
Aase's onion

Aster junciformis Rydb. Bull.—rush aster

Asteraceae (Aster family)

Synonyms—*Aster borealis* (Torr. & Gray) Prov.; *Symphyotrichum boreale* (Torr. & Gray) A. & D. Love

General Description—Slender, erect perennial 30–80 cm tall from creeping rhizomes seldom over 2 mm thick. The stems are mostly glabrous except for lines of appressed pubescence decurrent from the leaf bases. The linear-shaped leaves are 4–11 cm long by 2–6 (rarely to 9) mm wide, entire or subentire, scabrous on the margins, sessile, and often slightly clasping at the base. The lowermost leaves are sometimes reduced and sub-petiolate, but then soon deciduous. Each plant has a few uncrowded, to occasionally many, flower heads (or solitary in reduced plants). Rays commonly 20–50, white to pale blue or lavender, and 7–15 mm long. The mostly acute, glabrous, imbricate involucre bracts are 5–7 mm high and often have purplish tips and margins.

Illustration—(See http://fishandgame.idaho.gov/tech/CDC/spp_accounts_plants/astjun_illus.cfm.)

Field Identification Tips—The very slender habit combined with its more or less linear leaves, generally few, uncrowded flower heads, and saturated wetland habitat, helps distinguish it from most other aster-like plants.

Phenology—Flowers late July to September.

Similar Species—There are several other wetland habitat composite species that may look superficially similar, especially in *Aster* and *Erigeron*.

Habitat—Fens, bogs, springs, and wet meadows; typically where the substrate remains saturated year-round.

Global Distribution—Alaska, eastward to Quebec, and southward to Idaho, Colorado, Wyoming, Nebraska, South Dakota, Minnesota, and New Jersey.

Idaho Distribution—Known from four widely separated areas in the state: the Henrys Lake and Driggs areas in eastern Idaho, near Thousands Springs in east-central Idaho, the McCall area in west-central Idaho, and the Panhandle region. (See also: http://fishandgame.idaho.gov/tech/CDC/spp_accounts_plants/astjun_dis.cfm.)

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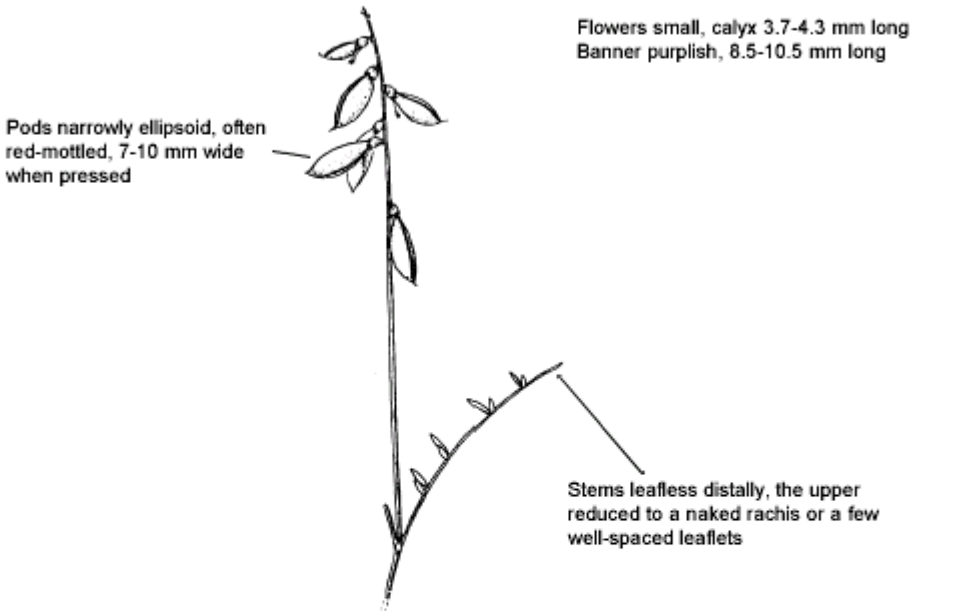
Photo © Peter Lesica
Aster junciformis
rush aster

Photo © Robert Bursik
Aster junciformis
rush aster

Astragalus cusickii var. packardiae—Packard's milkvetch

Packard's milkvetch ***Astragalus cusickii var. packardiae***



Scientific Name: *Astragalus cusickii* A. Gray var. *packardiae* Barneby
Bibliographic Reference: Barneby, 1989. Interm. Fl. 3b:78-80.
Common Name: Packard's milkvetch
Family (Common Name): Fabaceae or Leguminosae (Pea Family)
Synonyms: None
Idaho Native Plant Society Category: Global Priority 1
Natural Heritage Progam Rank: S1
Distribution: Endemic to the tributaries of Big and Little Willow Creek, Payette County, Idaho.
Habitat: Sparsely vegetated light colored soils. Usually associated with Wyoming sagebrush, at ca 850 m elevation.
Phenology: May through July.
Look-alikes: Most closely related to var. *cusickii* but with smaller purplish flowers, the calyx 3.7- 4.3 mm long, the purplish banner 8.5-10.5 mm long, narrowly ellipsoid, often red-mottled pods 7-10 mm wide when pressed, the stems leafless distally with the upper leaves reduced to a naked rachis or a few well-spaced leaflets.

Closeup of *Astragalus cusickii var. packardiae* Ann Debolt

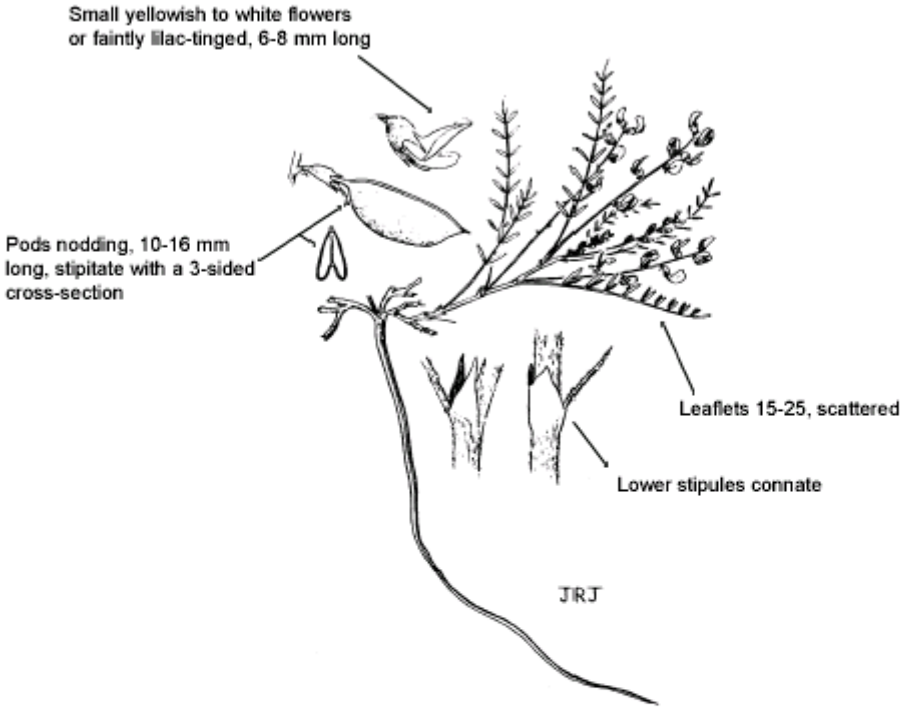
Habitat of *Astragalus cusickii var. packardiae*

Ann Debolt

Species Distribution

Astragalus mulfordiae—Mulford's milkvetch

Mulford's milkvetch ***Astragalus mulfordiae***



Scientific Name: *Astragalus mulfordiae* M.E. Jones

Bibliographic Reference: Jones, 1898. Contr. W. Bot. 8: 18.

Common Name: Mulford's milkvetch

Family (Common Name): Fabaceae or Leguminosae (Pea Family)

Idaho Native Plant Society Category: Global Priority 2

Natural Heritage Progam Rank: S2

Synonyms: *Onix mulfordae* Rydb.

Distribution: Western part of the Snake River Plain in Ada, Owyhee, Payette and Washington counties, Idaho; Malheur County, Oregon.

Habitat: Sandy slopes and ridges with needle-and-thread grass, Indian ricegrass and bitterbrush mostly on south facing exposures, from 650-850 m elevation.

Phenology: May and June.

Look-alikes: Allied to *A. yoder-williamsii* and *A. oniciformis* but easily recognized from these by the small yellowish to whitish or faintly lilac-tinged flowers, nodding stipitate trigonous and bilocular pods and lower connate stipules.

Closeup of *Astragalus mulfordiae* Ann Debolt

Habitat of *Astragalus mulfordiae* Ann Debolt

Species Distribution

Carex livida (Wahlenb.) Willd.—pale sedge

Cyperaceae (Sedge family)

General Description—Grass-like perennial growing in small clumps with flowering stems up to 20 cm tall arising from long-slender rhizomes. Leaves are deeply channeled, 1–4 mm wide, clustered on the lower third of the stem, and have a glaucous blue-green color. The inflorescence consists of 2–3, or sometimes 4, loosely clustered spikes. The narrow terminal spike is usually wholly staminate. The lateral spikes are pistillate and nearly sessile. Flowers have 3 stigmas, and the oval-shaped scales subtending the perigynia have a green midvein stripe, brown marginal stripes, and membranous edges. The perigynia are 2–4 mm long, pale green, elliptic or ovate in outline, and have a minutely bumpy surface.

Field Identification Tips—The pale blue-green, stiff, channeled, more or less falcate-shape leaves are quite distinctive in the field.

Phenology—Fruit matures in late June–August.

