

Appendix I. Specific factors that influence the integrity of Species of Greatest Conservation Need populations in New Mexico. Factors compiled by New Mexico Department of Game and Fish.

Common or Scientific Name ¹	Species Specific Factors	References
<i>Fish</i>		
Canadian Speckled Chub	Water diversion, groundwater pumping, regulated reservoir releases	NMDGF 2004a, Propst 1999
Bigscale Logperch	Predation by non-native fishes, fluctuating water levels, drying of habitat, Predation by non-native centrarchids	Propst 1999
Blue Catfish	Habitat deterioration	Sublette <i>et al.</i> 1990
Blue Sucker	Habitat fragmentation, water diversion, drying of habitat, Golden algae blooms	Propst 1999, Larson 2004
Central Stoneroller	Sedimentation, reduction in flows	NMDGF 2004a, Propst 1999
Chihuahua Chub	Non-native predators (salmonids & centrarchids) and competitors (longfin dace & rainbow trout), stream desiccation, habitat loss (debris removal, bank erosion, channelization), range fragmentation, irrigation diversion entrainment, parasites, disease	Propst 2004
Colorado Pikeminnow	Non-native fishes (particularly predators such as channel catfish), habitat fragmentation (diversion dams), loss of low-velocity habitats, entrainment in irrigation systems, modified flow regimes (loss of peaking flows as spawning cue), insufficiency of prey base, disease	Propst 1999, USFWS 1991, USFWS 2003
Desert Sucker	Non-native predators (mainly centrarchids & ictalurids), sedimentation, bank erosion, in-channel debris removal, channelization, stream desiccation, wildfire ash flows, disease	
Gila Chub	Non-native predators (mainly centrarchids & ictalurids), habitat modification (sedimentation, bank erosion, debris removal), wildfire ash flows, disease	
Gila Topminnow	Interactions with introduced gambusia species, lowered water levels	Sublette <i>et al.</i> 1990, Propst 1999
Gila Trout	Non-native competitors (mainly brown trout) and congeners (hybridizing rainbow trout), illegal angling, wildfire ash flows, disease, habitat loss (bank erosion), sedimentation	
Gray Redhorse	Drying of habitat, Golden algae blooms	Larson 2004
Greenthroat Darter	Lowered water tables, drying of springs, Predation by introduced Centrarchids, predation by non-native fishes, sediment deposition, water diversion	Propst 1999, Sublette <i>et al.</i> 2004, Brooks and Wood 1988, Hubbs and Strawn 1957, Cowley and Sublette 1987

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Common or Scientific Name ¹	Species Specific Factors	References
Headwater Catfish	Hybridization with <i>I. punctatus</i> , Drying of habitat	Sublette <i>et al.</i> 1990, Kelsch 1995
Headwater Chub	Non-native predators (mainly centrarchids & ictalurids), habitat modification (sedimentation, bank erosion, debris removal), wildfire ash flows, removal woody riparian vegetation, disease	
Loach Minnow	Non-native predators (mainly centrarchids & ictalurids) and competitors (mainly red shiner <i>Cyprinella lutrensis</i>), substrate armoring, bank instability, loss riparian vegetation, stream drying (diversion & groundwater pumping), sedimentation, channelization, wildfire ash flows, disease	
Mexican Tetra	Lowered water tables, drying of springs	Propst 1999
Mottled Sculpin	Habitat desiccation (irrigation withdrawals/diversion), habitat modification (sedimentation, channelization), disease	
Pecos Bluntnose Shiner	Drying of habitat, altered flow regimes	USFWS 1992, Hoagstom 2003, USFWS 2002
Pecos Gambusia	Lowered water tables, drying of springs, Predation by introduced Centrarchids, hybridization with <i>G. affinis</i> , loss of habitat	Echelle <i>et al.</i> 1989, Brooks and Wood 1988, USFWS 1983
Pecos Pupfish	Lowered water tables, drying of springs, Hybridization with <i>C. variegatus</i>	TPWD <i>et al.</i> 1998, Hoagstom and Brooks 1998, Minckley <i>et al.</i> 1991, Brooks and Wood 1988, Platania 2001
Rainwater Killifish	Lowered water tables, drying of springs, Predation by introduced Centrarchids, loss of habitat	Sublette <i>et al.</i> 2004, Brooks and Wood 1988, USFWS 1983
Razorback Sucker	Non-native fishes (predators), habitat modification (channalization, bank revetments), modified flow regimes, irrigation diversion entrainment, range fragmentation (diversion dams), modified flow regime, temperature modification, loss debris pool habitats, disease	USFWS 2003, Brandenburg <i>et al.</i> 2001
Rio Grande Chub	Habitat deterioration, non-native species, water diversion	Propst 1999, Douglas and Douglas 2003
Rio Grande Cutthroat Trout	Non-native species, habitat deterioration	NMDGF 2004a, Pflieger 1975, Pittinger 2004
Rio Grande Shiner	Drying of habitat	Sublette <i>et al.</i> 1990
Rio Grande Silvery Minnow	Water withdrawal, habitat fragmentation, channelization, water quality, non-native species	Sublette <i>et al.</i> 1990, USFWS 1983
Rio Grande Sucker	Habitat deterioration, non-native species, disease	NMDGF 1994a, Sublette <i>et al.</i> 1990

