
PROPOSED CASPER
RESOURCE MANAGEMENT PLAN AND
FINAL ENVIRONMENTAL IMPACT STATEMENT

APPENDIX E

Biological Resources Support Document

**Appendix E
Biological Resources Support Document**

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Acronyms and Abbreviations

°F	degrees Fahrenheit
ATV	all-terrain vehicle
BLM	Bureau of Land Management
cfs	cubic feet per second
CWD	Chronic Wasting Disease
EHD	Epizootic Hemorrhagic Disease
NSS	Native Species Status
RMP	Resource Management Plan
ROW	rights-of-way
SSS	Special Status Species
WGFD	Wyoming Game and Fish Department

Appendix E Biological Resources Support Document

This appendix contains information on Vegetation, Fish and Wildlife Resources – Fish, Fish and Wildlife Resources – Wildlife, Special Status Species (SSS) – Fish, SSS – Wildlife, and SSS – Plants. The information in this appendix was used to support the Affected Environment (Chapter 3) and Environmental Consequences (Chapter 4) for Biological Resources.

The Wyoming Game and Fish Department (WGFD) provided much of the information in this appendix and as such, the content has not been altered for this Proposed Resource Management Plan (RMP)/Final Environmental Impact Statement (EIS). The opinions and statements included in this appendix may not agree with or represent the opinion or policy of the Bureau of Land Management (BLM). In addition, the information provided by the WGFD has not undergone a complete technical edit and review. References cited within the WGFD tables are not included as part of this Proposed RMP/Final EIS.

E1.1. Common and Scientific Names of Plant and Animal Species Identified in the Environmental Impact Statement

Table E-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement

Common Name	Scientific Name
Plants	
Alfalfa	<i>Medicago sativa</i>
Alkali sacaton	<i>Sporobolus airoides</i>
American vetch	<i>Vicia sativa</i>
Antelope bitterbrush	<i>Purshia tridentata</i>
Arrow-grass	<i>Triglochin maritime</i>
Arrowhead	<i>Sagittaria</i> spp.
Aster	<i>Aster</i> spp.
Astragalus	<i>Astragalus</i> spp.
Balsamroot	<i>Balsamorhiza sagittata</i>
Baltic rush	<i>Juncus balticus</i>
Basin big sagebrush	<i>Artemisia tridentata</i>
Basin wildrye	<i>Leymus cinereus</i>
Big bluegrass (Sandberg's bluegrass)	<i>Poa secunda</i>
Big sagebrush	<i>Artemisia. tridentata</i>
Birdfoot sagebrush	<i>Artemisia pedatifida</i>
Biscuit-root	<i>Lomatium</i> spp.
Bitterbrush	<i>Purshia</i> spp.
Black henbane	<i>Hyoscyamus niger</i>
Black sagebrush	<i>Artemisia nova</i>
Blowout penstemon	<i>Penstemon haydenii</i>
Blue grama	<i>Bouteloua gracilis</i>
Bluebell	<i>Hyacinthoides</i> spp.
Bluebunch wheatgrass	<i>Agropyron spicatum</i>
Bluegrass	<i>Poa</i> spp.
Bottlebrush squirreltail	<i>Elymus elymoides</i>
Broom snakeweed	<i>Gutierrezia sarothrae</i>

Table E-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Plants (Continued)	
Buckwheat	<i>Polygonaceae</i> spp.
Bud sage	<i>Artemisia spinescens</i>
Bull thistle	<i>Cirsium vulgare</i>
Bulrush	<i>Schoenoplectus</i> spp.
Canada thistle	<i>Cirsium arvense</i>
Cattail	<i>Typha</i> spp.
cheatgrass	<i>Bromus tectorum</i>
Chicory	<i>Cichorium intybus</i>
Chokecherry	<i>Prunus virginiana</i>
Clover	<i>Trifolium</i> spp.
Colombia needlegrass	<i>Stipa columbiana</i>
Colorado butterfly plant	<i>Gaura neomexicana</i> ssp. <i>coloradensis</i>
Columbine	<i>Aquilegia</i> spp.
Common burdock	<i>Arctium minus</i> (Hill) Bernh.
Common crupina	<i>Crupina vulgaris</i>
Common mullein	<i>Verbascum thapsus</i>
Common reed	<i>Phragmites australis</i>
Common St. Johnswort	<i>Hypericum perforatum</i>
Common tansy	<i>Tanacetum vulgare</i>
Cottonwood	<i>Populus</i> spp.
Curl-leaf mountain mahogany	<i>Cercocarpus ledifolius</i>
Curlycup gumweed	<i>Grindelia squarrosa</i>
Currant	<i>Ribes</i> spp.
Dalmation toadflax	<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>
Dames rocket	<i>Hesperis matronalis</i>
Dandelion	<i>Taraxacum officinale</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Dock species	<i>Rumex</i> spp.
Douglas fir	<i>Pseudotsuga menziesii</i>
Douglas rabbitbrush	<i>Chrysothamnus viscidiflorus</i>
Dwarf mistletoe	<i>Arceuthobium pusillum</i>
Dyer's woad	<i>Isatis tinctoria</i>
Elk sedge	<i>Carex geyeri</i>
Field bindweed	<i>Convolvulus arvensis</i>
Fringed sagewort	<i>Artemisia frigida</i>
Gardner saltbush	<i>Atriplex garnderi</i>
Globemallow	<i>Sphaeralcea</i> spp.
Goatsrue	<i>Galega officinalis</i>
Goldenweed	<i>Pyrrocoma</i> spp.
Gorse	<i>Ulex europaeus</i>
Greasewood	<i>Sarcobatus vermiculatus</i>
Green needlegrass	<i>Stipa viridula</i>
Halogeton	<i>Halogeton glomeratus</i>
Hoary cress (whitetop)	(<i>Cardaria draba</i> and <i>Cardaria pubescens</i> Desv.)
Hood's phlox	<i>Phlox hoodsii</i>
Hooker sandwort	<i>Arenaria hookeri</i>
Horsetail	<i>Equisetum arvense</i>

Table E-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Plants (Continued)	
Houndstongue	<i>Cynoglossum officinale</i>
Iberian starthistle	<i>Centaurea iberica</i>
Idaho fescue	<i>Festuca idahoensis</i>
Indian paintbrush	<i>Castilleja</i> spp.
Indian ricegrass	<i>Oryzopsis hynenoides</i>
Inland saltgrass	<i>Distichlis spicata</i>
Iris	<i>Iris</i> spp.
Italian thistle	<i>Carduus pycnocephalus</i>
Japanese brome	<i>Bromus japonicus</i>
Jointed goatgrass	<i>Aegilops cylindrica</i>
Juniper	<i>Juniperus</i> spp.
Kentucky bluegrass	<i>Poa pratensis</i>
King spike fescue	<i>Leucopoa kingii</i>
Knapweed	<i>Centaurea</i> spp.
Laramie columbine	<i>Aquilegia laramiensis</i>
Laramie false sagebrush	<i>Sphaeromeria simplex</i>
Larkspur	<i>Delphinium occidentale</i>
Leafy spurge	<i>Euphorbia esula</i>
Limber pine	<i>Pinus flexilis</i>
Little bluestem	<i>Schizachyrium scoparius</i>
Locoweed	<i>Astragalus</i> spp.
Lodgepole pine	<i>Pinus contorta</i>
Lupine	<i>Lupinus</i> spp.
Many-stemmed spider flower	<i>Cleome multicaulis</i>
Meadow knapweed	<i>Centaurea pratensis</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Milkvetch	<i>Astragalus</i> spp.
Mountain big sagebrush	<i>Artemisia tridentate</i> var. <i>vaseyana</i>
Mountain mahogany	<i>Cercocarpus montanus</i>
Mountain pea	<i>Thermopsis montana</i>
Musk thistle	<i>Carduus nutans</i>
Mutton bluegrass	<i>Poa fendleriana</i>
Needle-and-thread	<i>Stipa comata</i>
Nelson's milkvetch	<i>Astragalus nelsonianus</i>
Orange hawkweed	<i>Hieracium aurantiacum</i>
Orchard grass	<i>Dactylis glomerata</i>
Oregon grape	<i>Mahonia aquifolium</i>
Ox-eye daisy	<i>Chrysanthemum leucanthemum</i>
Penstemon	<i>Penstemon</i> spp.
Perennial pepperweed (giant whitetop)	<i>Lepidium latifolium</i>
Perennial sowthistle	<i>Sonchus arvensis</i>
Phlox	<i>Phlox</i> spp.
Phragmites	<i>Phragmites australis</i>
Plumeless thistle	<i>Carduus acanthoides</i>
Ponderosa pine	<i>Pinus ponderosa</i>
Porter's sagebrush	<i>Artemisia porteri</i>
Poverty-weed	<i>Iva axillaris</i>

Table E-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Plants (Continued)	
Prairie clover	<i>Petalostemon purpureus</i>
Prairie junegrass	<i>Koeleria macrantha</i>
Prairie sandreed	<i>Calamorrifa longifolia</i>
Prickly pear cactus	<i>Opuntia</i> spp.
Puncturevine	<i>Tribulus terrestris</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Purple starthistle	<i>Centaurea calcitrapa</i>
Quackgrass	<i>Agropyron repens</i>
Quaking aspen	<i>Populus tremuloides</i>
Redtop	<i>Agrostis stolonifera</i>
Rocky Mountain juniper	<i>Juniperus scopulorum</i>
Rocky Mountain maple	<i>Acer glabrum</i>
Rubber rabbitbrush	<i>Ericameria nauseosa</i>
Rush skeleton weed	<i>Chondrilla juncea</i>
Russian knapweed	<i>Centaurea repens</i>
Russian thistle	<i>Salsola kali</i>
Russian wildrye	<i>Psathyrostachys junceus</i>
Sagebrush	<i>Artemisia</i> spp.
Salt cedar (tamarisk)	<i>Tamarix gallica</i>
Saltbush	<i>Atriplex</i> spp.
Saltgrass	<i>Distichlis spicata</i>
Sand dropseed	<i>Sporbolus cryptandrus</i>
Sand sagebrush	<i>Artemisia filifolia</i>
Sandberg's bluegrass (big bluegrass)	<i>Poa secunda</i>
Sandbur	<i>Cenchrus incertus</i>
Sandwort	<i>Arenaria</i> spp.
Scentless chamomile	<i>Matricaria perforate</i>
Scotch broom	<i>Cytisus scoparius</i>
Scotch thistle	<i>Onopordum acanthium</i>
Scurfpea	<i>Psoralea tenuiflora</i>
Sea blight	<i>Suaeda maritime</i>
Sedge species	<i>Carex</i> spp.
Sericea lespedeza	<i>Lespedeza cuneata</i>
Serviceberry	<i>Amerlanchier alnifolia</i>
Shadscale saltbush	<i>Atriplex confertifolia</i>
Showy milkweed	<i>Asclepias speciosa</i>
Silver sagebrush	<i>Artemisia canescens</i>
Skeletonleaf bursage	<i>Franseria discolor</i> Nutt.
Small burnett	<i>Sanguisorba minor</i>
Snowberry	<i>Symphoricarpos</i> spp.
Spiny hopsage	<i>Grayia spinosa</i>
Spotted knapweed	<i>Centaurea maculosa</i>
Squarrose knapweed	<i>Centaurea virgata</i> var. <i>squarrosa</i>
St. Johnswort	<i>Hypericum</i> spp.
Streambank wheatgrass	<i>Elymus lanceolatus</i>
Subalpine fir	<i>Abies lasiocarpa</i>
Sulphur cinquefoil	<i>Potentilla recta</i>