Similar Species—*Carex aquatilis* has long-stalked lateral spikes and flowers with two stigmas. *Carex limosa* is rhizomatous and has three stigmas, but has drooping lateral spikes on slender stalks. *Carex buxbaumii* has 3 stigmas and bluish-green foliage, but differs in having pistillate flowers at the tip of the upper spike and long-awned scales.

Habitat—Bogs and fens, swampy woods, or sometimes on mineral substrates adjacent to slow moving streams; from low to moderately high elevations.

Global Distribution—Circumboreal; in the western part of North America it reaches from southern Alaska south to northwestern California, Oregon, Washington, Idaho, Montana, Wyoming, Colorado, and Utah.

Idaho Distribution—Known from four widely separated areas in Idaho. It occurs in the Panhandle region; the Sawtooth Valley in the central mountains; the upper Lemhi River in east-central Idaho; and the Greater Yellowstone region near the state's eastern border. (See also: http://fishandgame.idaho.gov/tech/CDC/spp_accounts_plants/carliv_dis.cfm.)

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Photo © Robert Moseley
Carex livida
pale sedge

Carex livida
pale sedge

Hitchcock, C. L., A. Cronquist, and M. Ownbey. 1969. Vascular plants of the Pacific Northwest. Part 1. University of Washington Press, Seattle. 914 pp. Illustration by Jeanne Janish. Reprinted by permission of the University of Washington Press.

Ceanothus prostratus—mahala-mat ceanothus

Prostrate ceanothus ***Ceanothus prostratus***

Plants prostrate

Leaves opposite, thick, 3 to 7-toothed above the middle

Branches neither spinose nor rigid

Scientific Name: *Ceanothus prostratus* Benth.
Bibliographic Reference: Bentham, 1848. Pl. Hartw.302.
Common Name: Prostrate ceanothus
Family (Common Name): Rhamnaceae (Buckthorn Family)
Synonyms: None
Idaho Native Plant Society Category: State Priority 1
Natural Heritage Progam Rank: S1
Distribution: Eastern slope of the Cascades from Washington through Oregon to the Sierra Nevada, and w Nevada; disjunct in Adams Co., Idaho.
Phenology: May through July.
Habitat: Ponderosa pine/shrub community in course granitic soils.
Look-alikes: Can be confused with *C. macrantha*, which has larger heads, few pappus scales, and pinnatifid leaves.

Closeup of *Ceanothus prostratus* Roger Rosentreter

Species Distribution

Douglasia idahoensis—Idaho douglasia

Primulaceae (Primrose family)

General Description—*Douglasia idahoensis* forms a low, spreading cushion or mat on the soil surface. The leaves are small, green and succulent, forming a terminal rosette on the short stems. Stems are terminated by a cluster of 3 to 5, relatively large, pink to magenta flowers.

Technical Description—Perennial herbs, cushion- to more often mat-forming, loosely caespitose from a slender tap root; stems prostrate to ascending, minutely pubescent, terminating in rosettes of entire leaves; leaves succulent, oblong to oblanceolate, obtuse to acute, 7–11 mm long, 1–1.7 mm wide, puberulent, becoming glabrous and strongly reflexed in age; inflorescence umbellate, (2)3–5(7)-flowered, involucrate; bracts 5–9, lanceolate to lance-ovate, acute to acuminate, 2.5–3.7(5) mm long, 0.7–1.5 mm wide, with scattered simple white hairs, the margins ciliate; peduncles 1–6 mm long with simple to forked hairs throughout; pedicels 3–7(10) mm long at anthesis, the length variable within the inflorescence, densely covered with simple to branched white hairs; calyx 4–7 mm long, the lobes 1–2 mm wide, the margins ciliate, the apices acute, the tube 2.4–3 mm with short, simple white hairs at least proximally; corolla salverform, (5)6–10(11) long, glabrous, the lobes broadly flared, 5–6 mm long, 3–4 mm wide in fresh specimens, 3 mm long, 1.8–3 mm wide in pressed ones, the apex emarginate to retuse (entire), the limb pink to magenta, the throat yellow with 5 fornices, the tube 3.5–6 mm long, exceeding the calyx, lighter in hue than the limbs; stamens 5, included; anthers oblong, 0.8–1.1 mm long, yellow; style 1–1.8 mm long, the stigma small, capitate; capsules ovate, 5-valved, 1.4–2.6 mm long; seeds 1–several per capsule, dark reddish-brown to nearly black, minutely pitted, 0.9–2.5 mm long; n=18 (Henderson 1981).

Diagnostic Characteristics—*Douglasia idahoensis* is a distinctive member of the high elevation flora of central Idaho. It is easily recognized in flower by its profuse display of bright pink to magenta flowers, occurring as a mat on the ground. It is also distinctive when only vegetative material is available, as the leaves become suffused with anthocyanin (turning red) soon after flowering. This turns the mat a distinctive dark red-green. This feature is useful well into September.

Infraspecific Taxa—There are no infraspecific taxa for *Douglasia idahoensis*.

Similar-appearing Taxa—*Arenaria aculeata* is a common cushion plant of the central Idaho mountains and occurs with *Douglasia idahoensis* at most sites, which it superficially resembles when there are no flowers. *Arenaria aculeata* is easily distinguished by its narrow, sharply pointed, non-succulent leaves.

No congeners are known to occur within the range of *D. idahoensis*. *Douglasia montana* is found in the Bitterroot Mountains, approximately 40 miles east, across the Selway River valley from the Elk Mountain-Wylies Peak populations (Moseley 1990). *Douglasia montana* has fewer involucral bracts (1–3 versus 5–7) and fewer flowers per inflorescence (1–2 versus 3–5) than *D. idahoensis*. In addition, the pedicels of *D. idahoensis* are well-developed, whereas in *D. montana*, one of the pedicels is often sessile.

Identification of This Taxon in Idaho—*Douglasia idahoensis* is a distinctive member of central Idaho's high elevation flora. It is readily recognized when flowering by its profuse display of bright pink flowers. It is

also distinctive later in the season. The leaves become suffused with anthocyanin (turning red) soon after flowering, turning the mat/cushion a distinctive dark red-green. This feature can be used to identify *D. idahoensis* well into September (Moseley 1990).

Global Comments—

Idaho Comments—

Status

Global—*Douglasia idahoensis* is endemic to the mountains of central Idaho. Throughout its range, populations are small in extent and isolated, occurring in widely separated areas. Despite this narrow distribution, no imminently serious threats are foreseen, although many populations have incurred some level of anthropogenic disturbance in the past. *Douglasia idahoensis* is known from 30 scattered occurrences on open, subalpine ridges, summits, and upper slopes. Occurrences range in size from less than one acre, to over 100 acres. Most occurrences are small and support fewer than 2000 individuals, ranging from approximately 100 to over 10,000. These occur as widely spaced or clumps of individuals. Populations have low fecundity (Sondenna and Henderson 1995), but long-term trend information is lacking for this species. All known populations occur on National Forest lands, either the Boise or the Nez Perce national forests. A few populations are located within designated Wilderness Areas, and portions of another occur within the proposed Square Mountain Research Natural Area.

Douglasia idahoensis faces several threats, with habitat destruction the most serious, especially at small populations. Populations are most commonly threatened by their proximity to established roads and trails, where induced slope instability, maintenance activities, and increased human access and possible trampling and collecting are potential problems. Livestock grazing has historically occurred in *D. idahoensis* habitat, but present impacts appear limited to a few sites. Many occurrences are located in allotments that are no longer active (Owen 1993). Identified potential threats include helicopter landing sites within the open ridge habitat of *D. idahoensis*, increased mechanized and non-mechanized recreational activity, and the resumption of livestock grazing on currently inactive allotments which could lead to increased disturbance problems. Mining is an another potential threat to some populations. There has been molybdenum explorations around the Scott Mountain population in the past. Forest management practices of the past have emphasized fire suppression in the habitat types occupied by *D. idahoensis* populations. This has increased the potential for catastrophic fires that would likely be very damaging to some populations. Although *D. idahoensis* has potential to be a valuable horticultural species, collecting is presently not a problem. No disease or predation problems are known at this time.

Atwood and Charlesworth (1987) compiled a rudimentary status report for *D. idahoensis* in 1987. A comprehensive status survey report was compiled in 1990 (Moseley 1990). Field investigations have been conducted for portions of the Boise, Payette, and Nez Perce forests (Moseley 1988, Moseley 1989). National Forest botanists, especially on the Boise National Forest, have also conducted field surveys. Additional potential habitat remains to be searched in several areas. The Boise National Forest and U. S. Fish and Wildlife Service signed a Conservation Agreement for *D. idahoensis* in 1993. A study of the reproductive biology of *D. idahoensis* is currently underway (Sondenna and Henderson 1995).

Douglasia idahoensis is a Forest Service Regions 1 and 4 Sensitive Species. Until the

U.S. Fish and Wildlife Service revised their candidate system in 1996, *D. idahoensis* was a category 2 (C2) candidate for listing under the Endangered Species Act. Under the revised system, it is no longer a candidate species. The Idaho Conservation Data Center ranks *D. idahoensis* G3/S3. Both globally and for Idaho, this indicates the species is rare or uncommon, but not imperiled. The Idaho Native Plant Society includes *D. idahoensis* on their list of globally rare taxa.

Idaho—*Douglasia idahoensis* is on the Idaho Native Plant Society's list of globally rare taxa. It has a priority of 11, indicating threats are non-imminent and of low magnitude.

Distribution

Global—*Douglasia idahoensis* is a regional endemic of central Idaho that occurs in small, scattered populations. These are clustered in five main areas: the Middle Fork and North Fork Boise river drainages in eastern Boise and adjacent northern Elmore counties; the South Fork Salmon River/South Fork Payette River drainages of northern Boise and adjacent southern Valley counties; the North Fork Payette and Middle Fork Payette river drainages in central to northern Valley County; the Gospel Peak area of central Idaho County; and the upper Selway River drainage of eastern Idaho County.