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Common or Scientific Name ¹	Species Specific Factors	References
Roundtail Chub	Non-native fishes (particularly predators), habitat fragmentation (dams, diversions), habitat desiccation (irrigation withdrawals/diversions), habitat modification (channelization, vegetation removal, bank revetments), modified flow regimes (loss of spring runoff and storm spike flows), irrigation diversion entrainment, wildfire ash flows (Mesa Verde Wildfire), disease, and temperature modification	UDNR 2004, Propst 1999
Smallmouth Buffalo	Habitat deterioration, harvest, non-native fishes	Minckley <i>et al.</i> 1991, Douglas and Douglas 2003
Sonora Sucker	Non-native predators (mainly centrarchids & ictalurids), sedimentation, bank erosion, in-channel debris removal, channelization, stream desiccation, wildfire ash flows, disease	
Southern Redbelly Dace	Dewatering of springs, sedimentation	NMDGF 2004a, Propst 1999
Speckled Chub	Drying of habitat	Sublette <i>et al.</i> 1990
Spikedace	Non-native predators (mainly centrarchids & ictalurids) and competitors (mainly red shiner <i>Cyprinella lutrensis</i>), substrate armoring, bank instability, loss riparian vegetation, stream drying (diversion & groundwater pumping), sedimentation, channelization, wildfire ash flows, disease	
Suckermouth Minnow	Sedimentation, habitat desiccation and fragmentation.	NMDGF 2004a, Propst 1999
White Sands Pupfish	Habitat loss due to drought and water withdrawal, non-native species, military maneuvers	Ortiz <i>et al.</i> 2000, Propst 1999
Zuni Bluehead Sucker	Habitat degradation and loss, non-native aquatic species	NMDGF 2005, Propst 1999, Propst and Hobbes 1996
Birds		
American Bittern	Loss, degradation, or fragmentation of wetland habitat, pesticides and contaminants, acid precipitation, human disturbance, small, isolated populations	Gibbs <i>et al.</i> 1992
Common Black-Hawk	Loss/fragmentation/degradation of southwestern cottonwood-sycamore riparian habitat, stream dewatering, human disturbance at nest sites, illegal shooting	NMDGF 2004a
Boreal Owl	Loss of undisturbed spruce-fir and similar forests from timber harvest or other factors	Hayward and Hayward 1993, NMDGF 2004
Painted Bunting	Loss or degradation of riparian habitats, including programs to eradicate non-native plants, documented population declines	Lowther <i>et al.</i> 1999

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Varied Bunting	Loss of dense, shrubby riparian habitats from clearing, conversion, burning, improper grazing practices, and/or urbanization	Groschupf and Thompson 1998, NMDGF 2004a
Neotropic Cormorant	Loss/degradation of breeding sites, including loss of trees/snags for nest substrate, disturbance to breeding colonies, fluctuations in fish prey base, illegal shooting and other persecution	Telfair and Morrison 1995, NMDGF 2004a
Sandhill Crane	Loss or degradation of limited wetland and playa habitats, disturbance to roosting birds, disease, low recruitment rates	Tacha <i>et al.</i> 1992
Yellow-Billed Cuckoo	Loss, fragmentation, and degradation of riparian habitats from clearing for urban or agricultural development, improper grazing practices, flood control, schemes to eradicate exotic vegetation	pers. comm., S. Williams, NMDGF
Long-Billed Curlew	Loss, alteration, and fragmentation of native prairie breeding habitat from agricultural conversion, urbanization, improper grazing practices, shrub encroachment	Dugger and Dugger 2002, NMPIF 2004a
Mourning Dove	Persistent declining population trends, competition with expanding populations of native and non-native dove species, disease	Dolton and Rau 2004, pers. comm., J. Haskins, USFWS
Northern Pintail	Rangewide population decline related to drought and wetland conversion, wintering habitat losses from increased urbanization of agricultural lands and native habitats, degradation of playa habitats	Millar and Duncan 1999
Bald Eagle	Human disturbance to nests and winter roosts, loss/degradation of breeding and wintering habitat, including declines in prey populations and in nest/roost site availability, environmental contamination, electrocution, illegal killing by shooting and poisoning	NMDGF 2004a
Golden Eagle	Degradation of habitat, especially shrublands, from clearing, fires, surface mining, urbanization and human population growth, declining prey populations related to habitat degradation, disturbance and taking, electrocution, collision, lead poisoning, illegal shooting and poisoning	Kochert <i>et al.</i> 2002
Aplomado Falcon	Loss, degradation, or alteration of desert grassland habitat leading to reduced grass cover, increased brush encroachment, and reduced prey populations, resulting from improper grazing practices or agricultural conversion, fire, pesticides and other contaminants, electrocution, accidental drowning, human disturbance including research activities, lack of regulatory protection measures for individuals and habitats	USFWS 1990, Keddy-Hector 2000, NMDGF 2004a