Table E-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Plants (Continued)	
Syrian beancaper	<i>Zygophyllum fabago</i>
Tansy	<i>Tanacetum vulgare</i>
Tansy ragwort	<i>Senecio jacobaea</i>
Teasel	<i>Dipsacus</i> spp.
Threadleaf sedge	<i>Carex filifolia</i>
Threeawn	<i>Aristida beyrichiana</i>
Threetip sagebrush	<i>Artemisia tripartite</i>
Utah juniper	<i>Juniperus osteosperma</i>
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>
Verbena	<i>Verbena bracteata</i>
Violet	<i>Viola</i> spp.
Western prairie fringed orchid	<i>Platanthera praeclara</i>
Western wheatgrass	<i>Pascopyrum smithii</i>
Wild licorice	<i>Glycyrrhiz leptodota</i>
Wild onion	<i>Allium acuminatum</i>
William's wafer-parsnip	<i>Cymopterus williamsii</i>
Willow	<i>Salix</i> spp.
Winterfat	<i>Krascheninnikovia lanata</i>
Wood's rose	<i>Rosa woodsii</i>
Woody aster	<i>Xylorrhiza glabriuscula</i>
Wyoming big sagebrush	<i>Artemisia tridentata</i> var. <i>wyomingensis</i>
Wyoming threetip sagebrush	<i>Artemisia tripartite</i> ssp. <i>rupicola</i>
Yarrow	<i>Achillea millefolium</i>
Yellow hawkweed	<i>Hieracium pratense</i>
Yellow toadflax	<i>Linaria vulgaris</i>
Fungi	
Blitser rust	<i>Cronartium ribicola</i>
Fish	
Gizzard shad	<i>Dorosoma cepedianum</i>
Central stoneroller	<i>Campostoma anomalum</i>
Goldfish	<i>Carassius auratus</i>
Lake chub	<i>Couesius plumbeus</i>
Grass carp	<i>Ctenopharygodon idella</i>
Red shiner	<i>Cyprinella lutrensis</i>
Common carp	<i>Cyprinus carpio</i>
Western silvery minnow	<i>Hybognathus argyritis</i>
Brassy minnow	<i>Hybognathus hankinsoni</i>
Plains minnow	<i>Hybognathus placitus</i>
Common shiner	<i>Luxilus cornutus</i>
Hornyhead chub	<i>Nocomis biguttatus</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Emerald shiner	<i>Notropis atherinoides</i>
Bigmouth shiner	<i>Notropis dorsalis</i>
Spottail shiner	<i>Notropis hudsonius</i>
Sand shiner	<i>Notropis stramineus</i>
Suckermouth minnow	<i>Phenacobius mirabilis</i>
Fathead minnow	<i>Pimephales promelas</i>

Table E-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Fish (Continued)	
Flathead chub	<i>Platygobio gracilis</i>
Longnose dace	<i>Rhinichthys cataractae</i>
Creek cub	<i>Semotilus atromaculatus</i>
River carpsucker	<i>Carpionodes carpio</i>
Quillback	<i>Carpionodes cyprinus</i>
Longnose sucker	<i>Catostomus catostomus</i>
White sucker	<i>Catostomus commersoni</i>
Mountain sucker	<i>Catostomus platyrhynchus</i>
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>
Black bullhead	<i>Ameiurus melas</i>
Channel catfish	<i>Ictalurus punctatus</i>
Flathead catfish	<i>Pylodictis olivaris</i>
Stonecat	<i>Noturus flavus</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Brown trout	<i>Salmo trutta</i>
Brook trout	<i>Salvelinus fontinalis</i>
Cutthroat trout	<i>Oncorhynchus clarki</i>
Plains topminnow	<i>Fundulus sciadicus</i>
Plains killifish	<i>Fundulus zebrinus</i>
Rock Bass	<i>Ambloplites rupestris</i>
Green sunfish	<i>Lepomis cyanellus</i>
Bluegill	<i>Lepomis macrochirus</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Largemouth bass	<i>Micropterus salmoides</i>
White crappie	<i>Pomoxis annularis</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Iowa darter	<i>Etheostoma exile</i>
Johnny darter	<i>Etheostoma nigrum</i>
Yellow perch	<i>Perca flavescens</i>
Walleye	<i>Sander vitreus</i>
Tiger musky	hybrid
Freshwater drum	<i>Aplodinotus grunniens</i>
Pallid Sturgeon*	<i>Scaphirhynchus albus</i>
Wildlife	
American marten	<i>Martes americana</i>
American tree sparrow	<i>Spizella arborea</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
Badger	<i>Taxidea taxus</i>
Baird's sparrow	<i>Ammodramus bairdii</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Barrow's goldeneye	<i>Bucephala islandica</i>
Beaver	<i>Castor canadensis</i>
Big brown bat	<i>Eptesicus fuscus</i>
Bighorn sheep	<i>Ovis canadensis</i>
Bison	<i>Bison bison</i>
Black bear	<i>Ursus americanus</i>
Black tern	<i>Chlidonias niger</i>

Table E-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Wildlife (Continued)	
Black-billed magpie	<i>Pica pica</i>
Black-crowned night heron	<i>Nycticorax nycticorax</i>
Black-footed ferret	<i>Mustela nigripes</i>
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>
Blue grouse	<i>Dendragapus obscurus</i>
Bobcat	<i>Lynx rufus</i>
Brewer's sparrow	<i>Spizella breweri</i>
Brown creeper	<i>Certhia americana</i>
Brown thrasher	<i>Toxostoma rufum</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Bufflehead	<i>Bucephala albeola</i>
Burrowing owl	<i>Speotyto cunicularia</i>
Calliope hummingbird	<i>Stellula calliope</i>
Canvasback	<i>Aythya valisineria</i>
Caspian tern	<i>Sterna caspia</i>
Chukar partridge	<i>Alectoris chukar</i>
Common merganser	<i>Mergus merganser</i>
Cottontail rabbit	<i>Sylvilagus spp.</i>
Coyote	<i>Canis latrans</i>
Eastern pipistrelle	<i>Pipistrellus subflavus</i>
Eastern red bat	<i>Lasiurus borealis</i>
Elk	<i>Cervus elaphus</i>
Eskimo curlew	<i>Numenius borealis</i>
Ferruginous hawk	<i>Buteo regalis</i>
Forster's tern	<i>Sterna forsteri</i>
Fox squirrel	<i>Sciurus niger</i>
Franklin's gull	<i>Larus pipixcan</i>
Fringed myotis	<i>Myotis thysanodes</i>
Golden eagle	<i>Aquila chrysaetos</i>
Goldeneye	<i>Bucephala clangula</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Gray wolf	<i>Canis lupus</i>
Greater sage-grouse	<i>Centrocercus urophasianus</i>
Hispid pocket mouse	<i>Chaetodipus hispidus</i>
Hoary bat	<i>Lasiurus cinereus</i>
Hungarian partridge	<i>Perdix perdix</i>
Interior least tern	<i>Sterna antillarum athalassos</i>
Jackrabbit	<i>Lepus spp.</i>
Lesser scaup	<i>Aythya affinis</i>
Lewis' woodpecker	<i>Melanerpes lewis</i>
Little brown myotis	<i>Myotis lucifugus</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Long-billed curlew	<i>Numenius americanus</i>
Long-eared myotis	<i>Myotis evotis</i>
Long-legged myotis	<i>Myotis volans</i>
MacGillivray's warbler	<i>Oporornis tolmiei</i>

Table E-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Wildlife (Continued)	
Mallard	<i>Anas platyrhynchos</i>
Marmot	<i>Marmota</i> spp.
Merlin	<i>Falco columbarius</i>
Mink	<i>Mustela vison</i>
Mormon cricket	<i>Anabrus simplex</i>
Mountain lion	<i>Puma concolor</i>
Mountain plover	<i>Charadrius montanus</i>
Mourning dove	<i>Zenaida macroura</i>
Mule deer	<i>Odocoileus hermionus</i>
Muskrat	<i>Ondata zibethicus</i>
Northern goshawk	<i>Accipiter gentilis</i>
Northern harrier	<i>Circus cyaneus</i>
Northern leopard frog	<i>Rana pipiens</i>
Northern pintail	<i>Anas acuta</i>
Olive-backed pocket mouse	<i>Perognathus fasciatus</i>
Pallid bat	<i>Antrozous pallidus</i>
Peregrine falcon	<i>Falco peregrinus</i>
Piping plover	<i>Charadrius melodus</i>
Plains harvest mouse	<i>Reithrodontomys montanus</i>
Plains pocket gopher	<i>Geomys bursarius</i>
Porcupine	<i>Erethizon dorsatum</i>
Prairie falcon	<i>Falco mexicanus</i>
Prairie rattlesnake	<i>Crotalus viridis</i>
Prairie vole	<i>Microtus ochrogaster</i>
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>
Pronghorn	<i>Antilocapra americana</i>
Raccoon	<i>Procyon lotor</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
Red wolf	<i>Canis rufus</i>
Redhead	<i>Aythya americana</i>
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>
Ring-necked pheasant	<i>Phasianus colchicus</i>
Rough-legged hawk	<i>Buteo lagopus</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Sage sparrow	<i>Amphispiza belli</i>
Sage thrasher	<i>Oreoscoptes montanus</i>
Sagebrush lizard	<i>Sceloporus graciosus</i>
Sagebrush vole	<i>Lemmyscus curtatus</i>
Sandhill crane	<i>Grus canadensis</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Sharp-tailed grouse	<i>Tympananuchus phasianellus</i>
Silky pocket mouse	<i>Perognathus flavus</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Snow bunting	<i>Plectrophenax nivalis</i>
Snowshoe hare	<i>Lepus americanus</i>
Snowy egret	<i>Egretta thula</i>
Snowy owl	<i>Bubo scandiacus</i>

Table E-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Wildlife (Continued)	
Spotted bat	<i>Euderma maculatum</i>
Spotted skunk	<i>Spilogale gracilis</i>
Striped skunk	<i>Mephitis mephitis</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Swift fox	<i>Vulpes velox</i>
Teal duck	<i>Anas</i> spp.
Towhee	<i>Pipilo</i> spp.
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>
Townsend's warbler	<i>Dendroica townsendi</i>
Trumpeter swan	<i>Cygnus buccinator</i>
Warbling vireo	<i>Vireo gilvus</i>
Weasel	<i>Mustela</i> spp.
Western small-footed myotis	<i>Myotis ciliolabrum</i>
White-faced ibis	<i>Plegadis chihi</i>
White-tailed deer	<i>Odocoileus virginianus</i>
White-tailed prairie dog	<i>Cynomys leucurus</i>
Whooping crane	<i>Grus americana</i>
Wild turkey	<i>Meleagris gallopavo</i>
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>
Willow flycatcher	<i>Empidonas traillii</i>
Yellow-billed cuckoo	<i>Coccyzum americanus</i>
Invertebrates	
Ips beetle	<i>Ips</i> spp.
Mountain pine beetle	<i>Dendroctonus ponderosae</i>

* The pallid sturgeon is not located in the planning area but is discussed in the EIS as a federally endangered species downstream of the planning area.

E1.2. Fish and Wildlife Resources – Fish

The WGFD estimated and categorized the miles of stream by class, acres of standing water, and land status (approximate) identified in the following basin table (Table E-2). A further breakdown of the public land status category to land administered by the BLM was not available at the time this Proposed RMP/Final EIS was printed.

Table E-2 lists fish species collected in major drainages of the Casper Fisheries Management Region (WGFD 2005a). Stream classifications reflect the coldwater production capacity of a stream, in pounds of trout per mile. Stream classes are as follows: Blue equals greater than 600 pounds of trout per mile; Red equals 300 to 600 pounds of trout per mile; Yellow equals 50 to 300 pounds of trout per mile; Green equals less than 50 pounds of trout per mile; Orange equals warm and cool water game fish; and “No sport fish” equals no game fish sampled, but may contain other endemic species. Acres of standing water reflect only waters suitable for fish, and are based on the area of water at full pool. Land status is listed as private or public; lands listed as public are owned by state or federal agencies. The WGFD’s Strategic Habitat Plan for the Casper Region identified habitat challenges (WGFD 2001). Species listed in bold text are a management priority as a sport fish species. Native Species Status (NSS) 1 to 3 are species that may be rare to common, with declining or vulnerable habitat.

The information in Table E-2, provided by the WGFD, may include opinions and statements that may not agree with or represent the opinions or policies of the BLM.