Idaho—See Global Distribution comments. (See also: http://fishandgame.idaho.gov/tech/CDC/spp_accounts_plants/douida_dis.cfm.)

Habitat

Elevation (Global—200 to 8900 feet

Elevation (Idaho)—7200 to 8900 feet

Global—*Douglasia idahoensis* occurs on subalpine ridges, summits, and adjacent upper slopes. Populations typically occur on well-drained, shallow, decomposed granitic soils derived from the Idaho batholith. Most populations occur on northerly-facing slopes, rarely on southerly exposures. Elevations range from approximately 7,200–8,900 feet. It occurs in subalpine vegetation characterized by open, forb-dominated communities, and woodlands dominated by *Pinus albicaulis* and *Abies lasiocarpa*. Bare ground coverage is usually high. Several populations appear restricted to the lee sides of ridges, where wind-deposited snow accumulates and last later into the summer than adjacent areas. Beside rocks derived from the Idaho batholith, at least portions of one population (Square Mountain) also occurs on quartzite substrate.

Habitat types include *Abies lasiocarpa*/*Xerophyllum tenax-Vaccinium scoparium*, *A. lasiocarpa*/*Carex geyeri-C. geyeri*, *A. lasiocarpa*/*V.scoparium-Pinus albicaulis*, the *P. albicaulis-A. lasiocarpa* complex of habitat types, and possibly *A. lasiocarpa*/*Luzula hitchcockii-V. scoparium.*

Frequently associated species include *Pinus albicaulis*, *Vaccinium scoparium*, *Xerophyllum tenax*, *Luzula hitchcockii*, *Juncus drummondii*, *Antennaria lanata*, *Arenaria aculeata*, *Eriogonum pyrolifolium*, *Polygonum phytolaccifolium*. *Ivesia tweedyi*, a rare plant in Idaho, occurs with *D. idahoensis* at Elk Mountain.

Idaho—See Global Habitat comments.

Ecology

Global—*Douglasia idahoensis* responds favorably to moderate levels of disturbance, including both natural processes such as sheet and gully erosion, and man-caused events such as road and trail construction, where it establishes on cut banks and fill slopes. It does not appear to re-establish in areas where

historical habitat has been completely destroyed, such as by road, trail, and lookout construction (Moseley 1990).

Most populations are part of communities maintained in an early successional state due to chronic physical instability of the site. It appears that the largest populations occur within unforested, relatively unstable sites, while the smallest populations are found in mature *Pinus albicaulis* woodlands. Plants are not found beneath full canopy conditions.

Plants are restricted to well-drained sites in open subalpine communities, where little inter- and intraspecific competition is evident. Several types of disturbances keep these communities open. Highest population densities are found in areas of moderate instability, such as erosion channels created by snow runoff, wind blowouts on ridgelines, and trail cuts. Portions of populations in chutes and channels on steep slopes are less dense. Populations generally occur on northerly-facing slopes, indicating *D. idahoensis* requires moist, cool conditions. Prior to fire suppression efforts within the range of *D. idahoensis,* fire intensity, frequency, and related factors, must have been compatible with the survival of *D. idahoensis* in most cases. The effects of a catastrophic fire regime due to years of fire suppression are unknown.

Idaho—See Global Ecology comments.

Reproduction

Global—Breeding system experiments at the Square Mountain population (Sondenna and Henderson 1995) indicate that *Douglasia idahoensis* is a facultative outcrosser (primarily xenogamous, but partially self-compatible). Brood size averages 1.60 ± 0.64 seeds per flower, with a seed/ovule ratio of 28.92% ± 11.79%. Visual inspection has shown that many ovules that are fertilized and initiate development, are subsequently aborted. This suggests that limited resources or genetic factors may be contributing to low fecundity within the species. The presence of a red stigmatic ring prior to dehiscence and continuing through pollen dispersal indicates that *D. idahoensis* is protogynous. Hover flies (Syrphidae), halictid bees (Halictidae), brush-footed butterflies (Nymphalidae), and bumblebees (Apidae) are the most common community pollinators, and all except the bumblebees frequently visit *D. idahoensis* flowers. Dance flies (Empididae) and small ants (Formicidae) are also attracted to *D. idahoensis* flowers and may facilitate pollination on a limited scale. Plants excluded from insect visitors failed to set seed, indicating insects are required for successful reproduction. Pollinator rewards include products from glandular-trichomes near the corolla throat, pollen, and minute quantities of nectar from ovarian nectaries. Nectar sugar content has been tentatively estimated at 30–45%. This corresponds well with other small bee- or butterfly-pollinated species. It is possible that the ovarian nectaries discovered in *D. idahoensis* are unique within the Primulaceae (Sondenna and Henderson 1995).

Idaho—See Global Reproductive comments.

Phenology (Idaho)—*Douglasia idahoensis* has been observed to break bud within four days of emergence from snow cover (Sondenna and Henderson 1995). It is therefore, one of the earliest species to commence flowering in the subalpine communities where it occurs. This usually takes place in late June or early July, but can be as early as late May depending on snow accumulation and melt patterns. Flowering may last until late July in some places. Fruit maturation takes place in July and August and seeds are dispersed by early September.

Management

Global—All known *Douglasia idahoensis* populations are located on National Forest lands. Populations located north of the main Salmon River occur on the Nez Perce National Forest, in Region 1. Those located south of the Salmon River occur on the Boise National Forest, in Region 4. *Douglasia idahoensis* is listed on the Sensitive Species lists of both Regions. It has also been recommended that this species be added to the Sensitive Species list for the Bitterroot National Forest because potential habitat exists in the upper Selway River drainage (Moseley 1990). The Forest Service is directed to develop and implement management practices to insure sensitive species do not become threatened or endangered. Habitat destruction represents the greatest threat to *D. idahoensis*, especially at small population. It is very important land managers are aware of *D. idahoensis* and avoid these areas in planning future habitat-altering projects (Moseley 1990).

In 1993, the U. S. Fish and Wildlife Service and the Boise National Forest signed a Conservation Agreement for *D. idahoensis*. This Agreement identifies *D. idahoensis* populations critical to the viability of the species in the southern part of its range. The Boise National Forest has established a monitoring program to identify site-specific threats and assess the demographic viability of each population (USDA Boise National Forest 1993). It has been recommended that the Nez Perce National Forest also develop a Conservation Agreement for *D. idahoensis* (Moseley 1990). The Nez Perce National Forest is providing partial funding for research studying the reproductive biology of *D. idahoensis* (Sondenna and Henderson 1995). This research is being conducted by a graduate student from the University of Idaho.

Several populations occur entirely or partly in areas with special management designations that have landscape conservation as primary goals. These include populations within the Selway–Bitterroot Wilderness Areas, the Gospel–Hump Wilderness Area, and the proposed Square Mountain Creek Research Natural Area.

Idaho—See Global Management comments.

Inventory

General Comments (Idaho)—

Inventory Needs (Idaho)—Moseley (1990) recommended the Vermillion Peak-Indian Peak-Grave Meadow Peak area, west of Elk and Bilk mountains on the Nez Perce National Forest be searched. On the Boise National Forest, Lind (1993) has identified several areas for further survey, including the ridge complexes that leads north from Tyee Mountain, the Shepard Peak ridges, and ridges in the Trinity Mountains. These latter ridges support the southernmost potential habitat on the Forest. Surveys around the ridges of Swanholm Peak, and the Goat Mountain and Wolf Mountain ridge complexes would better delineate populations already known from these areas. The Payette Crest on the Payette National Forest has also been recommended for investigation.

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Author: M. Mancuso
Updated: 96-04-29
Produced by The Nature Conservancy, the Natural Heritage Network, and the Idaho Conservation Data Center.

Douglasia idahoensis
Idaho douglasia

Epipactis gigantea Douglas ex Hook.—giant helleborine

Orchidaceae (Orchid family)

General Description—A leafy, glabrous, perennial herb up to 1.5 m tall, with 1 to several stems from a creeping rhizome. Leaves are numerous, alternate, sessile, and 5–20 cm long. The lower are oval, but the leaves become more lance-shaped further up the stem. Flowers are rather showy and borne singly in a long, narrow, open, mostly one-sided, leafy-bracted inflorescence at the top of the stem. Sepals and upper petals are 1.3–1.7 cm long, greenish-yellow or brownish in color with purple veins. The lip petal is 1.5–2 cm long, greenish with purple veins, and divided into 3 unequal segments. The fruit is an elliptic, drooping cap.

Field Identification Tips—A relatively large stature, numerous long clasping leaves, large brownish flowers, and drooping fruits combine to make giant helleborine a distinctive species.

Phenology—Flowers June to August.

Similar Species—Vegetative plants may be confused with some members of the orchid genus *Platanthera*, or more likely with *Maianthemum stellatum*, in the lily family, species that can co-occur with giant helleborine. The prominently clasping leaf bases and taller habit of giant helleborine distinguishes it from *Maianthemum*, and its generally more numerous and larger leaves and taller habit from *Platanthera*.

Habitat—In general, giant helleborine occurs in moist areas along streambanks, lake margins, seeps and springs. In Idaho it is associated with thermal waters at higher elevations, or cold springs at lower elevations such as along the Snake River.

Global Distribution—From central Mexico northward to Texas and throughout the western United States to southern British Columbia.