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Common or Scientific Name ¹	Species Specific Factors	References
Peregrine Falcon	Chemical contamination of environment, disturbance of nesting pairs, illegal taking	NMDGF 2004a, Johnson and Williams 2004
Olive-Sided Flycatcher	Significant and accelerating rangewide population declines potentially linked to forest habitat losses from timber management or fire suppression	Altman and Sallabanks 2000
Southwestern Willow Flycatcher	Loss, fragmentation, or alteration of riparian habitat from water manipulation, urbanization, improper grazing practices, fire, and vegetation eradication programs, negative impacts from recreation and research, demography of fragmented populations	NMDGF 2004a
Northern Goshawk	Loss or alteration of forest habitat from timber harvest, fire, disturbance to nesting birds, illegal shooting and taking	Squires and Reynolds 1997
Eared Grebe	Loss/degradation of higher elevation wetland breeding habitat through drainage, conversion, flooding and/or dewatering for irrigation, grazing of emergent vegetation, contaminants	Cullen <i>et al.</i> 1999, pers. comm., D. Krueper, USFWS
Common Ground-Dove	Loss of lower elevation riparian shrublands, altered hydrology leading to dewatered riparian areas	NMDGF 2004a
Blue Grouse	Habitat loss or alteration from urbanization, agriculture, timber harvest, fire, improper grazing practices, and road building	Zwickel 1992
Northern Harrier	Loss/alteration of marsh/wet meadow breeding habitat from draining/drying marshes, conversion to monotypic agriculture, improper grazing practices, disturbance of nest sites from agricultural practices, pesticides and contaminants, illegal shooting	MacWhirter and Bildstein 1996
Ferruginous Hawk	Loss or alteration of native grassland habitats, including through urbanization, conversion, energy development, road construction, and shrub encroachment, decreased prey populations due to human activities, human disturbance at nest sites, illegal shooting	Bechard and Schmutz 1995, NMPIF 2004a
Broad-Billed Hummingbird	Loss of southwestern riparian canyon woodlands from fire, improper grazing practices, and clearing	NMDGF 2004a
Costa's Hummingbird	Loss of native xeric hillside vegetation and adjacent riparian habitats in southwestern New Mexico from burning or improper grazing practices	NMDGF 2004a
Lucifer Hummingbird	Loss of native dry-canyon/hillside habitats, including loss of food plants from burning or improper grazing practices	NMDGF 2004a
Violet-Crowned Hummingbird	Loss of low-elevation broadleaf riparian canyon woodlands, especially loss of scarce big-tree riparian habitats from fire, loss of food sources such as agaves from fire	Williams 2002, NMDGF 2004a

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White-Faced Ibis	Loss /degradation of wetland habitat, disturbance to breeding colonies, pesticides and other contaminants/toxicants	Ryder and Manry 1994
Pinyon Jay	Loss, degradation, or fragmentation of pinyon-juniper woodlands from conversion, clearing, firewood cutting, improper grazing practices, and altered fire regimes, illegal shooting	Balda 2002
Yellow-Eyed Junco	Small, isolated populations vulnerable to montane forest habitat loss or modification	NMDGF 2004a
Thick-Billed Kingbird	Loss or degradation of broadleaf riparian woodland habitat from fire, lowered water tables, improper grazing practices	NMDGF 2004a
Hooded Oriole	Loss or fragmentation of broadleaf riparian habitat from clearing, dewatering, fire, and improper grazing practices, cowbird parasitism	Krueper <i>et al.</i> 2003
Osprey	Human disturbance and shoreline development, prey population fluctuations, pesticides and contaminants, electrocution, collision, illegal shooting	Poole <i>et al.</i> 2002
Burrowing Owl	Loss or fragmentation of grassland habitat to agricultural conversion or urbanization, elimination of burrowing rodents such as prairie dogs, improper grazing practices, burning, mowing, illegal shooting	Klute <i>et al.</i> 2003
Elf Owl	Loss or degradation of mature riparian and canyon forest nesting habitat, human disturbance	NMPIF 2004
Whiskered Screech-Owl	Loss of pine-oak and oak woodland within restricted range from vegetation removal and natural and prescribed fires, human disturbance	NMDGF 2004a
Mexican Spotted Owl	Loss of preferred mature and old growth forest habitat from timber harvest and other cutting, altered fire regimes, stand-replacing fires	USFWS 1993, USFWS 1995
Greater Pewee	Loss, alteration, or degradation of southwestern pine-oak and mixed conifer habitats, especially loss of large conifers, reduced prey base from pesticide use in forest habitats	Chase and Twite 1999
Wilson's Phalarope	Loss of wetland/wet meadow breeding areas from water diversion, improper grazing practices, agricultural conversion, chemical contamination	pers. comm., W. Howe, USFWS
Band-Tailed Pigeon	Long-term population declines potentially linked to habitat alteration due to fire or drought, disease	Keppie and Braun 2000, pers. comm., J. Haskins, USFWS
Sprague's Pipit	Loss or fragmentation of native grassland habitats from improper grazing practices, land conversion, brush encroachment, and oil and gas development	Robbins and Dale 1999, pers. Comm., W. Howe, USFWS