Table E-2. Fish Species, Water Classification, and Habitat Challenges for Aquatic Basins Within the Casper Fisheries Management Region

Basin:	1PA – North Platte River, Pathfinder Dam to Alcova Dam		
Species Present (sport fish in bold) (<i>NSS1 to 3 in italics</i>):	Rainbow trout, walleye, cutthroat trout, brown trout, common carp, white sucker, longnose sucker, Iowa darter, longnose dace, bigmouth shiner, emerald shiner, fathead minnow, green sunfish , Johnny darter, lake chub, sand shiner, spottail shiner.		
Miles of Stream by Class:	Yellow = 4.2	Acres of Standing Water:	2,340
Land Status (approximate)	Public = 69 percent Private = 31 percent		
Habitat Challenges:	Flow management and sediment entrainment from eroding banks and upland sources are perceived as bottlenecks that limit salmonid spawning habitat potential, aquatic macro-invertebrate productivity, and perhaps juvenile survival.		
Basin:	1AD – North Platte River, Alcova Dam to Dave Johnston Power Plant Dam		
Species Present (sport fish in bold) (<i>NSS1 to 3 in italics</i>):	Rainbow trout, cutthroat trout, brown trout, walleye, common carp, white sucker, longnose sucker, longnose dace, emerald shiner, lake chub, creek chub, flathead chub, shorthead redhorse, red shiner, bigmouth shiner, sand shiner, central stoneroller, Johnny darter, Iowa darter, fathead minnow, brassy minnow, black bullhead , channel catfish , spottail shiner, brook stickleback.		
Miles of Stream by Class:	Blue = 86.8, Yellow = 1.6	Acres of Standing Water:	204
Land Status (approximate)	Public = 19 percent Private = 81 percent		
Habitat Challenges:	Flow management and sediment entrainment from eroding banks and upland sources are perceived as bottlenecks that limit salmonid spawning habitat potential, aquatic macro-invertebrate productivity, and perhaps juvenile survival.		
Basin:	1DG – Dave Johnston Power Plant to Glendo Dam		
Species Present (sport fish in bold) (<i>NSS1 to 3 in italics</i>):	Walleye, yellow perch, black crappie, white crappie, green sunfish, rainbow trout, largemouth bass, common carp, gizzard shad, emerald shiner, golden shiner, spottail shiner, common shiner, red shiner, bigmouth shiner, sand shiner, channel catfish, flathead catfish, stonecat, black bullhead, white sucker, longnose sucker, shorthead redhorse, river carpsucker, fathead minnow, brassy minnow, creek chub, lake chub, flathead chub, quillback, Johnny darter, Iowa darter, central stoneroller.		
Miles of Stream by Class:	Orange = 61	Acres of Standing Water:	12,365
Land Status (approximate)	Public = 20 percent Private = 80 percent		
Habitat Challenges:	Flow management and sediment entrainment from eroding banks and upland sources are perceived as bottlenecks that limit spawning habitat potential, aquatic macro-invertebrate productivity, and perhaps juvenile survival. The PP&L Dam below Glenrock (at Dave Johnston Power Plant) is a barrier to upstream fish movement. The fauna is more diverse below the barrier than above. However, the barrier may be desirable from the standpoint of isolating the cool-water assemblage, which is predominate below the barrier, from the cold-water assemblage, which is predominate above the barrier.		
Basin:	1GG – North Platte River, Glendo Dam to Guernsey Dam		
Species Present (sport fish in bold) (<i>NSS1 to 3 in italics</i>):	Brown trout, cutthroat trout, rainbow trout, walleye, largemouth bass, yellow perch, common carp, channel catfish, black crappie, green sunfish, emerald shiner, spottail shiner, gizzard shad, longnose sucker, white sucker, fathead minnow, quillback, longnose dace.		
Miles of Stream by Class:	Green = 20, Orange = 3.5	Acres of Standing Water:	2,377
Land Status (approximate)	Public = 37 percent Private = 63 percent		
Habitat Challenges:	The sport fishery potential and endemic aquatic species assemblage below Glendo Dam are limited by fluctuating water flows. A low flow of 25 cfs occurs below Glendo Dam during the nonirrigation season, which provides limited instream habitat for a sport fishery and endemic aquatic species. The current operational regime at Guernsey Reservoir, which includes a mean annual reservoir drawdown of 97 percent to accommodate the silt run, precludes any fisheries development.		

Table E-2. Fish Species, Water Classification, and Habitat Challenges for Aquatic Basins Within the Casper Fisheries Management Region (Continued)

Basin:	1GN – North Platte River, Guernsey Dam to Nebraska State Line		
Species Present (sport fish in bold) (NSS1 to 3 in italics):	Black bullhead, bluegill, brassy minnow, bigmouth shiner, brown trout, channel catfish, creek chub, common carp, common shiner, emerald shiner, fathead minnow, flathead chub, flathead catfish, green sunfish, gizzard shad, Johnny darter, largemouth bass, longnose dace, longnose sucker, shorthead redhorse, quillback, rainbow trout, river carpsucker, red shiner, sand shiner, central stoneroller, walleye, white sucker, yellow perch.		
Miles of Stream by Class:	Orange = 60	Acres of Standing Water:	Not identified
Land Status (approximate)	Public = 10 percent Private = 90 percent		
Habitat Challenges:	No flows are released below Guernsey during the nonirrigation season, which results in about 21 miles of dewatered river over the winter. Fish are restricted to deeper pools where they can over-winter during the no flow period. The Laramie River provides flow to the North Platte River during the non-irrigation season from its confluence with the North Platte River to the Nebraska border. However, most of the channel from Guernsey Dam to Nebraska has a shifting sand bottom, which is poor habitat for a salmonid fishery, but may be suitable for endemic fishes.		
Basin:	1PS – Pine Ridge to Sweetwater River – North Bank Tributaries to North Platte River		
Species Present (sport fish in bold) (NSS1 to 3 in italics):	Brown trout, rainbow trout, brook trout, black bullhead, black crappie, channel catfish, common carp, emerald shiner, green sunfish, largemouth bass, cutthroat trout, walleye, white crappie, white sucker, brassy minnow, creek chub, fathead minnow, golden shiner, gizzard shad, Iowa darter, Johnny darter, longnose sucker, grass carp, bigmouth shiner, longnose dace, plains killifish, sand shiner, brook stickleback, central stoneroller, lake chub.		
Miles of Stream by Class:	Orange = 152, Green = 120, No sport fish = 44	Acres of Standing Water:	1,329
Land Status (approximate)	Public = 50 percent Private = 50 percent		
Habitat Challenges:	The basin along the north side of the North Platte River between the Sweetwater River and Pine Ridge are relatively dry and sparsely vegetated. Most streams are ephemeral or intermittent, although some perennial streams exist, and many stream channels are degraded or actively degrading. Few contain trout and for those with trout, abundance is low. Most riparian communities, particularly wet meadow habitats have degraded significantly as a result of hummocking and headcutting. Most of the degradation can be attributed to livestock grazing. Numerous small reservoirs are managed for fisheries. Many of these reservoirs are dewatered from evaporation and livestock watering, but could support sport fisheries during wet years. Most reservoirs have not been maintained and have lost storage capacity through sedimentation and erosion of or leaching through the dike. The management objective for most small streams is to maintain the resident (endemic) aquatic species assemblages while providing fishing opportunities within suitable reservoir complexes.		
Basin:	1PN – Pine Ridge to Nebraska State Line – North Bank Tributaries to North Platte River		
Species Present (sport fish in bold) (NSS1 to 3 in italics):	Bluegill, fathead minnow, largemouth bass, common carp, walleye, channel catfish, rainbow trout, yellow perch, grass carp, pumpkinseed sunfish, white sucker, brook trout, brown trout, goldfish, longnose dace, creek chub, brassy minnow, longnose sucker, plains killifish, rock bass, sand shiner, central stoneroller, green sunfish, red shiner.		
Miles of Stream by Class:	Orange = 56, Green = 90	Acres of Standing Water:	168
Land Status (approximate)	Public = 11 percent Private = 89 percent		
Habitat Challenges:	The collection basins on the north side of the North Platte River support small intermittent to perennial prairie streams with low base flows. They flow through low gradient sandy and clay soils, which support habitats suited to non-game aquatic species. Arid conditions, warm temperatures, and the physical characteristics of the prairie stream channels limit the potential for sport fisheries. Some drainages contribute high sediment loads to segments of the North Platte River. Contributing factors include: prolonged and intense annual herbivory, adjustment of the base elevation of the North Platte River due to flow regulation, increased drainage density associated with roads and trails, improperly engineered stream crossings, and reduced hydrologic function in upland habitats due to successional progression. Because these streams offer very little fishing opportunity, protecting the endemic aquatic species assemblage is the main goal.		

Table E-2. Fish Species, Water Classification, and Habitat Challenges for Aquatic Basins Within the Casper Fisheries Management Region (Continued)

Basin:	1NI – Niobrara Drainage		
Species Present (sport fish in bold) (<i>NSS1 to 3 in italics</i>):	Rainbow trout, brassy minnow, brown trout , creek chub, fathead minnow, <i>finescape dace</i> , green sunfish, lowa darter, longnose dace, <i>pearl dace</i> , <i>plains topminnow</i> , sand shiner, central stoneroller, white sucker.		
Miles of Stream by Class:	Orange = 47	Acres of Standing Water:	5
Land Status (approximate)	Public = 5 percent Private = 95 percent		
Habitat Challenges:	The collection basins on the Niobrara River headwaters support small ephemeral and intermittent prairie streams that congregate to generate four miles of perennial stream flow in the Niobrara River and Van Tassel Creek. Land use conflicts, arid conditions, warm temperatures, and the physical characteristics of the prairie stream channels limit the potential for sport fisheries. Protecting habitat for endemic species is important, as several species are rare or not found in other drainages of the State.		
Basin:	1LR – North Slope of Laramie Range (Garden Creek to Cottonwood Creek)		
Species Present (sport fish in bold) (<i>NSS1 to 3 in italics</i>):	Channel catfish , rainbow trout , brook trout , brown trout , cutthroat trout , common carp, fathead minnow, green sunfish , lowa darter, white sucker, walleye , largemouth bass , bluegill , red shiner, black bullhead , black crappie , creek chub, longnose dace, plains killifish, sand shiner, <i>common shiner</i> , central stoneroller, bigmouth shiner, longnose sucker, stonecat , <i>plains topminnow</i> .		
Miles of Stream by Class:	Red = 64, Yellow = 215, Green = 373, Orange = 58, No sport fish = 7.6	Acres of Standing Water:	797
Land Status (approximate)	Public = 27 percent Private = 73 percent		
Habitat Challenges:	Flashy hydrologic processes attributed to the granitic geology and a preponderance of successional advanced or altered vegetation communities scour stream channels during high flows leaving wide channels. Low summer, fall, and winter flows limit instream habitat availability. Wide shallow channels and warm irrigation return flows result in unfavorable conditions for trout. Prolonged and intense livestock grazing has accelerated bank erosion impairing riparian function along vegetatively controlled channel types. Logging has also contributed to sediment loading in the basin.		
Basin:	1SS – South Fork Powder River and Salt Creek Drainages		
Species Present (sport fish in bold) (<i>NSS1 to 3 in italics</i>):	Bluegill , largemouth bass , brook trout , rainbow trout , cutthroat trout , fathead minnow, white sucker, channel catfish , common carp, goldfish, green sunfish , black crappie , golden shiner, <i>flathead chub</i> , longnose dace, plains killifish, sand shiner, black bullhead , <i>plains minnow</i> .		
Miles of Stream by Class:	Yellow = 23, Orange = 159, No sport fish = 55	Acres of Standing Water:	243
Land Status (approximate)	Public = 50 percent Private = 50 percent		
Habitat Challenges:	The South Fork Powder River and Salt Creek basins are dry and sparsely vegetated. Most streams are ephemeral or intermittent, although some perennial streams exist. Many stream channels are degraded or actively degrading. Most riparian communities, particularly wet meadow habitats, have degraded as a result of hummocking and headcutting. Numerous small reservoirs exist that are accessible to the public and managed for fisheries. Many of these reservoirs are dewatered from evaporation and livestock watering, but do support sport fisheries during wet years. Most reservoirs have not been maintained and have lost storage capacity through sedimentation and erosion of, or leaching through their dikes. The management objective for most small streams is to maintain the endemic aquatic species assemblages while providing fishing opportunities within suitable reservoir complexes.		