Idaho Distribution—Widespread in Idaho: Bonner, Boundary, and Nez Perce counties in northern Idaho; Idaho, Adams, Valley, Boise, Custer, and Lemhi counties in central Idaho; Elmore, Camas, Gooding, Jerome, Twin Falls, and Owyhee counties in southern Idaho; and Clark and Madison counties in the eastern part of the state. (See also: http://fishandgame.idaho.gov/tech/CDC/spp_accounts_plants/epigig_dis.cfm.)

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Epipactis gigantea
giant helleborine

Hitchcock, C. L., A. Cronquist, M. Ownbey, and J. W. Thompson. 1969. Vascular plants of the Pacific Northwest. Part 1. University of Washington Press, Seattle. 914 pp. Illustration by Jeanne Janish. Reprinted with permission of the University of Washington Press.

Photo © Robert K. Moseley
Epipactis gigantea
giant helleborine

Eriophorum viridicarinatum (Engelm.) Fern.—green keeled cotton-grass

Cyperaceae (Sedge family)

General Description—Stems widely spaced from an extensive creeping rhizome, from 20 to 60(90) cm tall. The long, largely flat, sheathing basal and stem leaf blades are 2–6 mm wide. The stem is terminated by 2–8, somewhat nodding spikelets borne in an umbel-like inflorescence. Scales are blackish-green with a prominent pale midrib that reaches the tip of the scale. Numerous prominent, white perianth bristles greatly exceed the scales and achenes and give the appearance of a cotton ball attached to the top of the plant.

Field Identification Tips—The cotton-grasses are characterized by the long, whitish, cottony perianth bristles that completely obscure the flower scales, bracts, and fruits. *Eriophorum viridicarinatum* often forms large colonies from creeping rhizomes.

Phenology—Flowers June through July.

Similar Species—*Eriophorum viridicarinatum* closely resembles *E. polystachion*, but has scales that are consistently blackish-green with a well-developed, notably paler midrib that tends to be expanded distally and reaches to the tip of the scale. *Eriophorum polystachion* has tawny to brownish or blackish-green scales with a slender midrib that is attenuated and does not reach the tip of the scale.

Habitat—Bogs, peatlands, and wet meadows.

Global Distribution—From Newfoundland to Alaska, south to New York, Michigan, Colorado, Wyoming, Washington, Idaho, and Montana.

Idaho Distribution—Boundary and Bonner counties in the Panhandle region, and Valley, Fremont, and Teton counties to the south and east. (See also: http://fishandgame.idaho.gov/tech/CDC/spp_accounts_plants/erivir_dis.cfm.)

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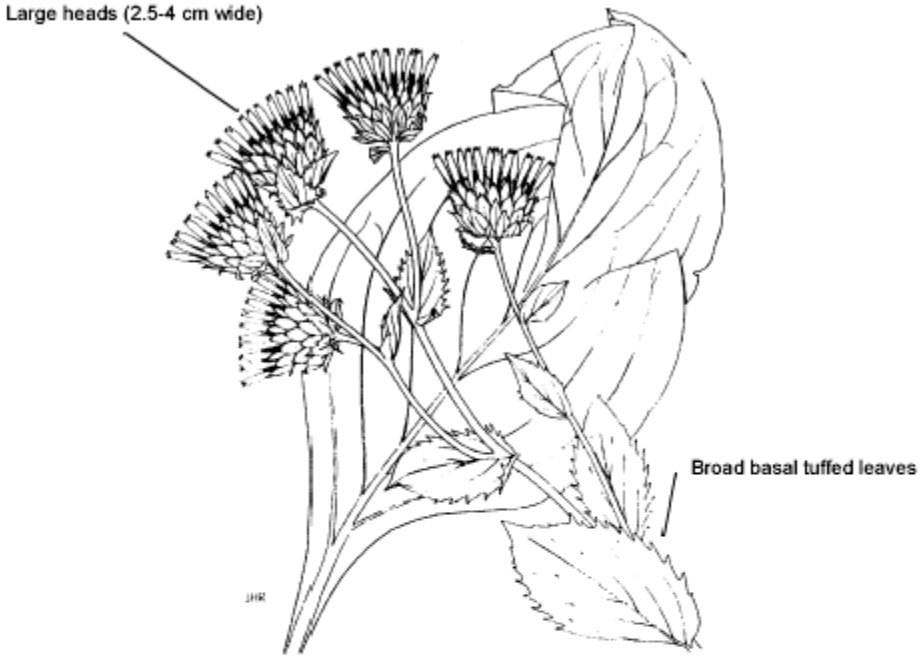
Eriophorum viridicarinatum
green keeled cotton-grass

Hitchcock, C. L., A. Cronquist, and M. Ownbey. 1969. Vascular plants of the Pacific Northwest. Part 1. University of Washington Press, Seattle. 914 pp. Reprinted by permission of the University of Washington Press.

Photo © Robert Bursik
Eriophorum viridicarinatum
green keeled cotton-grass

Haplopappus radiatus—Snake River goldenweed

Snake River goldenweed ***Haplopappus radiatus***



Plants large (4-9 dm tall)

Scientific Name: *Haplopappus radiatus* (Nutt.) Cronq.

Bibliographic Reference: Cronquist, 1955. Univ. Wash. Publ. Biol. 17(5): 223.

Common Name: Snake River goldenweed

Family (Common Name): Asteraceae or Compositae (Sunflower Family)

Synonyms: *Pyrrocoma radiata* Nutt.; *Aplopappus carthamoides* var. *maximus* A. Gray; *Haplopappus carthamoides* ssp. *maximus* H.M. Hall.

Idaho Native Plant Society Category: Global Priority 3

Natural Heritage Program Rank: S3

Distribution: Washington County, Idaho; Baker and Malheur counties, Oregon.

Habitat: Loam soils on steep rocky hillsides in big sagebrush, bluebunch wheatgrass, arrowleaf balsamroot and Idaho fescue communities, 650-1500 m elevation.

Phenology: June through August.

Look-alikes: Similar to *H. carthamoides* but differing from this species in the larger size (4-9 dm tall), broader basal tufted leaves and larger heads (2.5-4 cm wide).

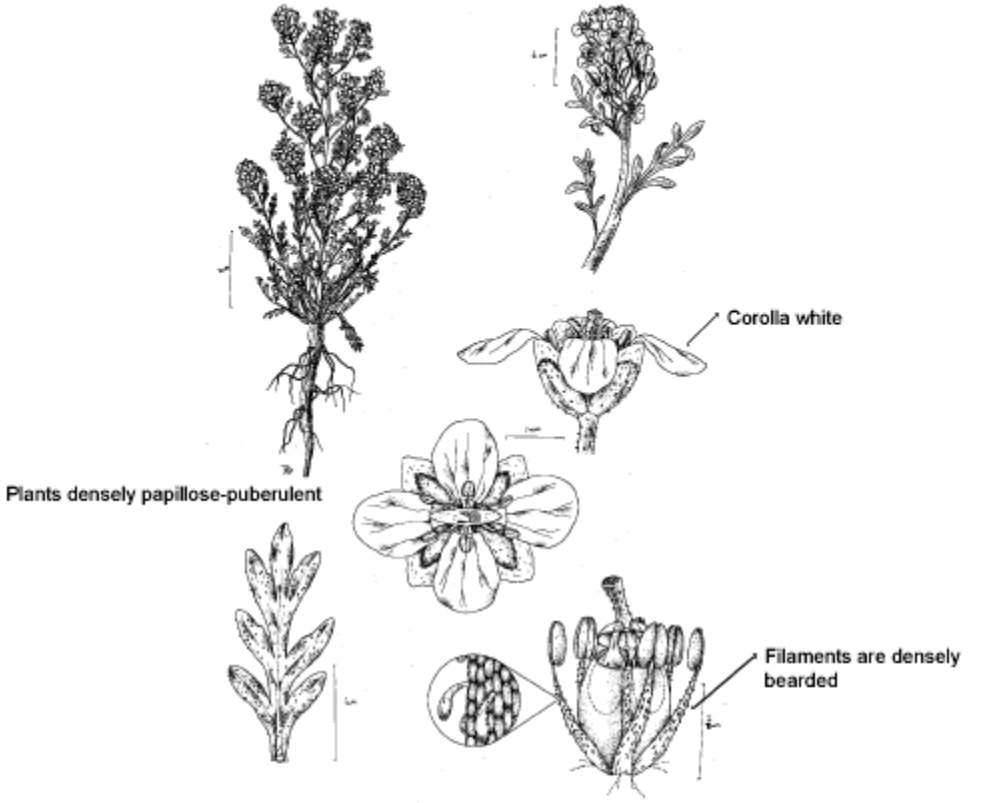
Closeup of *Haplopappus radiatus* Ann Debolt

Habitat of *Haplopappus radiatus* Roger Rosentreter

Species Distribution

Lepidium papilliferum—slick spot peppergrass

Slickspot peppergrass ***Lepidium papilliferum***



Scientific Name: *Lepidium papilliferum* (Hends.) A. Nels. & Macbr.
Bibliographic Reference: Nelson & Macbride, 1913. Bot. Gaz. 56: 474.
Common Name: Slickspot peppergrass
Family (Common Name): Brassicaceae or Cruciferae (Mustard Family)
Synonyms: *Lepidium montanum* Nutt. ex T. & G. var. *papilliferum* Hends.; *L. montanum* ssp. *papilliferum* (Hend.) C.L. Hitchc., Madroño 10: 158. 1950.
Idaho Native Plant Society Category: Global Priority 2
Natural Heritage Program Rank: S2
U.S. Fish & Wildlife Service Status: Candidate Species
Distribution: Ada, Canyon, Elmore, Gem, Owyhee, and Payette counties, Idaho.
Habitat: Bare slickspot soils within Wyoming sagbrush habitat.
Phenology: May through June.
Look-alikes: Similar to *L. montanum*, but slickspot peppergrass is densely papillose-puberulent, the hairs appearing somewhat flattened and the filaments are densely bearded with papillose-puberulent hairs. This annual, and occasional biennial species usually forms rounded clumps to 4 dm and the ovate to ovate-elliptic 2.5-3 mm long glabrous silicles have a very narrowly winged upturned margin.