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Common or Scientific Name ¹	Species Specific Factors	References
Mountain Plover	Loss or alteration of prairie breeding areas from agricultural conversion, energy development, surface mining, exotic vegetation, loss of native grazers including prairie dogs, loss or fragmentation of migration and wintering areas from conversion, urbanization, environmental contamination	Knopf 1996, NMPIF 2004
Snowy Plover	Loss or degradation of breeding alkali flats and playas from flooding, drying, and/or vegetation encroachment, disturbance to nesting birds	Page <i>et al.</i> 1995, NMPIF 2004
Lesser Prairie-Chicken	Loss, degradation, fragmentation of habitat through improper grazing practices, shrub control, and oil and gas development, small-population phenomena	Bailey and Williams 2000
White-Tailed Ptarmigan	Loss or alteration of limited alpine tundra habitat through overuse by grazing ungulates including elk and bighorn, increased human use, ski area development, construction of snow catchment fences, construction and operation of microwave relay stations	Braun <i>et al.</i> 1993, NMDGF 2004a
Montezuma Quail	Improper grazing practices of understory grasses necessary for food and nesting cover, altered fire regimes leading to replacement of required habitat, habitat loss to development and urbanization	Stromberg 2000, NMPIF 2004
Scaled Quail	Improper grazing practices compounded by periodic drought, habitat loss related to brush control	pers. comm., W. Howe, USFWS
Painted Redstart	Loss or alteration of middle elevation oak and pine-oak riparian woodlands from timber management, fire, and drought, human disturbance to nesting birds	pers. comm., S. Williams, NMDGF
Williamson's Sapsucker	Loss or alteration of mature mixed and deciduous forest habitats, especially mature aspen groves, from fire and timber operations	Dobbs <i>et al.</i> 1997, NMPIF 2004
Loggerhead Shrike	Significant rangewide declines potentially linked to habitat loss/degradation from changing agricultural practices, brush control programs or other land use changes, pesticide contamination, collision with vehicles	Pruitt 2000
Baird's Sparrow	Loss or degradation of native grassland habitat from improper grazing practices, shrub encroachment, land development, and oil and gas development	Green <i>et al.</i> 2002, NMDGF 2004a
Botteri's Sparrow	Loss or degradation of limited tall-grass habitat from improper grazing practices and fire	pers. comm., S. Williams, NMDGF
Grasshopper Sparrow	Loss or degradation of native grassland habitat, primarily from improper grazing practices and ill-timed (late spring-early summer) fires	NMDGF 2004a

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Common or Scientific Name¹**Species Specific Factors****References**

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Sage Sparrow	Rangewide declines linked to fragmentation, degradation, or destruction of sagebrush habitat from mechanical, chemical, and burning programs, improper grazing practices of disturbed/treated sagelands, altered fire regimes, exotic plant encroachment	Martin and Carlson 1998
Bank Swallow	Destruction or alteration of streambank nesting habitat from flood- and erosion-control projects, bank stabilization projects, inundation, road building	Garrison 1999
Black Swift	Disturbance at nesting caves	pers. comm., S. Williams, NMDGF
Interior Least Tern	Loss or alteration of riverine habitats from altered flow regimes, channelization, inundation, chemical contamination of prey base, human disturbance of nesting flats	1990, NMDGF 2004a
Bendire's Thrasher	Total population small and restricted, significant rangewide population declines potentially related to habitat changes or to unknown factors	pers. comm., S. Williams, NMDGF
Sage Thrasher	Loss or degradation of sagebrush habitat through mechanical or chemical clearing, invasion of non-native plants, conversion to agriculture, fire	Reynolds <i>et al.</i> 1999
Juniper Titmouse	Rangewide declining trends potentially related to loss of pinyon-juniper habitat from clearing, range conversion, excessive firewood and fence post cutting	Cicero 2000
Abert's Towhee	Loss, alteration, or degradation of native southwestern riparian habitats from improper grazing practices, clearing, or conversion	NMDGF 2004a
Elegant Trogon	Loss of limited broadleaf riparian foraging and breeding habitat, including large trees with suitable nesting cavities, from fire, wood cutting, and improper grazing practices, human disturbance of nesting birds	NMDGF 2004a
Gould's Wild Turkey	Habitat loss from removal of vegetation, fire, improper grazing practices, lack of water sources, hybridization with non-native turkeys, human killing and disturbance	NMDGF 2004a
Northern Beardless-Tyrannulet	Loss or degradation of native riparian habitat through clearing, burning, and improper grazing practices	NMDGF 2004a
Bell's Vireo	Loss or fragmentation of dense shrubby/woody riparian habitats from urbanization, agricultural conversion, improper grazing practices, firewood cutting, flood control, and reservoir construction, cowbird parasitism	Brown 1993, NMDGF 2004a
Gray Vireo	Loss or alteration of quality juniper-grassland habitat from clearing, burning, and improper grazing practices, cowbird parasitism	NMDGF 2004a