Table E-2. Fish Species, Water Classification, and Habitat Challenges for Aquatic Basins Within the Casper Fisheries Management Region (Continued)

Basin:	5LR – Laramie River Drainage, Grayrocks, Dry Laramie River, Duck Creek, Marble and Lumen Creek Drainages		
Species Present (sport fish in bold): <i>(NSS1-3 in italics):</i>	Bigmouth shiner, black crappie , brassy minnow, brook trout , brown trout , channel catfish , creek chub, common carp, <i>common shiner</i> , fathead minnow, freshwater drum , gizzard shad, green sunfish , <i>hornyhead chub</i> , Iowa darter, Johnny darter, largemouth bass , longnose dace, longnose sucker, northern redhorse, plains killifish, <i>plains topminnow</i> , pumpkinseed sunfish quillback, rainbow trout , red shiner, river carpsucker, sand shiner, smallmouth bass , spottail shiner, stonecat , central stoneroller, walleye , white sucker, yellow perch .		
Miles of Stream by Class:	Red = 14, Green = 73, Orange = 10, No Sport Fish = 48	Acres of Standing Water:	4,304
Land Status (approximate)	Public = 10% private = 90%		
Habitat Challenges:	<p>The tailwater river channel below Grayrocks Reservoir has been impacted by hydrologic changes (e.g. down-cutting of the river channel and a loss of the number of channels) that may be less favorable to native nongame fishes. Cooler water temperatures, seasonally low dissolved oxygen, and channel changes also appear to have negatively impacted warmwater sportfish. Dewatering, sediment supply from return flows and sediment flushes from water management systems are widespread impacts. Diversion structures, dams and culverts are possible migration barriers and habitat/population-fragmentation threats.</p> <p>The reach of the Laramie River from the inflow of Grayrocks Reservoir to the dam that diverts water from the Laramie River to Bluegrass Creek, has had a long-term impact to the natural hydrology of the river. The Bluegrass Diversion was completed before Statehood, so river discharge and sediment supply have been altered for over 100 years. Annual water yield below the diversion was reduced and annual fluctuations were dampened primarily by the storage or diversion of peak flows. Reductions in high flows have reduced channel scour and transport of large sediment (cobbles and larger). Operation of the diversion has resulted in release of sediment accumulated on the upstream face of the diversion dam and probably hydrogen sulfide, or other gases toxic to aquatic life, resulting in fish kills. The release of sediment and dampening of the hydrograph have resulted in accumulation of fine sediments; substrate composition appears to be largely composed of silt and boulders with little gradation between those sizes. Flushing flows apparently are rare, as vegetation (e.g. cattails, willows, alder) has invaded the accumulated fine sediment. Obligate-gravel-spawning fish may have limited spawning habitat.</p>		
Basin:	5CC – Chugwater Creek and Wheatland Creek Drainages		
Species Present (sport fish in bold): <i>(NSS1-3 in italics):</i>	Creek chub, fathead minnow, Iowa darter, <i>plains topminnow</i> , white sucker, black bullhead , largemouth bass , brook trout , rainbow trout , green sunfish , longnose dace, brown trout , longnose sucker, brassy minnow, bigmouth shiner, channel catfish , common carp, Johnny darter, quillback, red shiner, sand shiner, central stoneroller, <i>common shiner</i> , plains killifish, tiger musky , gizzard shad, black crappie , bluegill , pumpkinseed , spottail shiner, golden shiner.		
Miles of Stream by Class:	Yellow = 108, green = 35 No game fish = 114	Acres of Standing Water:	567
Land Status (approximate)	Public = 10% private = 90%		
Habitat Challenges:	Dewatering, sediment supply from return flows and sediment flushes from water management systems are widespread impacts. Diversion structures, dams and culverts are possible migration barriers and habitat/population-fragmentation threats. The mainstem Chugwater Creek has been impacted by: 1) channelization in northwestern Laramie County along the railroad right-of-way; 2) heavy grazing, 3) the natural erosive nature of the basin, and 4) flashfloods.		

Table E-2. Fish Species, Water Classification, and Habitat Challenges for Aquatic Basins Within the Casper Fisheries Management Region (Continued)

Basin:	5NL – North Laramie River and Drainages		
Species Present (sport fish in bold): (<i>NSS1 to 3 in italics</i>):	Black bullhead, bluegill, brook trout , brassy minnow, bigmouth shiner, brown trout , channel catfish , creek chub, common carp, <i>common shiner</i> , fathead minnow, green sunfish , <i>homyhead chub</i> , iowa darter, Johnny darter, largemouth bass , longnose dace, plains killifish, rainbow trout , red shiner, sand shiner, stonecat , central stoneroller, white sucker.		
Miles of Stream by Class:	Yellow = 21, Green = 33, No game fish = 10	Acres of Standing Water:	34
Land Status (approximate)	Public = 5 percent Private = 95 percent		
Habitat Challenges:	The relatively dry climate of the North Laramie River basin results in small streams with little perennial flow, intermittent flow, or ephemeral streams. Irrigation water withdrawals in summer probably result in low flows and high water temperatures. Diversions, culverts, or other obstructions are possible migration barriers and habitat/population-fragmentation threats.		
Basin:	5HC – Horse Creek and drainages		
Species Present (sport fish in bold): (<i>NSS1 to 3 in italics</i>):	White crappie, black crappie , river carpsucker, red shiner, walleye, bluegill, stonecat, channel catfish, black bullhead, largemouth bass , bigmouth shiner, brown trout , creek chub, longnose dace, sand shiner, central stoneroller, white sucker, rainbow trout , brassy minnow, <i>common shiner</i> , fathead minnow, plains killifish, common carp, green sunfish , gizzard shad, longnose sucker, shorthead redhorse, quillback, red shiner, <i>suckermouth minnow</i> , yellow perch .		
Miles of Stream by Class:	Green = 90, Orange = 43 No game fish = 88	Acres of Standing Water:	2,561
Land Status (approximate)	Public = 10 percent Private = 90 percent		
Habitat Challenges:	Dewatering and sedimentation are the two greatest threats to native fish populations in Horse Creek. Other potential threats include: fragmentation by diversions, culverts, or other structures; non-point source pollution, especially from sources such as livestock feedlots, competition and predation by exotic; and hydrologic changes to parameters such as turbidity and intermittency. For some native fishes, decreases in turbidity and increased late summer flows that reduce intermittency may be a negative impact; especially if those conditions favor nonnative predators or competitors.		
Basin:	1BH – Bates Hole		
Species Present (sport fish in bold): (<i>NSS1 to 3 in italics</i>):	Brook trout, rainbow trout, brown trout, cutthroat trout , creek chub, longnose dace, green sunfish , grass carp.		
Miles of Stream by Class:	Red = 14, Yellow = 37, Green = 19, Orange = 73	Acres of Standing Water:	31
Land Status (approximate)	Public = 45 percent Private = 55 percent		
Habitat Challenges:	<p>Erosion and sediment entrainment are natural processes in Bates Hole that have been accelerated by human activities. Contributing factors include, but are not limited to: prolonged or intense annual herbivory, adjustment of the base elevation of the North Platte River due to river flow regulation, increased drainage density associated with roads and trails, improperly engineered stream crossings, and reduced hydrologic function in upland habitats due to successional progression.</p> <p>Following reservoir construction, the base elevation of the North Platte has dropped. The tributaries are downcutting to meet the new elevation. Sedimentation issues are exacerbated by the presence of erosive soils, intense grazing, road density, poorly engineered stream crossings, and reduced hydrologic function in the uplands due to successional progression.</p> <p>Most soils in the lower basin were derived from soft marine shales. Varying slopes, and high silt, clay, and soluble salt content limit the potential for vegetation cover. The potential for surface erosion, gully erosion, and channel degradation is high. Channel degradation and loss of riparian function (e.g., floodplain connectivity, channel stability, and riparian bank storage) are widespread.</p> <p>The eastern perimeter of the basin is dominated by broad plateaus and complexes of narrow ridgelines intersected by steep drainage ways. Most of the level-to-moderately sloping soil surfaces are relatively stable with moderate vegetation canopy coverage. The greatest erosion hazard occurs from head-cutting and sediment entrainment from bank sloughing and gully widening. Stream channel degradation and loss of riparian function is less common than at lower elevations.</p>		

Table E-2. Fish Species, Water Classification, and Habitat Challenges for Aquatic Basins Within the Casper Fisheries Management Region (Continued)

Basin:	Cheyenne River – Sheridan Crew records
Species Present (sport fish in bold) (<i>NSS1 to 3 in italics</i>):	Black bullhead , <i>flathead chub</i> , fathead minnow, longnose dace, plains killifish, <i>plains minnow</i> , sand shiner, river carp sucker, white sucker, channel catfish , mountain sucker, plains topminnow, green sunfish .
Habitat Challenges:	<p>The Cheyenne River hydrograph is driven by low elevation snow accumulations, seasonal rainfall, and periodic storm events. Peak flows occur from March through May (500 to 600 cfs) with occasional flood events (23,000 cfs recorded in 1978) associated with summer storms. Lowest flows, which are probably exacerbated by irrigation withdrawals throughout the basin, occur in July and August, and again from October through November (Druse et al. 1991). Near the South Dakota State line, flows cease in the Cheyenne River during most years (Druse et al. 1991).</p> <p>The repeated withdrawal, warming, and return of irrigation water undoubtedly contribute to high summer temperatures that reaches 70 to 80 degrees Fahrenheit (°F) during the summer (USGS 1974) which may be detrimental to some species.</p> <p>Turbidity, which prevents light penetration needed for growing aquatic vegetation, channel instability, and high temperatures, probably inhibit aquatic invertebrate production (Pennak 1978) and create an environment hostile to fish species not specifically adapted to such conditions (i.e., most game fish species).</p> <p>Little is known of the habitat requirements, relative abundance, or spatial distribution of most indigenous fish in the Cheyenne River basin and Patton (1997) provides the most recent baseline data on species presence and distribution. There presently is no extensive baseline against which to measure population trends.</p> <p>Illegal introductions of green sunfish and black bullhead into waters where they become over abundant, precludes some management options for other more desirable species, and may limit production of other game and non-game fish species through various interspecific interactions.</p>

Source: WGFD 2005
cfs cubic feet per second

At the time this Proposed RMP/Final EIS was prepared, the Fish Division of the WGFD was reevaluating the boundaries of aquatic Basin Management Plans. The WGFD databases have been updated and reflect the basin names used in the fish tables provided in this appendix. The information in Table E.2 is correct for the basin area name identified in Table E.2. However, revision of the narrative report associated with each Basin Management Plan was not complete at the time this Proposed RMP/Final EIS was prepared. Therefore, discrepancies exist between basin names identified in Table E.2 and the associated narrative reports listed below. While the information presented in Table E.2 is available in the following narrative reports, a direct comparison between the basin name identified in Table E.2 and the following narrative reports is not possible at this time.

Although not reproduced here, references for the Basin Management Plan narrative reports follow:

- WGFD (Wyoming Game and Fish Department). 1995. Basin Management Plan LE030. Basin: Lower Laramie River.
- WGFD. 1996. Basin Management Plan LE050. Basin: North Laramie River.
- WGFD. 1996. Basin Management Plan. Basin: Cheyenne River.
- WGFD. 1996. Basin Management Plan. Basin: Glendo Reservoir.
- WGFD. 1996. Basin Management Plan. Basin: Guernsey Reservoir and North Platte River from Guernsey Reservoir to the State Line.
- WGFD. 1996. Basin Management Plan. Basin: North Platte River from Glendo Dam to Guernsey Reservoir.
- WGFD. 1996. Basin Management Plan. Basin: North Platte River from Pathfinder Dam to Alcova Reservoir.

WGFD. 1996. Basin Management Plan. Basin: North Platte River, Goose Egg Bridge to Mills Bridge.

WGFD. 1996. Basin Management Plan. Basin: North Platte River, Mills Bridge to Glendo Reservoir.

WGFD. 1996. Basin Management Plan. Basin: North Slope of the Laramie Range (Garden Creek to Cottonwood Creek).

WGFD. 1996. Basin Management Plan. Basin: Pine Ridge to Nebraska.

WGFD. 1996. Basin Management Plan. Basin: South Fork of the Powder River and Salt Creek Drainages.

WGFD. 1998. Basin Management Plan. Basin: Seminole, Kortez, Pathfinder, Alcova, and Gray Reef Reservoirs.

WGFD. 2002. Basin Management Plan (Revised) LE040. Basin: Chugwater Creek and Wheatland Creek.

E1.3. Fish and Wildlife Resources – Wildlife

E1.3.1. Big Sagebrush Monitoring

Following is text provided to the BLM by the WGFD and cited in Chapter 3 as WGFD 2004a. The text may include opinions and statements that may not agree with or represent the opinions or policies of the BLM. In addition, the information provided here by the WGFD has not undergone a complete technical edit and review.