Closeup of *Lepidium papilliferum* Ann Debolt

Habitat of *Lepidium papilliferum* Ann Debolt

Species Distribution

Peraphyllum ramosissimum—squaw apple

Squaw apple ***Peraphyllum ramosissimum***

Scientific Name: *Peraphyllum ramosissimum* Nutt. in Torr. & Gray
Bibliographic Reference: Nuttall in Torrey & Gray, 1840. Fl. N. Amer. 1: 474.
Common Name: Squaw apple
Family (Common Name): Rosaceae (Rose Family)
Synonyms: None
Idaho Native Plant Society Category: State Priority 2
Natural Heritage Program Rank: S2
Distribution: Washington County, Idaho; e and ne California, e Oregon, wc and s Nevada, s and c Utah to w Colorado, nw New Mexico.
Habitat: On heavy clay soils, often as small inclusions in sagebrush-bunchgrass or mountain shrub communities, 1000-1500 m elevation.
Phenology: May through June (July).
Look-alikes: A distinct intricately and rigidly branched shrub with narrowly, and abruptly acute oblanceolate leaves fascicled at the tips of short spurs. Calyx lobes triangular-acuminate; fruit an acrid yellowish to reddish apple-like pome.

Closeup of *Peraphyllum ramosissimum* Joe Duft

Habitat of *Peraphyllum ramosissimum* Roger Rosenreter

Species Distribution

Saxifraga bryophora var. *tobiasiae*—Tobias' saxifrage

Saxifragaceae (Saxifrage family)

General Description—*Saxifraga bryophora* var. *tobiasiae* (Tobias' saxifrage) is a diminutive annual with one main stem (rarely 2–3) that has several lateral branches. The main stem is terminated by a prominent white flower, as is an occasional lateral branch. The remaining flowers are replaced with numerous bulbils. The herbage is covered with glandular hairs. Although Grimes and Packard (1981) noted the branches are never terminated by a flower, further field investigations have found that one to several of the branches can bear terminal flowers (Moseley 1989).

Technical Description—Glandular-pubescent annual, 4–20 cm tall; stems usually one, rarely more, much branched, terminated by a single flower, other flowers replaced by bulbils; leaves to 15 mm long, ciliate with multicellular hairs; petals 4 in number, 4–6 x 2 mm, with sagittate bases up to 0.25 mm long (modified from Grimes and Packard 1981).

Diagnostic Characteristics—Diagnostic characters for Tobias' saxifrage include its annual habit, the main stem being terminated by a single flower, and most other flowers replaced by bulbils.

Infraspecific Taxa—*Saxifraga bryophora* var. *tobiasiae* is the only infraspecific taxa of *S. bryophora* occurring in Idaho.

Similar-Appearing Taxa—Five other species of *Saxifraga* have been observed in the vicinity of Tobias' saxifrage populations on the Payette National Forest. All five are perennial species. In addition, they occur in different habitats.

S. arguta occurs along perennial streams and rivulets.

S. debile is restricted to steep, north-facing outcrops that rarely receive direct sunlight.

S. ferruginea generally is found on north-facing rock outcrops or moist slopes with thin soil over bedrock.

S. tolmiei var. *ledifolia* is restricted to the immediate vicinity of late-lying snowbanks on north-facing slopes.

S. rhomboidea usually occurs on moist, north-facing slopes with more organic material at the surface. *Saxifraga rhomboidea* has been observed sympatric with Tobias' saxifrage in one place (Moseley 1989).

Identification of This Taxon in Idaho—The combination of its annual habit, and the main stem being terminated by a single flower with most other flowers being replaced by bulbils, distinguishes Tobias' saxifrage.

Global Comments—

Idaho Comments—When originally discovered at Fisher Creek Saddle in 1978, specimens were identified as *Saxifraga foliolosa* var. *foliolosa*, a taxon whose distribution is mainly arctic. The taxonomic disposition of this population was later reevaluated and found to be an undescribed variety of *S. bryophora*, a species previously thought to be endemic to California (Grimes and Packard 1981).

Status

Global—Tobias' saxifrage is endemic to the western Salmon River Mountains north of McCall, Idaho, where it is known from five

populations, all on the Payette National Forest. It was originally discovered by Nelle Tobias in 1978, and is one of the rarest taxa in the state. One population is large, containing more than 10,000 plants over approximately 200 acres. Another population covers approximately 10 acres and supports an estimated 1500 plants. Three small populations contain an estimated 200–250 widely scattered plants each. One of these small populations may have been recently extirpated. In 1989, it was estimated to be one acre in size and contain 200 plants.

Four populations of Tobias' saxifrage are located within the perimeters of the large Corral and Blackwell fires, which burned during August through October 1994. Surveys by Moseley in 1995, found that habitat containing three populations actually burned, and one was in an unburned portion of the Blackwell Fire (Moseley 1996). His preliminary assessments indicate that two of the burned populations were not greatly affected because of the low intensity or spotty burn pattern of the fires. One population (North Fork Pearl Creek, 002) was not found, and may be extirpated. A combination of the plant's life history characteristics and the severe intensity of the burn and subsequent erosion may have contributed to its disappearance from the site. This site will have to be revisited to verify whether the population is extirpated, or if more than one year of post-fire recovery of the habitat is needed.

Aside from erosion and other deleterious effects to the species' habitat due to high-magnitude disturbances such as severe wildfires, no factors have been identified which threaten Tobias' saxifrage. Populations occur on high-elevation ridges in areas of low productivity and high amounts of exposed bedrock that are generally unsuitable for timber harvest. Past, and possibly ongoing sheep grazing takes place in some populations, but does not appear to negatively affect Tobias' saxifrage (Moseley 1989).

Until the U. S. Fish and Wildlife Service revised their candidate system in early 1996, Tobias' saxifrage was a Category 2 (C2) candidate for listing under the Endangered Species Act. Under the revised system it is no longer considered a candidate species. Tobias' saxifrage is a U. S. Forest Service Region 4 Sensitive Species for the Payette National Forest. The Idaho Conservation Data Center ranks Tobias' saxifrage as G5T1 S1 [G5 = *Saxifraga bryophora* is demonstrably secure; T1 = var. *tobiasiae* is critically imperiled globally because of rarity or because of some factor of its biology making it especially vulnerable to extinction; because it is endemic to Idaho, the state (S) rank is the same as the taxon's global (T) rank]. Tobias' saxifrage is on the globally rare plant list maintained by the Idaho Native Plant Society, and was recommended for federal candidate status at the 1996 Idaho Rare Plant Conference.

Idaho—Tobias' saxifrage is on the globally rare plant list maintained by the Idaho Native Plant Society. At the 1996 Idaho Rare Plant Conference, it was recommended for reinstatement as a federal candidate species.

Distribution

Global—Tobias' saxifrage is endemic to the western Salmon River Mountains, north of McCall, Idaho.

Idaho—See Global Distribution comments. (See also: http://fishandgame.idaho.gov/tech/CDC/spp_accounts_plants/saxbry_dis.cfm.)

Habitat

Elevation (Global)—7400 to 8400 feet

Elevation (Idaho)—7400 to 8400 feet

Global—Tobias' saxifrage occurs in openings in subalpine forest communities, classified as the *Vaccinium globulare* phase of the *Abies lasiocarpa*/*Xerophyllum tenax* habitat type. Within this community it occurs in microhabitats characterized by considerable amounts of bare soil and substrate instability. The cause of the instability has two sources: earth cores created by pocket gopher activity and meltwater channels between bedrock or areas stabilized by perennial vegetation. Plants are found on the flat to gently sloping portions of the meltwater channels. It does not occur in the steeper channel sections, where the substrate is continually subject to downslope movement, nor in gravelly depressions where ephemeral ponding takes place.

Although saturated early in the growing season, soils at all sites are dry by about mid-July. Populations occur mostly on aspects other than north. Elevations of known populations range from 7,400–8,400 feet. The underlying geology is uniformly intrusive, although several rock-types are present, including quartz monzonite, granodiorite, and quartz diorite.

Associated species include *Lewisia triphylla, Hypericum formosum, Polygonum phytolaccifolium, Polygonum austiniae, Castilleja miniata, Antennaria lanata, Erythronium grandiflorum, Arenaria capillaris, Trisetum spicatum, Poa gracillima, Vaccinium scoparium, Mimulus breweri, Phlox diffusa, Cymopterus glaucus, Suksdorfia ranunculifolia,* and *Pinus albicaulis* (Moseley 1989).

Idaho—See Global Habitat comments.

Ecology

Global—Tobias' saxifrage is rarely found beneath the forest canopy, suggesting a relatively high light requirement. Tobias' saxifrage occurs in sites characterized by considerable amounts of exposed bare soil and substrate instability (Moseley 1996). Competition for space and resources appears to limit plants to these open soil areas (Moseley 1989). Like many annuals, these observations indicate Tobias' saxifrage is adapted to and probably requires periodic disturbance to maintain open habitats. However, high-magnitude disturbance events may be detrimental, at least on a local scale. Evidence for this comes from a recent resurvey of populations located in areas where large wildfires occurred in 1994. Preliminary indications are that one population may have been extirpated, perhaps due to a combination of the species' life history characteristics and the severe intensity of the burn and subsequent erosion. Tobias' saxifrage puts most of its reproductive energy into producing bulbils as a means of propagation. These bulbils may not be able to withstand burial by high levels of sediment such as after a severe fire, or other major disturbance event.