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Common or Scientific Name¹	Species Specific Factors	References
Grace's Warbler	Loss, alteration, or fragmentation of ponderosa pine habitat from timber harvest, firewood harvest, improper grazing practices, fire suppression, and urban development	Block and Finch 1997, Stacier and Guzy 2002
Black-Throated Gray Warbler	Loss or alteration of pinyon-juniper and oak-juniper woodlands through thinning, clearing, fire, or disease	pers. comm., W. Howe, USFWS
Lucy's Warbler	Loss or degradation of southwestern riparian habitats from clearing, firewood cutting, improper grazing practices, fire, and inundation	Johnson <i>et al.</i> 1997
Red-Faced Warbler	Loss or alteration of undisturbed montane riparian and forest habitats from timber harvest, catastrophic fire, and improper grazing practices, human disturbance to nesting birds	NMPIF 2004
Yellow Warbler	Loss or degradation of willow and other riparian habitats from improper grazing practices, clearing, and flood control projects	Lowther <i>et al.</i> 1999, Krueper <i>et al.</i> 2003
Gila Woodpecker	Habitat destruction from cutting or other destructive clearing (burning, inundation) of mature cotton and sycamore riparian stands, progressive fragmentation of remaining habitat patches, competition for nest sites with exotic European starlings	NMDGF 2004a
Lewis's Woodpecker	Loss or alteration of ponderosa pine nesting habitat from altered fire regimes, timber harvest including salvage logging, improper grazing practices, progressive loss of mature cottonwood bosque breeding habitat	NMFIF 2004
Red-Headed Woodpecker	Loss or degradation of breeding habitat, especially mature cottonwood bosque, from urbanization, clearing and other cutting, agricultural conversion, river channelization, competition for nest sites with exotic European starlings	Smith <i>et al.</i> 2000, pers. comm., W. Howe, USFWS
<i>Mammals</i>		
Allen's Big-Eared Bat	Roost disturbance	CO Committee, Western Bat Working Group 2003
Pocketed Free-Tailed Bat	Poorly known, probably roost disturbance	AZ Bat Resource Group 2003
Lesser Long-Nosed Bat	Roost disturbance, wildfire, loss of nectar plants	NMDGF 2004a
Mexican Long-Nosed Bat	Roost disturbance, wildfire, loss of nectar plants	NMDGF 2004a
Mexican Long-Tongued Bat	Roost disturbance, wildfire, loss of nectar plants	AZ Bat Conservation Strategic Plan 2003
Arizona Myotis Bat	Habitat loss/conversion, roost disturbance	CO Committee, Western Bat Working Group 2003

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Common or Scientific Name¹	Species Specific Factors	References
Western Red Bat	Riparian habitat loss/conversion, small populations	AZ Bat Conservation Strategic Plan 2003
Spotted Bat	Roost/foraging habitat disturbance, pesticides	NMDGF 2004a
Western Yellow Bat	Riparian habitat loss/conversion, small populations	NMDGF 2004a
Black Bear	Upland habitat loss/conversion, drought, human conflicts	pers. comm., R. Winslow, NMDGF
American Beaver	Water withdrawals, habitat loss/fragmentation, depredation control	pers. comm., J. Stuart, NMDGF
Penasco Least Chipmunk	Habitat loss/fragmentation, species competition	NMDGF 2004a
White-Nosed Coati	Madrean/riparian habitat loss/fragmentation, small populations, spring loss	pers. comm., J.K. Frey, NMSU
Mule Deer	Habitat loss/fragmentation, ecological succession, drought	pers. comm., B. Hale, NMDGF
Coues' White-Tailed Deer	Habitat loss/fragmentation, ecological succession, drought	pers. comm., B. Hale, NMDGF
Swift Fox	Grassland habitat loss/conversion, road mortality	pers. comm., J. Stuart, NMDGF
Southern Pocket Gopher	Habitat loss/conversion, wildfire, small populations	NMDGF 2004a
Snowshoe Hare	Loss of dense forest through logging, development, wildfire	pers. comm., J.K. Frey, NMSU
Jaguar	Habitat loss/conversion/fragmentation, illegal shooting	FWS 1997
American Marten	Timber overharvest, forest habitat loss/conversion, wildfire	NMDGF 2004a
New Mexico Meadow Jumping Mouse	Improper grazing practices, wetland habitat loss/conversion, small populations	NMDGF 2004a
Northern Pygmy Mouse	Improper grazing practices, grassland habitat loss/conversion, small populations	pers. comm., J. Stuart, NMDGF
River Otter	Riverine habitat loss/conversion, water pollution	pers. comm., J.K. Frey, NMSU
Goat Peak Pika	Habitat loss/conversion, climate change, small populations	pers. comm., J. Stuart, NMDGF
Black-Tailed Prairie Dog	Sylvatic plague, habitat loss/fragmentation, unregulated taking	USFWS 2000
Gunnison's Prairie Dog	Sylvatic plague, unregulated taking, habitat loss/fragmentation	Knowles 2002
White-Sided Jack Rabbit	Improper grazing practices, habitat loss/conversion, small populations	NMDGF 2004a