Bates Hole Habitat Inventory and Evaluation Area

In the Bates Hole area, WGFD personnel in cooperation with BLM personnel have been monitoring big sagebrush production and utilization since 1993. The intent of this monitoring was to determine if utilization (browsing) by domestic livestock and wildlife would increase or decrease big sagebrush production. Secondly, if utilization affected big sagebrush production, what level of utilization was considered detrimental to the big sagebrush community (i.e., life cycle). Following several years of monitoring, we have determined that not only does utilization affect big sagebrush production, but spring (April to June) precipitation patterns play an integral role in big sagebrush production. Furthermore, we have determined in Bates Hole that approximately 35 percent use of the current year's production is the point where utilization may be having detrimental impacts on individual big plants and the big sagebrush community as a whole.

Therefore, we wanted to convey to the public how production and utilization was affecting the big sagebrush community; hence we developed a use index. The use index was derived by taking 35 percent, which is the level where percent leaders browsed is considered excessive, and dividing by the highest current year's growth observed during our monitoring efforts (use index equals percent leaders browsed (ocular estimate) / current year's growth (annual growth)). This formula developed a threshold, which is depicted by the line where the red shaded area meets the green shaded area (Figure E-1). At this point, utilization on current year's growth becomes excessive and may be having detrimental impacts on the big sagebrush community (i.e., decline in plant vigor, poor seed production, increased plant mortality, and reduced carrying capacity). Furthermore, even though some use indices fall within the green shaded area, there are still impacts to big sagebrush plants and communities.

Figure E-1 depicts the use indices over 10 years, 1993 to 2002. During those 10 years, 7 have been within the red shaded area, which is indicative of excessive use and detrimental impacts to big sagebrush plants and communities. In those years where current year's growth is high and percent leaders browsed approaches 35 percent, the index approaches the threshold. Furthermore, the use index will increase

proportionately as current year’s growth decreases and percent leaders browsed increases. The inverse is also true, as current year’s growth increases and percent leaders browsed decreases, the use index will decrease (fall within the green shaded area). At the present time, we have calculated the use index threshold for Bates Hole to be 0.213. Since 1993, use indices have an upward trend, which may be indicative of a big sagebrush community in poor condition. Figure E-2 shows the average annual growth of big sagebrush in Bates Hole as it correlates to spring precipitation.

Figure E-1. Bates Hole Big Sagebrush Use Index

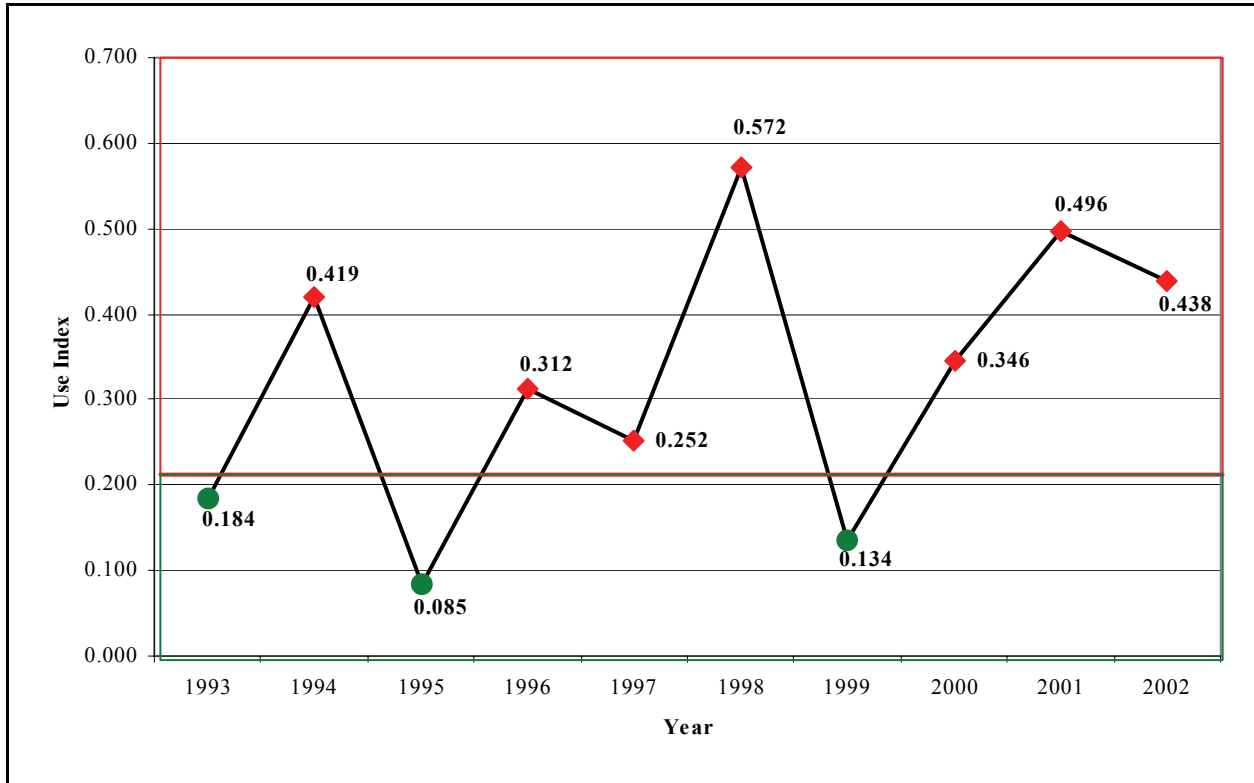
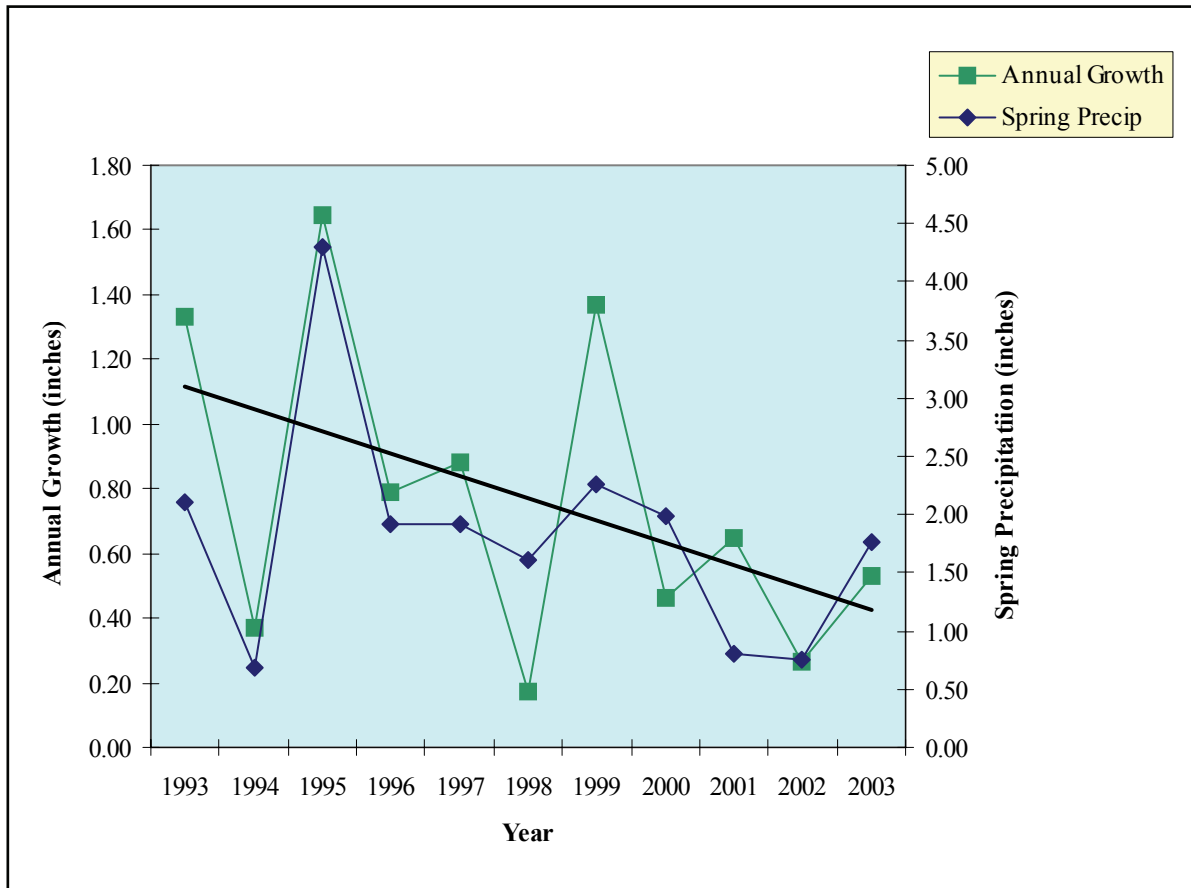


Figure E-2. Bates Hole Big Sagebrush Average Annual Growth



Rattlesnake Hills Habitat Inventory and Evaluation Area

The use index in the Rattlesnake Hills is virtually the exact opposite of that in Bates Hole. Out of nine data points, only two occur within the red shaded area, or the where percent leaders browsed is considered excessive (Figure E-3). The remaining seven points are within the green shaded area, which is indicative of less severe impacts to individual big sagebrush plants, but there are still impacts. We have calculated the use index at 0.259, which is the threshold where percent leaders browsed is considered excessive and detrimental impacts to big sagebrush may be occurring. In 2000, we documented a significant increase in utilization, primarily from wintering domestic sheep, which contributed to the spike in the use index. Figure E-4 shows the average annual growth of big sagebrush for Rattlesnake Hills.