Idaho—See Global Ecology comments.

Reproduction

Global—Most flowers in the inflorescence are modified into bulbils, and it appears that Tobias' saxifrage places most of its reproductive energy into asexual propagation rather than sexual reproduction by seeds. Nothing is known about seed longevity, seed banking, or other aspects of the species' reproductive biology.

Idaho—See Global Reproductive comments.

Phenology (Idaho)—Seeds probably germinate in early summer. Plants flower later in the summer, usually beginning around mid-July, and continuing well into August at some sites. The species reproduces largely via vegetative propagules (bulbils). These drop

off the parent plant, overwinter, then resume growth early the next summer.

Management

Global—All known populations are located on the Payette National Forest. A small portion of the Fisher Creek Saddle population occurs within the Bruin Mountain Research Natural Area. Moseley (1996) has recommended the North Fork Pearl Creek population (002) be resurveyed (in 1996) to determine if it is extirpated, or if more than one year of post-fire recovery is needed for plants to become apparent above-ground. A graduate student is researching aspects of the population biology and reproductive ecology of Tobias' saxifrage. This research has important implications regarding conservation management and planning for the species, and should continue to receive adequate funding. Research plots should be made permanent for long-term post-fire population and habitat monitoring. There are considerable amounts of potentially suitable habitat remaining to be surveyed on the Payette National Forest. Sensitive plant clearances should be conducted for all projects that occur in areas of suitable habitat on the Forest.

Idaho—See Global Management comments.

Inventory

General Comments (Idaho)—Prior to 1989, two populations had been discovered opportunistically. The type locality at Fisher Creek Saddle was discovered in 1978, and another in the North Fork Pearl Creek in 1988. Moseley (1989) conducted a systematic inventory of potential habitat in the Payette River drainage in 1989, and discovered three additional populations. One of these was later found to be connected by intermediate subpopulations to the type locality and now considered one large population. One new population was discovered during a revisit to the Payette National Forest in 1995 to assess the effects of recent wildfires on previously known sites (Moseley 1996).

Inventory Needs (Idaho)—A considerable amount of suitable-appearing habitat remains to be surveyed on the Payette National Forest. Further searches should include the Granite Mountain-Hard Butte-Patrick Butte divide, Squaw Point-Bear Pete Mountain divide, and the Payette Crest east of McCall.

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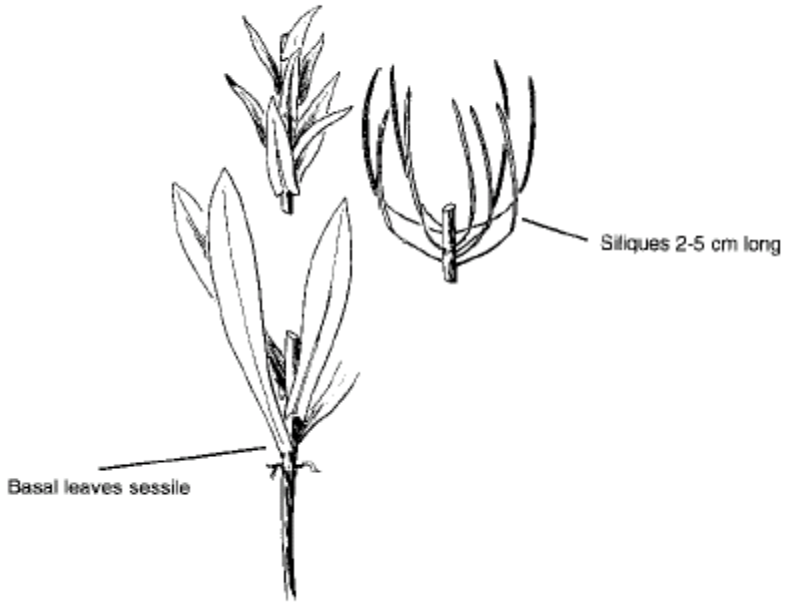
Moseley, R. K. 1996. Effects of the 1994 Blackwell and Corral fires on populations of the rare endemic, *Saxifraga bryophora* var. *tobiasiae*, Payette National Forest. Report prepared for the Payette National Forest. Conservation Data Center, Idaho Department of Fish and Game. 7 pp.

Author: M. Mancuso
Updated: 96-04-29
Produced by The Nature Conservancy, the Natural Heritage Network, and the Idaho Conservation Data Center.

Saxifraga bryophora var. *tobiasiae*
Tobias' saxifrage

Stanleya confertiflora—biennial princesplume

Malheur princesplume or Biennial princesplume ***Stanleya confertiflora***



Plants with a single stem and dense raceme of creamy yellow flowers

Scientific Name: *Stanleya confertiflora* (Robins.) Howell
Bibliographic Reference: Howell, 1897. Flora. of Northwest America 59.
Common Name: Malheur princesplume, biennial princesplume
Family (Common Name): Brassicaceae or Cruciferae (Mustard Family)
Synonyms: *S. viridiflora* Nutt. var. *confertiflora* Robins.; *S. rara* A. Nels.; *S. annua* M. E. Jones
Idaho Native Plant Society Category: Global Priority 1
Natural Heritage Program Rank: S1
Distribution: Gooding, Owyhee, and Washington counties, Idaho; Harney and Malheur counties, Oregon.
Habitat: Dry plains on somewhat sparsely vegetated clay soils, 732-1525 m elevation.
Phenology: April through June.
Look-alikes: *S. viridiflora* and *S. pinnata*, but Malheur princesplume has a single stem with dense racemes, larger, flowers, the slender petals to 2.5 cm long, siliques 2-5 cm long, the stipe to 2 cm long, and sessile basal leaves. It is an annual or biennial species versus perennial in the previous species.

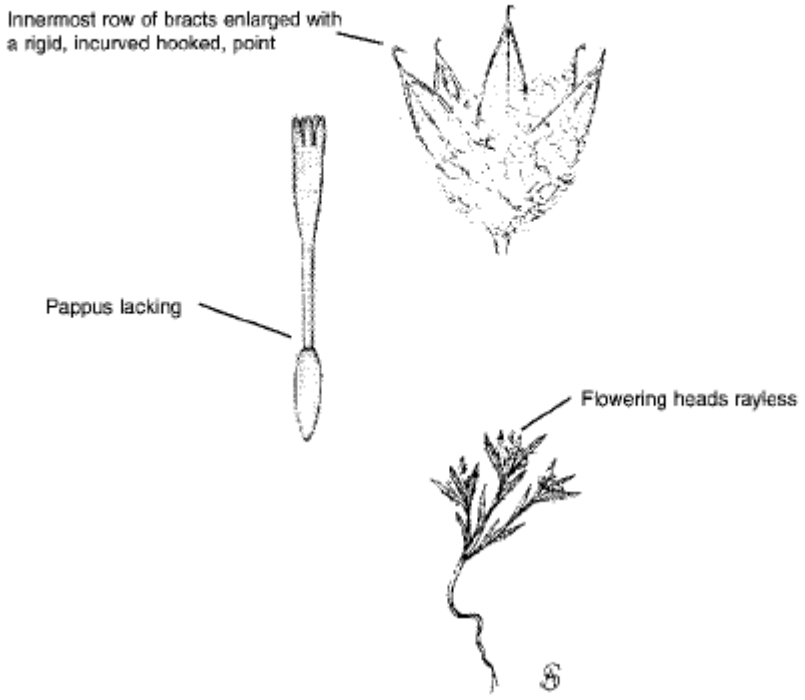
Closeup of *Stanleya confertiflora* Bob Moseley

Habitat of *Stanleya confertiflora* Bob Moseley

Species Distribution

Stylocline filaginea—stylocline

Stylocline ***Stylocline filaginea***



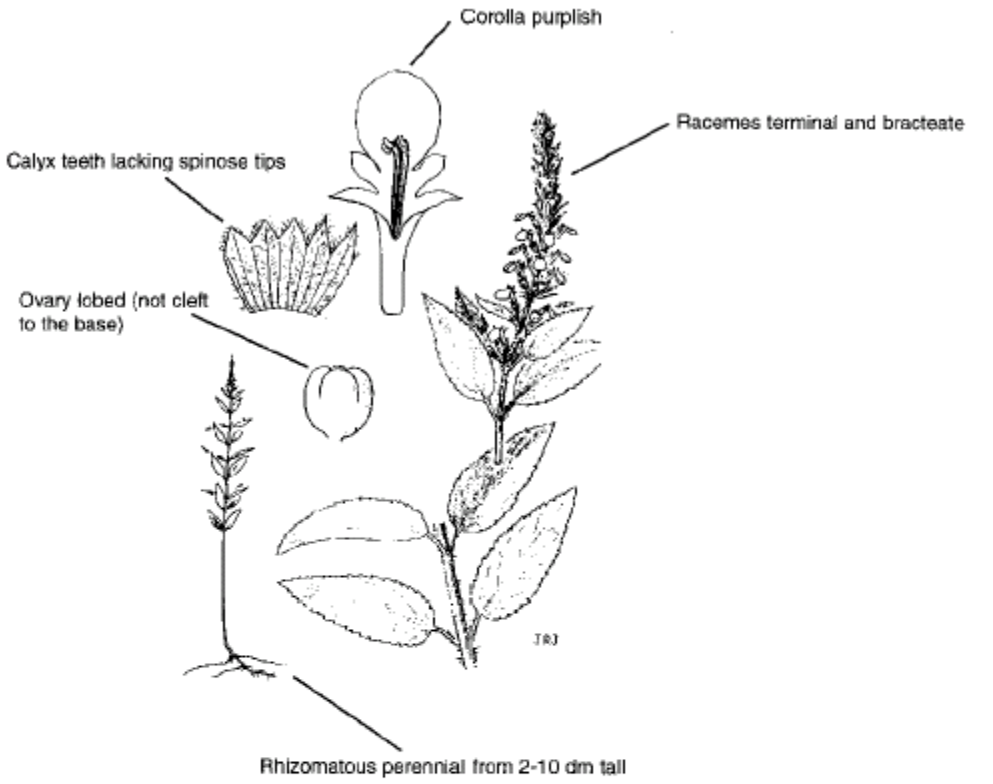
Scientific Name: *Stylocline filaginea* A. Gray
Bibliographic Reference: Gray, 1873. Proc. Amer. Acad. Arts 8: 652.
Common Name: Stylocline
Family (Common Name): Asteraceae or Compositae (Sunflower Family)
Synonyms: *Ancistrocarphus filagineus* A. Gray
Idaho Native Plant Society Category: State Monitor
Natural Heritage Program Rank: S2
Distribution: Blaine, Camas, Elmore, Gooding, Owyhee, and Washington counties, Idaho; Baja California; Jefferson and Baker counties, Oregon; Lander and w Elko counties, Nevada.
Habitat: Open, dry or vernally moist habitats in the valleys and foothills on shallow stony basalt with cindery graveled surface. Commonly associated with alkali sage, Owyhee sage or stiff sage, from 600-1900 m elevation.
Phenology: (April) May through June.
Look-alikes: Possibly confused with other species of the genus *Stylocline* but distinguished from them by the enlarged and conspicuous innermost row of receptacular bracts, each with a rigid, incurved hooked point.