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White-Tailed Jack Rabbit	Grassland loss w/in sage community, fragmentation, improper grazing practices	pers. comm., J.K. Frey, NMSU
Yellow-Nosed Cotton Rat	Improper grazing practices, grassland habitat loss/conversion, small populations	pers. comm., J. Stuart, NMDGF
Desert Bighorn Sheep	Woody vegetation encroachment, improper grazing practices, disease from domestic livestock, inbreeding, lion predation	pers. comm., E. Rominger, NMDGF
Rocky Mountain Bighorn Sheep	Woody vegetation encroachment, climate change, disease from domestic livestock	pers. comm., E. Rominger, NMDGF
Arizona Shrew	Habitat loss/conversion, wildfire, small populations	NMDGF 2004a
Least Shrew	Improper grazing practices, habitat loss/conversion, wetland drying	NMDGF 2004a
New Mexico Shrew	Timber overharvest, wildfire, habitat loss/conversion	pers. comm., J.K. Frey, NMSU
Preble's Shrew	Habitat loss/conversion, improper grazing practices, drought/climate change	pers. comm., J.K. Frey, NMSU
Abert's Squirrel	Forest habitat loss/conversion, drought, wildfire	pers. comm., J.K. Frey, NMSU
Arizona Gray Squirrel	Riparian habitat loss/conversion, small populations	pers. comm., J.K. Frey, NMSU
Arizona Montane Vole	Improper grazing practices, wetland habitat loss/conversion, small populations	NMDGF 2004a
Prairie Vole	Improper grazing practices, wetland habitat loss/conversion, small populations	pers. comm., J. Stuart, NMDGF
Mexican Gray Wolf	Illegal killing, road mortality, disease, small populations, habitat fragmentation	NMDGF 2004a
<i>Amphibians</i>		
Western Chorus Frog	disease, non-native predators (bullfrogs, non-native fishes, crawfish), conversion of habitat to agriculture, draining of wetlands	Kats <i>et al.</i> 2003, Daszak <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Chiricahua Leopard Frog	disease, non-native predators (bullfrogs, non-native fishes, crawfish), habitat modification, drought	Kats <i>et al.</i> 2003, Daszak <i>et al.</i> 2004, USFWS (In Prep) 2002
Lowland Leopard Frog	disease, non-native predators (bullfrogs, non-native fishes, crawfish), limited range in NM	Kats <i>et al.</i> 2003, Daszak <i>et al.</i> 2004, Degenhardt <i>et al.</i> 1996
Northern Leopard Frog	disease, non-native predators (bullfrogs, non-native fishes, crawfish), habitat modification, drought	Kats <i>et al.</i> 2003, Daszak <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF

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Plains Leopard Frog	disease, non-native predators (bullfrogs, non-native fishes, crawfish), habitat modification, drought	Kats <i>et al.</i> 2003, Daszak <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Rio Grande Leopard Frog	disease, non-native predators (bullfrogs, non-native fishes, crawfish), habitat modification, drought	Kats <i>et al.</i> 2003, Daszak <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Mountain Tree Frog	disease, habitat modification	pers. comm., C. Painter, NMDGF
Jemez Mountains Salamander	disease, silvicultural activities, drought, wildfire	Degenhardt <i>et al.</i> 1996, pers. comm., C. Painter, NMDGF
Sacramento Mountain Salamander	disease, Silvicultural activities, drought, wildfire	Ramotnik 1996, Ramotnik 1997, NMDGF 2000
Tiger Salamander	disease, use and transportation as fish bait (direct mortality and genetic swamping), pet trade	Collins <i>et al.</i> 2004, Fitzgerald <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Arizona Toad	disease, hybridization, conversion of habitat to agriculture	Sullivan 1986, pers. comm., C. Painter, NMDGF
Western Boreal Toad	disease, introduced trout, habitat alteration	Hammerson 1999, Goettl 1997
Colorado River Toad	modification of wetland habitat, conversion to agriculture, highway mortality	pers. comm., C. Painter, NMDGF
Great Plains Narrowmouth Toad	elimination of wetland habitat, conversion to agriculture, non-native predators (bullfrogs)	Stuart and Painter 1996
Reptiles		
Western River Cooter	indiscriminate shooting, drought, water diversion, pet trade, market hunting	Fitzgerald <i>et al.</i> 2004
Texas Banded Gecko	pet trade	NMDGF Collecting Permit files, Fitzgerald <i>et al.</i> 2004
California Kingsnake	highway mortality, limited NM range, pet trade	Fitzgerald <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Gray-Banded Kingsnake	pet trade, lack of life history data, isolated small population, periphery of range	Hakkila 1994, NMDGF 2002, Fitzgerald <i>et al.</i> 2004
Sonoran Mountain Kingsnake	wildfire, habitat alteration, pet trade	Fitzgerald <i>et al.</i> 2004, Hubbs 2004
Madrean Alligator Lizard	wildfire, conversion of habitat	pers. comm., C. Painter, NMDGF