Figure E-3. Rattlesnake Hills Big Sagebrush Use Index

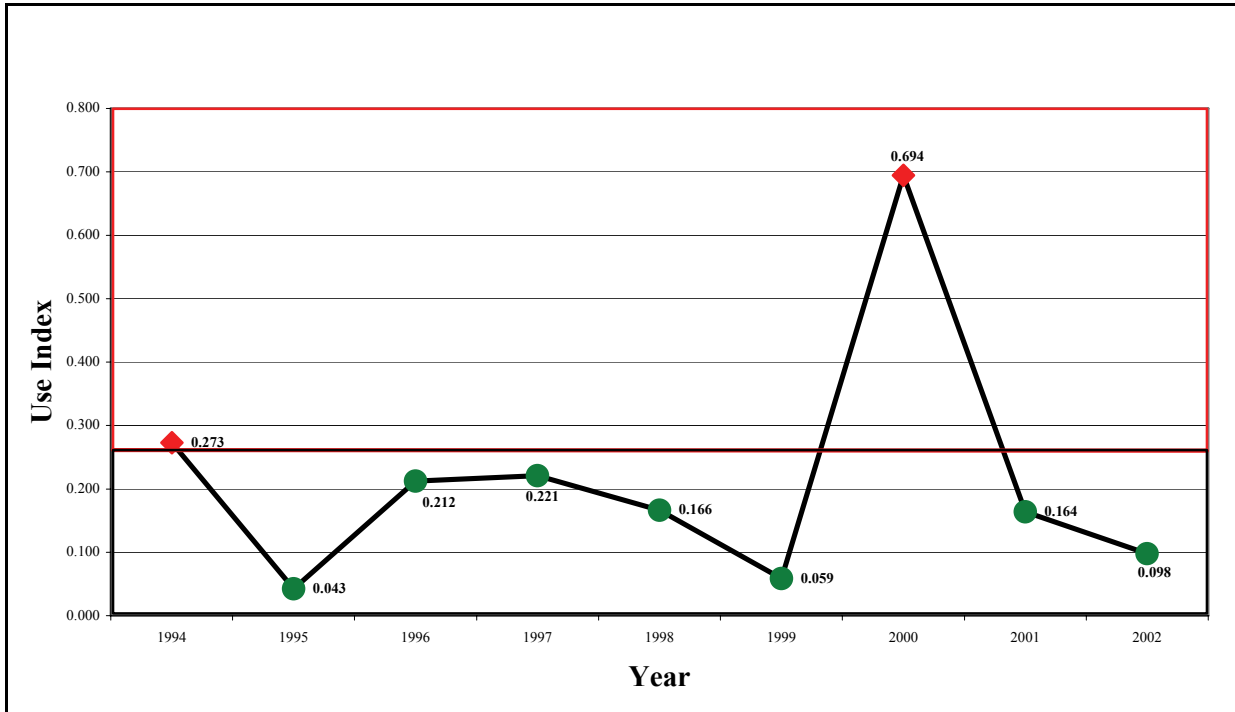
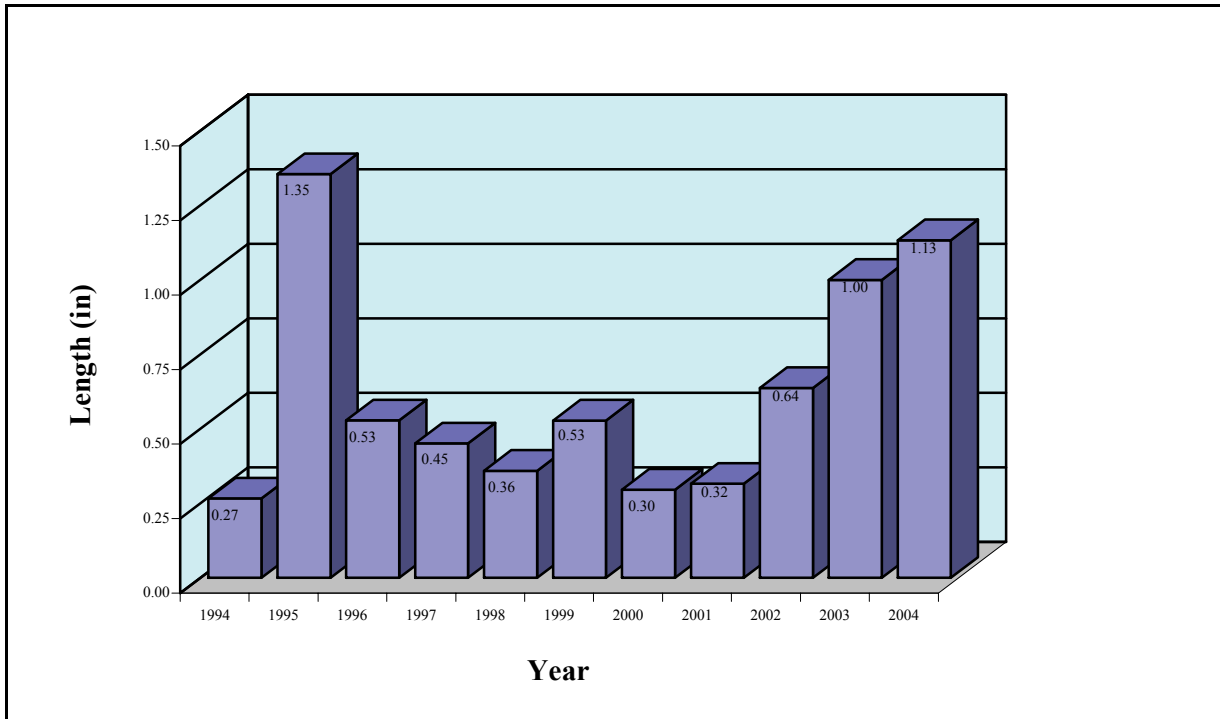


Figure E-4. Rattlesnake Hills Big Sagebrush Average Annual Growth



E1.4. Big Game Herd Units

Table E-3 summarizes the current population objective, current population estimate, population trend, percent of BLM-administered land, and the management challenges for each big game herd unit intersecting the Casper planning area (WGFD 2005b). The information in Table E-3, provided by the WGFD, may include opinions and statements that may not agree with or represent the opinions or policies of the BLM.

Table E-3. Big Game Populations in the Casper Planning Area

Herd Unit	Current Population Objective	Current Population Estimate ¹	Population Trend	Percent BLM land within Herd Unit ²	Management Challenges
Pronghorn					
North Converse	28,000	23,300	Stable; population below levels of early 1990s	12	<ul style="list-style-type: none"> Poor public access; predominantly private land; majority of public/Bureau of Land Management (BLM) lands inaccessible to public Sagebrush communities in very poor condition due to historic overuse, drought, lack of regeneration; leading to poor fawn productivity and recruitment
Medicine Bow	60,000	56,700	Slowly increasing to stable	14	<ul style="list-style-type: none"> Habitat conditions on many winter ranges are poorer than desired due to drought, old age, sagebrush eradication on some ranges, and historic over-utilization Adult survival appears to be lower than average in some hunt areas Fawn recruitment is highly variable among years and areas Attempts to reduce the herd by harvest are limited due to limited access Hunter crowding occurs within hunt areas having a lot of accessible public land Range, highway, and railway fences complicate seasonal movements Increasing energy development Increasing all-terrain vehicle (ATV) recreation with off-road travel violations
North Natrona	9,000	7,400	Stable to slightly decreasing	48	<ul style="list-style-type: none"> Poor habitat conditions primarily on winter range Habitat loss to agricultural conversion Conflict with agriculture Pasture and rights-of-way (ROW) fences impeding migration to current and historical winter range Increasing energy development – habitat loss and fragmentation
Meadowdale	6,000	6,900	Increasing	3	<ul style="list-style-type: none"> Poor public access; predominantly private land Poor habitat conditions; lack of extensive shrub stands
Cheyenne River	38,000	27,000	Slightly increasing; population below levels of early 1990s	2	<ul style="list-style-type: none"> Poor public access; predominantly private land Sagebrush communities in very poor condition due to historic overuse, drought, lack of regeneration

Table E-3. Big Game Populations in the Casper Planning Area (Continued)

Herd Unit	Current Population Objective	Current Population Estimate¹	Population Trend	Percent BLM land within Herd Unit²	Management Challenges
Pronghorn (Continued)					
Rattlesnake	12,000	8,300	Decreasing	32	<ul style="list-style-type: none"> • Extensive oil/gas development over the past decade has eliminated and fragmented large areas of big game habitat in this herd unit • Repetitious seismic testing in the area has resulted in a tremendous increase in road/trail miles • New wells continue to be placed on crucial winter range in the summer, resulting in substantially increased human activity on winter ranges • Poor forage/browse production and low plant vigor • Increasing time spent investigating poaching complaints with increased numbers of transient oil/gas workers • Heavy competition with livestock in portions of the herd unit • Such extensive oil/gas development substantially reduces the aesthetic value of hunts in the area • Habitat loss to agricultural conversion • Poor public access; predominantly private land; majority of public/BLM lands inaccessible to public
Beaver Rim	25,000	22,700	Increasing	41	<ul style="list-style-type: none"> • Poor habitat conditions due to drought
Hawk Springs	7,000	5,200	Slightly increasing	1	<ul style="list-style-type: none"> • Pronghorn are dependent on agriculture fields for the majority of their habitat needs • Poor access throughout the herd unit
Badwater	3,000	2,200	Slightly increasing; population below levels of early 1990s	48	<ul style="list-style-type: none"> • Extensive oil/gas development over the past decade has eliminated and fragmented large areas of big game habitat in this herd unit • Repetitious seismic testing in the area has resulted in a tremendous increase in road/trail miles • New wells continue to be placed on crucial winter range in the summer, resulting in substantially increased human activity on winter ranges • Drought conditions throughout the herd unit have resulted in poor forage/browse production and low plant vigor • Increasing time spent investigating poaching complaints with increased numbers of transient oil/gas workers • Such extensive oil/gas development substantially reduces the aesthetic value of hunts in the area • Heavy competition with livestock in portions of the herd unit

Table E-3. Big Game Populations in the Casper Planning Area (Continued)

Herd Unit	Current Population Objective	Current Population Estimate ¹	Population Trend	Percent BLM land within Herd Unit ²	Management Challenges
Pronghorn (Continued)					
Middle Fork	2,100	3,600	Stable	47	<ul style="list-style-type: none"> Poor public access in most of the herd unit Sagebrush communities in very poor condition due to historic overuse, drought, lack of regeneration Some sagebrush stands eliminated due to spraying
North Ferris	5,000	2,900	Increasing	37	<ul style="list-style-type: none"> Some fences impede pronghorn movements and migrations Some riparian habitats in poor condition, affecting fawn production and survival
Dwyer	4,000	4,400	Decreasing	4	<ul style="list-style-type: none"> Poor fawn production due to drought/habitat conditions Majority of the sagebrush community converted to agricultural production through mechanical and chemical treatments
Mule Deer					
Southwest Bighorn	28,000	21,700	Slightly increasing	43	<ul style="list-style-type: none"> Somewhat difficult public access Some sagebrush communities dying due to drought Poor forage production due to drought
Pumpkin Buttes	11,000	12,000	Stable	49	<ul style="list-style-type: none"> Poor public access creates problems with achieving harvest objectives Sagebrush communities in poor condition due to historic overuse, drought, lack of regeneration Heavy use of rangelands decreases diversity and productivity
Upper Powder River	18,000	16,500	Decreasing	47	<ul style="list-style-type: none"> Poor public access creates problems with achieving harvest objectives in some portions of the herd unit Public land areas over-hunted Sagebrush communities in poor condition due to historic overuse, drought, lack of regeneration. Some sagebrush stands eliminated due to spraying High mortality of limber pine stands Conifer encroachment in curl-leaf mountain mahogany stands Increasing ATV recreation with off-road travel violations
Goshen Rim	25,000	21,000	Slightly increasing	2	<ul style="list-style-type: none"> Poor public access; predominantly private land; majority of public/BLM lands inaccessible to public Deer are very dependant on crop production Shrub species old, with little nutrient value

Table E-3. Big Game Populations in the Casper Planning Area (Continued)

Herd Unit	Current Population Objective	Current Population Estimate¹	Population Trend	Percent BLM land within Herd Unit²	Management Challenges
Mule Deer (Continued)					
Laramie Peak	29,000	27,000	Stable	9	<ul style="list-style-type: none"> • Little access in the southern end of the Herd Unit; mostly private land-makes any management decisions difficult • Shrub species (primarily mountain shrubs such as true mountain mahogany) old with little nutrient value • High Chronic Wasting Disease (CWD) prevalence rate • Cheatgrass invasion • Increased competition from elk • Fire suppression
Sweetwater	6,000	4,000	Increasing	70	<ul style="list-style-type: none"> • Poor habitat conditions due to drought • Winter range conditions remain poor to fair
Ferris	5,000	2,300	Stable	32	<ul style="list-style-type: none"> • Some riparian habitats in poor condition, affecting fawn production and survival • Some fences impede deer movements and migrations
Beaver Rim	2,600	730	Increasing slightly; population below levels of early 1990s	30	<ul style="list-style-type: none"> • Over the past several years, drought conditions throughout the herd unit have resulted in poor forage/browse production and low plant vigor • Oil/gas development is increasing rapidly in this area
Thunder Basin	20,000	19,300	Stable; population below levels of early 1990s	0	<ul style="list-style-type: none"> • Sagebrush communities in very poor condition due to historic overuse, drought, lack of regeneration • Poor public access; predominantly private land • Lack of understory (food/cover), including woody shrubs, in riparian cottonwood communities due to livestock grazing
Lance Creek	18,000	14,800	Stable	2	<ul style="list-style-type: none"> • Sagebrush communities in very poor condition due to historic overuse, drought, and lack of regeneration • Poor public access; predominantly private land • Lack of understory (food/cover), including woody shrubs, in riparian cottonwood communities due to livestock grazing
North Converse	9,100	9,400	Decreasing	12	<ul style="list-style-type: none"> • Poor public access; predominantly private land; majority of public/BLM lands inaccessible to public • Sagebrush communities in poor condition due to historic overuse, drought, and lack of regeneration

Table E-3. Big Game Populations in the Casper Planning Area (Continued)