Closeup of *Stylocline filaginea* Ann Debolt

Species Distribution

Teucrium canadense var. occidentale—American wood sage

American wood sage ***Teucrium canadense var. occidentale***



Scientific Name: *Teucrium canadense* L. var. *occidentale* (A. Gray) McClintock & Epling

Bibliographic Reference: McClintock & Epling, 1946. Britt. 5: 499.

Common Name: American wood sage

Family (Common Name): Lamiaceae or Labiatae (Mint Family)

Synonyms: *T. occidentale* A. Gray; *T. canadense* ssp. *occidentale* W.A. Weber

Idaho Native Plant Society Category: State Priority 1

Natural Heritage Program Rank: S2

Distribution: Ada, Canyon, Idaho, Owyhee and Washington counties, Idaho; widespread in the U.S. and adj. Canada; less common in the w states, in Utah (Cache and Utah counties); Mexico.

Habitat: Streambanks and moist bottom-lands, 800-1200 m elevation.

Phenology: June through August.

Look-alikes: Some may confuse American wood sage with members of the genus *Stachys*, but it is easily distinguished from it by the terminal bracteate spikes or racemes (sometimes flowers are solitary in the axils of the upper leaves), calyx teeth lacking spinulose tips, exserted stamens, ovary merely lobed (not cleft to the base), and the laterally attached nutlets.

Habitat of *Teucrium canadense var. occidentale*

Species Distribution

APPENDIX 1-4—DAMS IN THE BOISE, PAYETTE, AND WEISER SUBBASINS

Dam Name	Owner/ Manager	Size	Year	Purpose Code	Purpose	Barrier	Stream	Reservoir Area (Acres)	Storage (acre-feet)
Boise–Mores Creek									
Lucky Peak	Fed-ACE	1	1954	IFP	Irrigation	Anadramous	Boise River	2,820	307,000
Arrowrock	Fed-BOR	1	1915	LFR	Domestic & irrigation	Anadramous	Boise River	3,100	286,600
LBO									
Deer Flat Lower	Fed-BOR	1	1907	I	Irrigation	Anadramous	Boise River (Os)	9,800	190,000
Deer Flat Upper	Fed-BOR	1	1908	AUXDAM				9,800	0
Hubbard	Fed-BOR	1	1902	I	Irrigation	Anadramous	Boise River (Os)	450	4,060
Blacks Creek	Irrig Co	1	1915	L	Domestic & irrigation		Blacks Creek (Tenmile Ck)	220	3,640
Crane Creek East Fork	Muni	1	PROP	0	#N/A		Tr-Crane Creek	2	24
Boise Diversion	Fed-BOR	2	1908	IP	Irrigation	Anadramous	Boise River	80	600
Barber	M-County	2	1906	PGO	Power	Anadramous	Boise River	60	180
Micron Technology	Pr Corp	2	1984	NO	Industrial		Tr-Five Mile Creek	30	155
Orchard (Indian Creek)	St	2	1892	GHR	Wildlife propagation		Indian Creek	195	2,035
Deer Flat Middle	Fed-BOR	3	1911	AUXDAM				9,800	0
Hidden Hollow Detention	M-County	3	PROP	O	Other		Tr-Boise River	1	9
Cottonwood Creek Lower	Muni	3	1961	F	Flood control		Cottonwood Creek	9	83
Cottonwood Creek Middle	Muni	3	1961	F	Flood control		Cottonwood Creek	4	39
Cottonwood Creek Upper	Muni	3	1961	F	Flood control		Cottonwood Creek	2	21
Micron Technology No 2	Pr Corp	3	1991	O	Other		Tr-Five Mile Creek (Os)	4	30
Nicholson	Priv	3	1970	I	Irrigation		Tr-Sand Creek	33	95

Dam Name	Owner/ Manager	Size	Year	Purpose Code	Purpose	Barrier	Stream	Reservoir Area (Acres)	Storage (acre-feet)
Crane Creek	Priv	3	1995	I	Irrigation		Tr-Crane Creek	1	1
Terteling	Priv	3	1973	K	Domestic & stock & irrigation		Stewart Creek	5	20
Tiegs	Priv	3	1936	I	Irrigation		Boise River (Os)	3	15
Thompson	Priv	3	1974	L	Domestic & irrigation		Boise River (Os)	1	1
Middle Fork Payette									
Terrace Lakes	Priv	3	1967	K	Domestic & stock & irrigation		Easley Creek	1	4
North Fork Payette									
Molony Dam		0			#N/A			0	0
Skein Lake Dam		0			#N/A			0	0
Cascade	Fed-BOR	1	1948	IFP	Irrigation	Anadramous	N Fk Payette River	28,300	703,200
Little Payette Lake	Irrig Co	1	1926	I	Irrigation		Lake Fork Creek	1,450	10,300
Payette Lake	Irrig Co	1	1943	IR	Irrigation		N Fk Payette River	5,337	41,000
Jemima K	Priv	1	1974	I	Irrigation		West Fork Beaver Creek	115	3,000
Tom J	Priv	1	1995	I	Irrigation		Beaver Creek	133	2,950
Horsethief	St	1	1967	RHG	Recreation		Horsethief Creek	185	4,900
Louie Lake	Irrig Co	2	1928	I	Irrigation		Louie Creek	35	361
Jug Creek	Irrig Co	2	1946	I	Irrigation		Jug Creek	85	1,132
Jughandle Estates	Irrig Co	2	1974	RD	Recreation		Tr-Boulder Creek	3	27
Box Lake	Irrig Co	2	1935	I	Irrigation		Box Creek	145	1,295
Granite Lake	Irrig Co	2	1932	I	Irrigation		Lake Creek	195	2,900
Payette Lake Upper	Irrig Co	2	1953	I	Irrigation		N Fk Payette River	315	3,000
Boulder Lake	Irrig Co	2	1902	I	Irrigation		Boulder Creek	114	1,310
Warren Diversion	Irrig Co	2	1924	I	Irrigation		Big Creek	25	100
Koskella	Priv	2	1947	I	Irrigation		Tr-Gold Fork River	12	74
Browns Pond-Cruzen	Priv	2	1962	I	Irrigation		Lake Fork Creek	92	1,043
Eld	Priv	2	1976	I	Irrigation		Laffinwell Creek	18	130

Dam Name	Owner/ Manager	Size	Year	Purpose Code	Purpose	Barrier	Stream	Reservoir Area (Acres)	Storage (acre-feet)
Blackwell (Fall Creek)	Priv	2	1925	L	Domestic & irrigation		Fall Creek	37	178
Knox Meadow	Priv	2	1941	I	Irrigation		Lake Fork Creek (Os)	156	1,073
Corral Creek	Priv	2	1952	I	Irrigation		Corral Creek	33	560
Hollenbeak	Priv	2	1972	IH	Irrigation		Cold Creek	16	159
Jussila Bow	Priv	2	1949	I	Irrigation		Wilhelm Creek	25	200
Boulder Meadow	Priv	2	1968	I	Irrigation		Boulder Creek	39	550
Hughes (Melton)	Priv	2	1957	I	Irrigation		Stover Creek	11	141
Shaw Twins Upper	Priv	2	1930	J	Stock water & irrigation		Tr-Lake Fork Creek	20	188
Blackhawk Lake	Priv	2	1968	I	Irrigation		Duffner Creek	95	1,630
Davis (Boyd Smith)	Priv	2	1942	I	Irrigation		Mud Ck, Pearsol Ck (Os)	95	1,200
Smalley	Priv	2	1952	I	Irrigation		Glen Cove Creek	13	113
Yanke	Priv	2	1988	H	Fish propagation		Tr-Cascade Reservoir	5	65
Herrick	Priv	2	1953	L	Domestic & irrigation		Skunk Creek	42	562
Pitkin	Irrig Co	3	1974	R	Recreation		Skunk Creek	18	83
Little Payette Lk Dike	Irrig Co	3		AUXDAM				1,450	0
Pine Lake	Irrig Co	3	1974	RH	Recreation		Tr-Cascade Res & Irr Waste	11	65
Rio Vista	Irrig Co	3	1971	R	Recreation		N Fk Payette River (Os)	11	41
Poro	Priv	3	1947	I	Irrigation		Jug Creek	9	59
Knox Meadow Dike	Priv	3		AUXDAM				156	0
Hait Lower	Priv	3	1973	I	Irrigation		Duffner Creek	4	20
Roberts	Priv	3	1977	IR	Irrigation		Roberts Ck (Contrl Inflow)	2	8
Callender	Priv	3	1946	AUXDAM				50	0
Davis Dike	Priv	3		AUXDAM				95	0
Brown	Priv	3	1979	I	Irrigation		Laffinwell Creek	12	99
Tripod	St	3	1940	IR	Irrigation		Tripod Creek	6	40
North Fork/Middle Fork Boise									
Greene Tree Dam		0			#N/A			0	0