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Collared Lizard	extensive urbanization, agricultural development and associated pesticides and herbicides, invasion of non-native grasses (cheatgrass), pet trade, oil/gas industry opening roads thus increasing access to habitat	NMDGF Collecting Permit files, Hamerson 1999
Bunch Grass Lizard	improper grazing practices, wildfire, conversion of habitat	Bock and Bock 2000, pers. comm., C. Painter, NMDGF
Regal Horned Lizard	wildfire, limited range in NM	pers. comm., C. Painter, NMDGF
Sand Dune Lizard	habitat conversion, herbicide spraying, oil/gas exploration and development,	Painter <i>et al.</i> 1999, Fitzgerald <i>et al.</i> 1997
Desert Massasauga	conversion of grasslands to agriculture herbicide spraying, improper grazing practices, pet trade, indiscriminate killing, fragmentation of populations (=habitat)	Hammerson 1999, Holycross 2002
Reticulate Gila Monster	wildfire, habitat conversion to agriculture, indiscriminate killing, pet trade	Brown and Carmony 1991, Beck 2005, NMDGF 2000, pers. comm., C. Painter, NMDGF
Western Diamondback Rattlesnake	highway mortality, commercial trade, indiscriminate killing, addition of new roads opening habitat and thus exposure to people	Fitzgerald and Painter 2000, pers. comm., C. Painter, NMDGF
New Mexico Ridgenose Rattlesnake	wildfire, commercial trade, small isolated population	Degenhardt <i>et al.</i> 1996, NMDGF 2000, Holycross 2002, pers. comm., C. Painter, NMDGF
Banded Rock Rattlesnake	commercial trade, indiscriminate killing, addition of new roads opening habitat and thus exposure to people	Degenhardt <i>et al.</i> 1996, NMDGF 2000, Fitzgerald <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Mottled Rock Rattlesnake	commercial trade, indiscriminate killing, addition of new roads opening habitat and thus exposure to people	Degenhardt <i>et al.</i> 1996, NMDGF 2000, Fitzgerald <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Mountain Skink	wildfire, conversion of habitat	pers. comm., C. Painter, NMDGF
Big Bend Slider	indiscriminate shooting, drought, water diversion, pet trade, market hunting	Fitzgerald <i>et al.</i> 2004
Yaqui Blackhead Snake	wildfire, limited NM distribution, isolated, small population	Degenhardt <i>et al.</i> 1996, NMDGF 2000, pers. comm., C. Painter, NMDGF
Mexican Garter Snake	limited NM distribution, draining and destruction of wetlands, non-native predators, indiscriminate killing	Degenhardt <i>et al.</i> 1996, NMDGF 2000, pers. comm., C. Painter, NMDGF

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Common or Scientific Name¹**Species Specific Factors****References**

Narrowhead Garter Snake	disease, non-native predators (bullfrogs, non-native fishes, crawfish), improper grazing practices of streamside vegetation, erosion of banks, siltation, recreational use of habitat, indiscriminate killing	Nowak and Santana-Bendix 2003a, Nowak and Santana-Bendix 2003b, pers. comm., C. Painter, NMDGF
New Mexico Garter Snake	limited NM distribution, conversion to agriculture, draining of wetlands, drought, highway mortality, indiscriminate killing	pers. comm., C. Painter, NMDGF
Milk Snake	lack of life history data, highway mortality, intensive urbanization, pet trade	NMDGF permit files, Hammerson 1999, Fitzgerald <i>et al.</i> 2004
Green Rat Snake	wildfire, limited NM distribution, isolated, small population, pet trade	Degenhardt <i>et al.</i> 1996, NMDGF 2000, Fitzgerald <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Arid Land Ribbon Snake	limited NM distribution, draining of wetlands, non-native predators, indiscriminate killing	Degenhardt <i>et al.</i> 1996, NMDGF 2000, pers. comm., C. Painter, NMDGF
Blotched Water Snake	indiscriminate shooting, drought, water diversion, pet trade	Degenhardt <i>et al.</i> 1996, NMDGF 2000, Fitzgerald <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Ornate Box Turtle	highway mortality, pet trade, turtle races (Clovis), conversion to agriculture, improper grazing practices	Degenhardt <i>et al.</i> 1996, Hammerson 1999, pers. comm., C. Painter, NMDGF
Sonoran Mud Turtle	habitat modification, drought	pers. comm., C. Painter, NMDGF
Western Painted Turtle	indiscriminate shooting, drought, water diversion, pet trade, market hunting	Fitzgerald <i>et al.</i> 2004
Midland Smooth Softshell Turtle	indiscriminate shooting, drought, water diversion, pet trade, market hunting	Fitzgerald <i>et al.</i> 2004, pers. comm., C. Painter, NMDGF
Gray-Checkered Whiptail	improper grazing practices, competition with native species (genetic swamping), herbicide treatment of creosotebush	Cole <i>et al.</i> (In Prep), pers. comm., C. Painter, NMDGF
Giant Spotted Whiptail	wildfire, conversion of habitat	pers. comm., C. Painter, NMDGF
<i>Molluscs</i>		
Paper Pondshell Mussel	habitat modification (damming, stream channelization, regulated flows), non-native bivalves	Lang and Mehlhop 1996, NMDGF 2004a, website ²
Texas Hornshell	habitat modification (damming, diversion), aquifer depletion, surface water contamination, drought, sedimentation, non-native molluscs, golden algae	Lang 2004

Appendix I Cont.