Herd Unit	Current Population Objective	Current Population Estimate ¹	Population Trend	Percent BLM land within Herd Unit ²	Management Challenges
Mule Deer (Continued)					
South Converse	16,000	10,100	Decreasing	2	<ul style="list-style-type: none"> • Crucial winter ranges (mountain shrub communities) in very poor condition due to drought, lack of fire, and senescence • Increased prevalence of cheatgrass • Poor public access; predominantly private land • High prevalence of CWD
Rattlesnakes	5,500	3,600	Stable	35	<ul style="list-style-type: none"> • Extensive oil/gas development over the past decade has eliminated and fragmented large areas of big game habitat in this herd unit • Repetitious seismic testing in the area has resulted in a tremendous increase in road/trail miles • New wells continue to be placed on crucial winter range in the summer, resulting in substantially increased human activity on winter ranges • Poor forage/browse production and low plant vigor • Increasing time spent investigating poaching complaints with increased numbers of transient oil/gas workers • Heavy competition with livestock in portions of the herd unit • Habitat loss to agricultural conversion and cabin sites • Poor public access; predominantly private land; majority of public/BLM lands inaccessible to public
Bates Hole / Hat Six	12,000	7,000	Decreasing	26	<ul style="list-style-type: none"> • Crucial winter ranges (mountain shrub communities) in very poor condition due to drought, lack of fire, and senescence • Poor public access in some portions of the herd unit • Habitat loss to urbanization • Increased prevalence of cheatgrass • Increasing ATV recreation with off-road travel violations
North Natrona	6,500	3,400	Stable	48	<ul style="list-style-type: none"> • Extensive oil/gas development over the past decade has eliminated and fragmented large areas of big game habitat in this herd unit • Crucial winter ranges (mountain shrub – curl-leaf mountain mahogany and sagebrush communities) in very poor condition due to drought, lack of fire, and senescence • Habitat loss to agriculture conversion • Conflict with agriculture • Increasing ATV recreation with off-road travel violations

Table E-3. Big Game Populations in the Casper Planning Area (Continued)

Herd Unit	Current Population Objective	Current Population Estimate¹	Population Trend	Percent BLM land within Herd Unit²	Management Challenges
White-tailed Deer					
Central	NA	NA	Increasing, but fluctuates during Epizootic Hemorrhagic Disease (EHD) outbreaks	19	<ul style="list-style-type: none"> Lack of understory (food/cover), including woody shrubs, in riparian cottonwood communities due to livestock grazing CWD prevalent in some areas
Southeast Wyoming	NA	NA	Increasing, but fluctuates during EHD outbreaks	4	<ul style="list-style-type: none"> Outbreaks of Epizootic Hemorrhagic Disease (EHD) Difficult access CWD prevalent in some areas
Powder River	8,000	14,000	Increased substantially since 1980s	48	<ul style="list-style-type: none"> Urban development limits management options Private property access limiting access and harvest CBM development results in reduced access/opportunity Disease concerns: periodic EHD outbreaks, CWD, fibromas High rate of deer / vehicle collisions
Elk					
Laramie Peak/Muddy Mountain	5,000	6,400	Increasing	9	<ul style="list-style-type: none"> Poor public access in much of herd unit, with interspersed private and public lands; many BLM lands inaccessible to public in southern portion of herd unit Lack of aspen regeneration Illegal ATV use on public lands, disrupting elk security areas Cheatgrass invasion
Rattlesnakes	200	770	Increasing	35	<ul style="list-style-type: none"> Lack of public/hunter access impedes management ability
South Bighorns	2,900	4,900	Increasing	47	<ul style="list-style-type: none"> Poor public access creates problems with achieving harvest objectives in some portions of the herd unit Accessible public lands receive heavy hunting pressure High mortality of limber pine stands Increasing ATV recreation with off-road travel violations
Shirley Mountain	800	800	Stable to slightly decreasing	43	<ul style="list-style-type: none"> Difficult to get adequate harvest because of large ranches creating refuges Habitat conditions on many winter ranges are poorer than desired due to drought, old age, and historic over-utilization Hunter crowding occurs within accessible public lands
Green Mountain	500	1,300	Increasing through mid 1990s; recently decreasing	32	<ul style="list-style-type: none"> Elk in Hunt Area 128 are difficult to manage as elk appear to use this hunt area on a somewhat intermittent basis; dependent on hunting pressure from adjacent areas and private lands along the Sweetwater River

Table E-3. Big Game Populations in the Casper Planning Area (Continued)

Herd Unit	Current Population Objective	Current Population Estimate¹	Population Trend	Percent BLM land within Herd Unit²	Management Challenges
Elk (Continued)					
Ferris	350	500	Increasing through 1990s; recently decreasing	37	<ul style="list-style-type: none"> • Little elk use of habitats within the Casper planning area except during severe winters
Rochelle Hills	400	460	Increasing	2	<ul style="list-style-type: none"> • Extensive road networks and illegal off-road vehicle use on public lands, disrupting elk security areas • Lack of understory (food/cover) in riparian cottonwood communities due to livestock grazing
Rawhide	40	350+	Increasing	4	<ul style="list-style-type: none"> • Poor public access, predominantly private land; resulting in an inability to obtain sufficient harvest
Iron Mountain	1,800	NA	Increasing	10	<ul style="list-style-type: none"> • Poor public access; predominantly private land; vast majority of public/BLM lands inaccessible to public
Pine Ridge	125	NA	Increasing	18	<ul style="list-style-type: none"> • Poor public access; predominantly private land; vast majority of public/BLM lands inaccessible to public
Bighorn Sheep					
Laramie Peak	500	NA, currently below objective	Increasing		<ul style="list-style-type: none"> • Poor public access; predominantly private land; vast majority of public/BLM lands inaccessible to public • Disease outbreaks - pneumonia • Cheatgrass invasion • Conifer encroachment; fire suppression

Source: WGFD 2005b

¹Estimates are postseason population estimates for 2003.

²Figures only represent lands within each Herd Unit occurring within the Casper planning area.

NA Not available

E1.5. Nongame Mammals

Table E-4, provided by the WGFD, identifies the nongame mammals potentially occurring within the planning area.

Table E-4. Potential Nongame Mammals in Casper Planning Area

Common Name	Scientific Name	Habitat ¹
Eastern red bat	<i>Lasiurus borealis</i>	Coniferous/deciduous forest, riparian woodlands
Hoary bat	<i>L. cinereus</i>	Coniferous/deciduous forest, riparian woodlands
Silver-haired bat	<i>Lasionycteris noctivagans</i>	Coniferous/deciduous forest, riparian woodlands
Eastern pipistrelle	<i>Pipistrellus subflavus</i>	Wooded areas, caves, and abandoned mines
Meadow vole	<i>Microtus pennsylvanicus</i>	Moist meadow grasslands
Sagebrush vole	<i>Lemmiscus curtatus</i>	Basin-prairie shrublands
Long-tailed vole	<i>Microtus longicaudus</i>	Sagebrush, grassland, coniferous forests
Prairie vole	<i>M. ochrogaster</i>	Shrubland and grassland
Plains pocket gopher	<i>Geomys bursarius</i>	Sagebrush and grassland
Northern pocket gopher	<i>Thomomys talpoides</i>	Most habitats
Masked shrew	<i>Sorex cinereus</i>	Riparian areas, moist meadow shrublands
Merriam's shrew	<i>S. merriami</i>	Basin-prairie shrublands
Dusky shrew	<i>S. monticolous</i>	Cottonwood riparian, talus, sagebrush-grassland
White-footed mouse	<i>Peromyscus leucopus</i>	Deciduous woodlands
Deer mouse	<i>P. maniculatus</i>	All habitats
Eastern mole	<i>Scalopus aquaticus</i>	Plains grasslands
Yellow-pine chipmunk	<i>Tamias amoenus</i>	Sagebrush-grassland, coniferous forests
Ord's kangaroo rat	<i>Dipodomys ordii</i>	Basin-prairie shrublands
Grey fox	<i>Urocyon cinereoargenteus</i>	Basin-prairie shrublands, coniferous forests
Least chipmunk	<i>T. minimus</i>	Most habitats
Yellow-bellied marmot	<i>Marmota flaviventris</i>	Rock outcrops
Wyoming ground squirrel	<i>Spermophilus elegans</i>	Basin-prairie shrublands
Golden-manteled ground squirrel	<i>S. lateralis</i>	Mountain foothill grasslands
Thirteen-lined ground squirrel	<i>S. tridecemlineatus</i>	Basin-prairie shrublands
Western harvest mouse	<i>Reithrodontomys megalotis</i>	Basin-prairie shrublands
Northern grasshopper mouse	<i>Onychomys leucogaster</i>	Basin-prairie shrublands
Bushy-tailed woodrat	<i>Neotoma cinerea</i>	Most habitats
Western jumping mouse	<i>Zapus princeps</i>	Moist meadow grasslands
Meadow jumping mouse	<i>Z. hudsonicus</i>	Moist meadow grasslands

Source: WGFD 2005c

¹For a complete habitat description, refer to WGFD 2004b – Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming.

E1.6. Greater Sage-Grouse

The following text is a Greater Sage-Grouse Assessment from the WGFD (2005d). A summary of this information is found in Chapter 3 and cited as WGFD 2005. The following paragraphs, provided by the WGFD, may include opinions and statements that may not agree with or represent the opinions or policies of the BLM. In addition, the information provided by the WGFD has not undergone a complete technical edit and review.

From the beginning of recorded history, sage-grouse have been part of Wyoming and the Wyoming way of life. Native Americans mimicked them, early travelers wrote about them, and pioneers subsisted on them. For generations of Wyoming hunters, the opening day of “sage chicken” season was the first

official day of autumn. In recent years, wildlife enthusiasts have been fascinated by the birds' dramatic spring courtship rituals.

Up until the middle of the 20th century, sage-grouse flourished in Wyoming and throughout most of the West. By the mid-1950s biologists in the western states began to express concerns about populations of sage-grouse and sagebrush-steppe habitats. That led the Western Association of Fish and Wildlife Agencies – of which Wyoming was, and is, a member – to establish the Western States Sage-grouse Technical Committee in 1956. Since that time, much sage-grouse information has been amassed, including the initial “Guidelines for the Protection of Sage-grouse,” first published in 1977. In 2000, this document was revised, updated, and expanded to become the “Guidelines to Manage Sage-grouse Populations and their Habitats” (Connelly et al. 2000). The guidelines provide management suggestions for biologists and land managers to use in managing sage-grouse populations and sagebrush-steppe habitats throughout the West.

By most accounts, including the recently completed range-wide “Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats” (Connelly et al. 2004), the numbers of sage-grouse have declined across their range during the past 50 years, as has the quality and distribution of the bird's requisite sagebrush-steppe habitat.

Sage-grouse are found throughout the sagebrush/grassland habitats of Bates Hole, the Shirley Basin, the Rattlesnake Hills, the south end of the South Bighorn Mountains, and the Laramie Range Mountains. Occupied habitat is fairly contiguous throughout much of Bates Hole and the Shirley Basin. Habitats within the Rattlesnake Hills and the south end of the South Bighorns are more fragmented by changes in habitat type and oil/gas development. Sage-grouse habitat in the Laramie Range is primarily limited to that portion of the west slope of the Laramie Range. Large, contiguous blocks of sagebrush/grassland communities east of the Laramie Range have, for the most part, been eliminated.

Management data collected by the WGFD, with assistance from the BLM and various volunteers, for sage-grouse have focused on lek counts and surveys, harvest statistics, and data derived from wings collected from harvested birds. Lek counts and surveys have been conducted within the Casper planning area since at least 1967. Lek counts are conducted in April and early May. Individual leks are counted 3 times in 7 to 10 day intervals. Lek counts are conducted to estimate trends in the population based on the average peak male attendance. Lek surveys are also conducted in the spring, but are only conducted one time per lek to determine general lek status (i.e., active/inactive). Some sage-grouse brood data has also been collected and documented typically during August. These brood counts provide some indication of population trends; however, their use is limited in estimating recruitment because the surveys are not conducted in either a systematic or consistent manner and sample sizes are small.

Past management of sage-grouse within the Casper planning area focused mainly on the protection and/or enhancement of their habitats and protection of leks during the breeding season. Protection efforts have primarily occurred through the project review process conducted by State and Federal agency personnel. Sage-grouse have been given increasing consideration through the project review process with emphasis on minimizing disturbance during the breeding season within and around the lek sites and protections for sage-grouse nesting and early brood rearing habitats.