Dam Name	Owner/ Manager	Size	Year	Purpose Code	Purpose	Barrier	Stream	Reservoir Area (Acres)	Storage (acre-feet)
Kirby Dam	PrCo	1			#N/A	Passage		0	0
Mainstem Payette									
Black Canyon	Fed-BOR	1	1924	IPR	Irrigation	Anadramous	Payette River	1,100	29,822
Paddock Valley	Irrig Co	1	1949	I	Irrigation		Little Willow Creek	1,340	36,400
Sage Hen	Irrig Co	1	1938	L	Domestic & irrigation		Sage Hen Creek	238	5,210
Bettis	Priv	1	1976	I	Irrigation		Dry Creek (Os)	58	1,060
Bissell Creek	Priv	2	1975	EI	Erosion control		Bissell Creek	3	20
Little (Van Duesan)	Priv	2	1963	J	Stock water & irrigation		Bissell Creek (Os)	92	1,228
Hidden Lake	Priv	2	1970	RH	Recreation		Padget Creek	28	375
Woodall	Priv	2	1973	JR	Stock water & irrigation		Tr-Little Squaw Creek	3	24
Beal No 3	Priv	2	1974	I	Irrigation		Abeny Creek	14	149
Haw Creek	Priv	2	1970	J	Stock water & irrigation		Haw Creek	10	100
Hunter	Fed-BLM	3	1990	SG	Stock water		Tr-Big Willow Creek	3	27
Jakes Creek (Pitt)	Fed-BLM	3	1964	SG	Stock water		Jakes Creek	3	9
Monument	Fed-BLM	3	1994	SG	Stock water		Dry Creek	1	8
Skow	Fed-BLM	3	1987	SG	Stock water		Holland Gulch	2	10
Mooers	Priv	3	PROP	IG	Irrigation		Tr-Squaw Creek	3	50
Gatfield No 1	Priv	3	1938	J	Stock water & irrigation		Rock Creek (Os)	4	18
Gatfield No 2	Priv	3	1951	L	Domestic & irrigation		Rock Creek (Os)	10	70
Gatfield No 3	Priv	3	1972	J	Stock water & irrigation		Church Creek	2	10
Holbrook	Priv	3	1955	I	Irrigation		Little Squaw Creek	20	71
Bettis Dike	Priv	3		AUXDAM				58	0
Bettis Diversion	Priv	3	1976	I	Irrigation		Dry Creek	4	20
Bettis No 2	Priv	3	1976	I	Irrigation		Big Willow Creek (Os)	8	50

Dam Name	Owner/ Manager	Size	Year	Purpose Code	Purpose	Barrier	Stream	Reservoir Area (Acres)	Storage (acre-feet)
Bettis No 3	Priv	3	1910	I	Irrigation		Big Willow Creek (Os)	10	50
Indian Creek	Priv	3	1990	I	Irrigation		Indian Creek	16	97
South Fork Boise									
Anderson Ranch	Fed-BOR	1	1950	IPF	Irrigation		S Fk Boise River	4,740	493,200
Little Camas	Irrig Co	1	1912	I	Irrigation		Little Camas Creek	1,455	18,400
Rhead Ranch	Priv	2	1974	I	Irrigation		Little Camas Creek	32	380
Joost No 1	Priv	3	1962	I	Irrigation		Curlew Creek And Springs	1	7
Joost No 2	Priv	3	1962	I	Irrigation		Curlew Creek And Springs	1	5
Joost No 3	Priv	3	1962	I	Irrigation		Curlew Creek And Springs	1	5
Joost No 4	Priv	3	1962	I	Irrigation		Curlew Creek And Springs	1	4
Belknap	Priv	3	1978	J	Stock water & irrigation		Tr-Smith Creek	3	16
Deadwood	Fed-BOR	1	1931	IPR	Irrigation	Anadramous	Deadwood River	3,000	161,900
Weiser									
Ellsworth-Middle Dam		0			#N/A			0	0
Galloway Dam		0			#N/A			0	0
Glenn Gallant Dam		0			#N/A			0	0
Mann Creek (Spangler)	Fed-BOR	1	1967	I	Irrigation		Mann Creek	283	12,950
Crane Creek	Irrig Co	1	1912	LP	Domestic & irrigation		Crane Creek	3,000	56,800
C Ben Ross	Irrig Co	1	1937	L	Domestic & irrigation		Little Weiser River (Os)	353	7,787
Lost Valley	Irrig Co	1	1910	L	Domestic & irrigation		Lost Creek	633	7,100
Barton	Irrig Co	1	1915	L	Domestic & irrigation		Mann Creek (Os)	61	685
Fairchild	Priv	1	1975	I	Irrigation		Sage Creek (Os)	104	3,640
Hornet Ck Upper North	Irrig Co	2	1913	I	Irrigation		Hornet Creek	32	270

Dam Name	Owner/ Manager	Size	Year	Purpose Code	Purpose	Barrier	Stream	Reservoir Area (Acres)	Storage (acre-feet)
Hornet Creek Lower	Irrig Co	2	1913	I	Irrigation		Hornet Creek	16	150
Dickerson	Priv	2	1972	I	Irrigation		Tr-Monroe Creek	1	10
Fairchild No 2	Priv	2	1988	O	Other		Sage Creek (Os)	10	80
Chandler	Priv	2	1980	I	Irrigation		Sheep Creek (Os)	4	35
Wiggins	Priv	2	1985	I	Irrigation		Rush Creek (Os)	6	33
Bruce	Priv	2	1980	J	Stock water & irrigation		Tr-Hog Creek	52	280
Cinnabar	Priv	2	1975	J	Stock water & irrigation		Tr-Cove Creek	22	173
Little Crane Creek	Priv	2	1908	L	Domestic & irrigation		Star Butte Creek (Os)	50	500
North Cove Creek	Priv	2	1975	J	Stock water & irrigation		Tr-Cove Creek	14	94
Soulen	Priv	2	1935	I	Irrigation		S Fk Crane Creek	113	630
Soulen South Dike	Priv	2		AUXDAM				113	0
Thousand Springs Ranch	Priv	2	PROP	GJ	Wildlife propagation		Thousand Springs Creek(Os)	1	16
Phelps No 1	Priv	2	1976	J	Stock water & irrigation		Tr-Little Weiser River	4	36
Little	Priv	2	1895	I	Irrigation		North Crane Creek	19	140
Cricket	Fed-BLM	3	1970	SG	Stock water		Tr-Spring Creek	1	2
Spring Creek	Fed-BLM	3	PROP	SG	Stock water		Tr-Spring Creek	1	6
Usblm (Uhrig)	Fed-BLM	3	1965	S	Stock water		Tr-North Crane Creek	3	25
Buckskin	Fed-BOR	3	1970	S	Stock water		Tr-Spring Creek	1	7
Craig	Fed-BOR	3	1963	SG	Stock water		Tr-Tennison Creek	2	13
Crane Creek Dike	Irrig Co	3		AUXDAM				3,000	0
Hornet Ck Upper Dike	Irrig Co	3		AUXDAM				32	0
Hornet Ck Upper South	Irrig Co	3		AUXDAM				32	0
Thorson	Priv	3	1973	SGH	Stock water		Monroe Creek	1	7

Dam Name	Owner/ Manager	Size	Year	Purpose Code	Purpose	Barrier	Stream	Reservoir Area (Acres)	Storage (acre-feet)
Land	Priv	3	1976	J	Stock water & irrigation		Tr-Tennison Creek (Os)	12	90
Courtright	Priv	3	1973	I	Irrigation		Tr-Hog Creek	9	90
Courtright Dike	Priv	3		AUXDAM				9	0
Schwilling	Priv	3	1983	J	Stock water & irrigation		Lester Creek	1	9
Deardorff Lower	Priv	3	1980	S	Stock water		Tr-North Crane Creek	2	9
Deardorff Upper	Priv	3	1980	S	Stock water		Tr-North Crane Creek	1	6
Schwenkfelder	Priv	3	PROP	I	Irrigation		Tr-Little Weiser River	10	60
Robinson	Priv	3	1947	HD	Fish propagation		Robinson Creek	5	40
Wiggins No 2	Priv	3	1988	I	Irrigation		Rush Creek (Os)	3	17
Demoss No 1	Priv	3	1980	J	Stock water & irrigation		Tr-Dixie Creek	6	35
Demoss No 2	Priv	3	1980	I	Irrigation		Dixie Creek	3	19
Craig	Priv	3	1978	I	Irrigation		Tennison Creek (Os)	13	68
Gann	Priv	3	1977	I	Irrigation		Tr-Monroe Creek	3	20
Phelps No 3	Priv	3	1973	J	Stock water & irrigation		Tr-Little Weiser River	2	9
Phelps No 4	Priv	3	1973	J	Stock water & irrigation		Tr-Little Weiser River	1	8
Sumrall	Priv	3	1978	J	Stock water & irrigation		Tr-Monroe Creek	1	7
Williamson Upper	Priv	3	1977	J	Stock water & irrigation		Thousand Springs Ck (Os)	1	2