Sage-Grouse Biology

The greater sage-grouse (*Centrocercus urophasianus*) is the largest species of grouse in North America. It is appropriately named due to its year-round dependence on sagebrush (*Artemisia* spp.) for both food and cover. Insects and forbs also play an important role in their food habits, but primarily during the breeding season. In general, the sage-grouse is a mobile species, capable of movements greater than 50

kilometers (km) between seasonal ranges. Despite this mobility, sage-grouse appear to display substantial amounts of fidelity to seasonal ranges. Sage-grouse populations are characterized by relatively low productivity and high survival. Sage-grouse depend on sagebrush for much of their annual food and cover. This close relationship is reflected in the North American distribution of sage-grouse, which is closely aligned with sagebrush, and in particular big sagebrush (*A. tridentata*) and silver sagebrush (*A. cana*). This relationship is perhaps tightest in the late autumn, winter, and early spring when sage-grouse are completely dependent on sagebrush for both food and cover. However, sage-grouse also depend on sagebrush at other times of year, primarily for protective cover, such as for nests during the breeding season. Other habitat characteristics may be less overtly important than sagebrush, but may be nearly as important. For example, herbaceous cover may provide both food and cover during the nesting and early brood-rearing seasons, thus playing a major role in the population dynamics of sage-grouse. For detailed discussions see Connelly et al. 2004.

Perhaps the most appropriate description of sage-grouse habitats and habitat use during nesting, early brood-rearing, and late brood-rearing within a portion of the Casper planning area is from Holloran (1999).

Nesting and Nesting Habitat – In the Bates Hole portion of the Casper planning area successful nests were found in stands of tall, dense sagebrush with increased residual grass height (greater than 12 centimeters or 4.7 inches) and forb cover, especially food forb cover. It was speculated increased food forb cover reduced hen foraging effort thereby reducing activity and scent around the nest and hence reducing the probability of detection by predators. Hen fidelity was similar to that reported by others. Successive nests were located an average of 710 meters (approximately 2,330 feet) apart. This exemplifies the need to identify and conserve existing nesting habitat within the Casper planning area. Any reduction in herbaceous cover in the sagebrush communities would negatively affect sage-grouse nesting habitat and success. Therefore, any attempts to modify sagebrush habitats should only be implemented in areas where proximal suitable habitats exist. Further, sagebrush thinning opposed to complete removal is preferred as this would allow for an increase in herbaceous vegetation without eliminating the needed shrub component.

Early Brood-rearing – The majority of chick loss (75 percent) within the study area occurred between hatch and 2 to 3 weeks of age. Therefore, early brood-rearing habitat is extremely important. Early brood-rearing habitats identified in this portion of the Casper planning area were typified by decreased shrub cover and height and increased forb and overall herbaceous cover. Hens with broods selected for the herbaceous components within sagebrush dominated sites. This makes sense as chicks less than 10 days old require insects in their diets for normal growth, development, and ultimately survival. Further, after the first week of life, forbs replace insects in the chick's diet. It is hypothesized that in the study area hen selection for early brood-rearing sites was based on forb and insect availability, not for the decreased shrub component. As with nesting habitat, management practices designed to eliminate shrub cover should be avoided. Treatments creating mosaics of different shrub seral stages, heights and densities are recommended. Further, it is recognized grazing is required to disturb areas with healthy herbaceous understories. This practice keeps the herbaceous cover from becoming overly rank and allows the establishment of weedy forbs used by hens and their broods as a food source. It is emphasized, while grazing is a valuable tool, overgrazing will decrease grass heights important as the screening component in the preferred low sagebrush density areas during early brood-rearing.

Late Brood-rearing – Hens with broods shifted from early brood-rearing areas into areas with shorter residual grass, decreased shrub density, and less non-food forb cover typically in early July when upland vegetation became desiccated. It was evident hens were selecting for areas that provided a food source at the expense of escape or screening cover. Sagebrush dominated sites (microsites) with increased succulent vegetation were preferred, but open riparian zones were used during drier periods. Similarly

barren hens and roosters selected later summer habitats based on food availability with less regard to screening or escape cover. Management practices providing a mosaic of open areas and shrub patches in different seral stages, heights, and densities are recommended. Again, total elimination of the shrub component would be detrimental. It is especially important livestock grazing on sage-grouse summer habitats be managed to ensure adequate residual vegetation is provided for.

During winter, sage-grouse feed almost exclusively on sagebrush leaves and buds. Suitable winter habitat requires sagebrush typically 10 to 14 inches above the snow. Sagebrush canopy covers utilized may range from 10 to 30 percent. Winter foraging areas tend to be gentle southwest facing slopes and windswept ridges. Roosting areas can range from open slopes with low growing sagebrush on calm nights to heavier, taller shrubs during windy periods. Sage-grouse movement (greater than 5 miles) and changes in elevation (greater than 1,000 feet) are common between winter feeding sites and suitable roosting sites (WGFD 2003). Specific wintering areas (foraging and roosting) of sage-grouse within the planning area have not been widely documented. This should be a priority.

Sage-Grouse Population and Trend

Sage-grouse are generally found throughout the Casper planning area with the exception of the more heavily forested, agriculturally developed, and urbanized areas. The Casper planning area encompasses 12 of the WGFD Upland Game Management Areas (8, 18, 22, 27, 28, 30, 32, 33, 35, 36, 37, and 45). Of course, the Resource Area boundary and the boundaries of these areas do not coincide. Population trend data is collected, stored, and analyzed by the WGFD using these areas. Therefore, some data included in this analysis is from sage-grouse not included in the Casper planning area. Data from areas 18 and 45 were excluded from these analyses because the majority of data collected in these areas was not within the Casper planning area.

It is believed monitoring male attendance on leks provides a reasonable index of relative change in abundance in response to prevailing environmental conditions over time. Nevertheless, this data must be viewed and interpreted with caution for several reasons described in the Wyoming Greater Sage Grouse Conservation Plan, 2003.

Lek count surveys have been conducted within the Casper planning area since the late 1950s; however, the most consistent data were collected starting in 1996. The number of leks counted within the Casper planning area has increased markedly since 1958. Concurrent with increased monitoring effort the number of grouse (males) has also increased. The increased number of grouse counted is not a reflection of population increase, rather one of increased monitoring effort. The number of males observed per lek has decreased by more than 31 percent since 1958 (Figure E-5). More recently, the number of males counted per lek increased through the 1980s, peaked in 1992, dramatically declined through the early 1990s to an all time low from 1994 to 1997, and has since recovered to a level similar to the early 1980s (Figure E-6). Fluctuations in the number of grouse observed on leks are not due to changes in grouse numbers exclusively. These data reflect changes in lek survey effort. Certainly, since data collection was standardized in 1996, the number of male grouse counted on leks has exhibited some recovery.

Figure E-5. Number of Males Observed Per Lek during Lek Counts by Decade, 1970 through 2004, within the Casper Planning Area

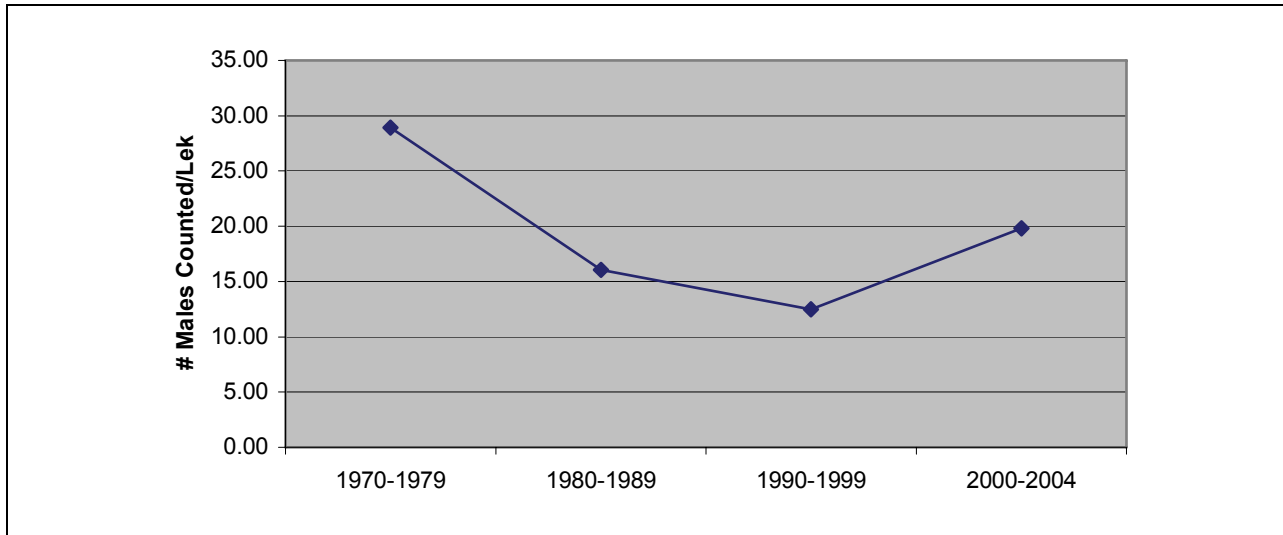
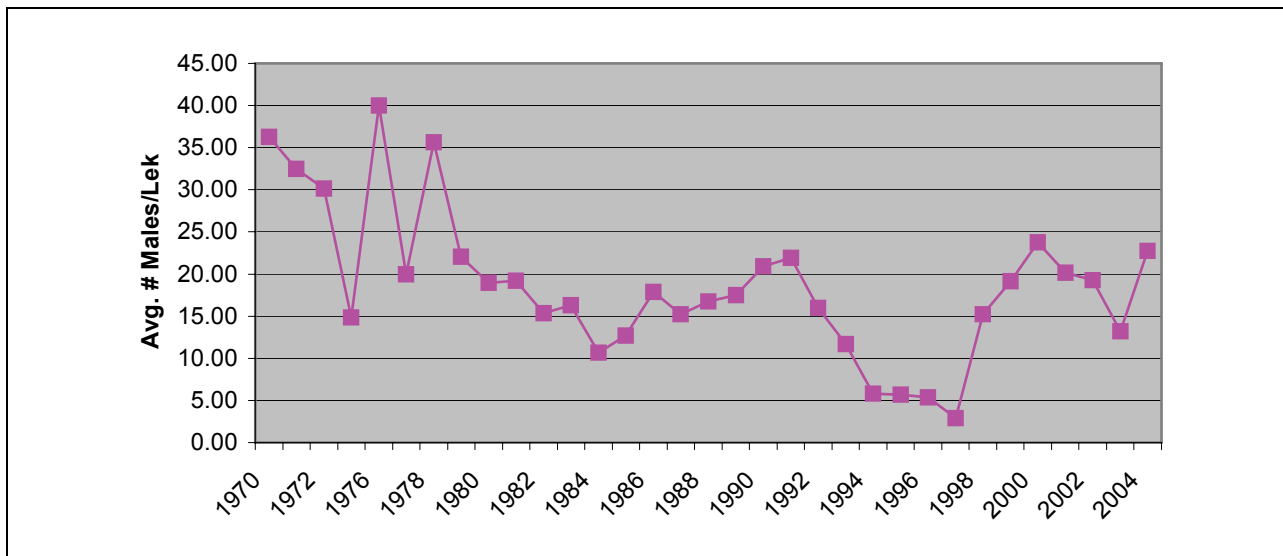


Figure E-6. Average Number of Males Per Lek Observed during Lek Counts, 1980 through 2004, within the Casper Planning Area



E1.7. References

Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildl. Soc. Bull. 28(4): 967-985.

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Appendix E – Biological Resources Support Document

- WGFD. 2003. Determining the Value of Wildlife Associated Recreation per U.S. Bureau of Land Management Field Office Region in Wyoming. Wyoming Game and Fish Department. Wyoming Game and Fish Department (WGFD). 2005c. Table of nongame mammals occurring in the Casper planning area. Input for Casper Resource Management Plan revision. File Name: NG mammals.xls.
- WGFD. 2004a. Annual Report Strategic Habitat Plan Accomplishments. 73 pages.
- WGFD. 2004b. Atlas of Birds, Mammals, Amphibians and Reptiles in Wyoming. Wildlife Division. July 2004.
- WGFD. 2005a. Wyoming Game and Fish Department Basin Management Plans.
- WGFD. 2005b. Table of biggame mammals occurring in the Casper planning area. Input for Casper Resource Management Plan revision.
- WGFD. 2005c. Table of nongame mammals occurring in the Casper planning area. Input for Casper Resource Management Plan revision. File Name: NG mammals.xls.
- WGFD. 2005d. Greater Sage-Grouse Assessment Input to Bureau of Land Management Casper Field Office Resource Management Plan Revision. Microsoft Word File: SageGrouseAssessment.doc.