Common or Scientific Name ¹	Species Specific Factors	References
Swamp Fingernailclam	stream channel incisement/aggradation from poor watershed management practices, water pollution	NMDGF 2004a
Lake Fingernailclam	stream channel incisement/aggradation from poor watershed management practices, water pollution	NMDGF 2004a
Long Fingernailclam	stream channel incisement/aggradation from poor watershed management practices, water pollution	NMDGF 2004a
Chupadera Pyrg Snail	spring diversion/impoundment, improper grazing practices riparian corridor, non-native species (crayfish, New Zealand mudsnail)	Fernandez and Rosen 1996, Childs 1999, NMDGF 2004a, website ³
Gila Pyrg Snail	recreational bathing, non-native species (crayfish, New Zealand mudsnail)	Fernandez and Rosen 1996, Childs 1999, NMDGF 2004a, website ³
Socorro Pyrg Snail	spring diversion/impoundment, non-native crayfish	Fernandez and Rosen 1996, Childs 1999, NMDGF 2004a
Pecos Pyrg Snail	spring diversion/impoundment, improper grazing practices riparian corridor, groundwater depletion/contamination, non-native species (crayfish, New Zealand mudsnail)	Fernandez and Rosen 1996, Childs 1999, NMDGF 2004a, Lang 2005a, website ³
Roswell Pyrg Snail	groundwater depletion, spring habitat alterations, wildfire, ground/surface water contamination, non-native molluscs	Lang 2005a, NMDGF 2005a, website ³
New Mexico Hot spring Pyrg Snail	recreational bathing, non-native species (crayfish, New Zealand mudsnail)	Fernandez and Rosen 1996, Childs 1999, NMDGF 2004a, website ³
Alamosa Springsnail	beryllium mining, non-native species (crayfish, New Zealand mudsnail, tamarisk)	Fernandez and Rosen 1996, Childs 1999, NMDGF 2004a, website ³
Koster's Tryonia Snail	groundwater depletion, spring habitat alterations, wildfire, ground/surface water contamination, non-native molluscs	Lang 2005a, NMDGF 2005a, website ³
Pecos Assiminea Snail	groundwater depletion, spring habitat alterations, wildfire, ground/surface water contamination, non-native molluscs	Lang 2005a, NMDGF 2005a, website ³
Wrinkled Marshsnail	habitat loss (improper grazing practices, arroyo entrenchment/sedimentation, fire frequency), drought, water contamination from sewage effluent, hydroperiod alteration, vegetative loss within drainage catchment	NMDGF 2004a, Lang 2005a
Star Gyro Snail	habitat modification (wetland filling, change in hydrology)	NMDGF 2004a
New Mexico Ramshorn Snail	arroyo entrenchment/sedimentation, hydroperiod alteration, drought, human alteration of swales and depressions	Taylor 1985, Leibowitz and Nadeau 2003, pers. comm., B. Lang, NMDGF
Creeping Ancyliid Snail	habitat modification (damming, diversion), non-native fish introductions	Hoving 2004

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Common or Scientific Name ¹	Species Specific Factors	References
Obese Thorn Snail	human habitat modification	Metcalf and Smartt 1997
Crestless Column Snail	human alteration of high elevation wetlands	pers. comm., B. Lang, NMDGF
Three-Toothed Column Snail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997
Sonoran Snaggletooth Snail	human habitat modification	pers. comm., B. Lang, NMDGF
Shortneck Snaggletooth Snail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Blade Vertigo Snail	groundwater depletion, wetland habitat alterations (improper grazing practices, human modification)	pers. comm., B. Lang, NMDGF
Ovate Vertigo Snail	groundwater depletion, wetland habitat alterations (improper grazing practices, human modification)	Metcalf and Smartt 1997
Vallonia Snail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Distorted Metastoma Snail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Cockerell Holospira Snail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Cross Holospira Snail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Metcalf Holospira Snail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Animas Mountain Holospira Snail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Whitewashed Radabotus Snail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Rocky Mountainsnail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997
Mineral Creek Mountainsnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Black Range Mountainsnail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997
Socorro Mountainsnail	fire, mining, deforestation, road & bldg. construction, land-use on Ft. Bliss and WSMR	Lang 2000, Lang 2005b, Sullivan 1997, Boykin <i>et al.</i> 2001
Bearded Mountainsnail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997

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Common or Scientific Name¹	Species Specific Factors	References
Hacheta Mountainsnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Fringed Mountainsnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Blunt Ambersnail	groundwater depletion, spring habitat alterations, wildfire, ground/surface water contamination, beryllium mining	Metcalf and Smartt 1997, NMDGF 2000, pers. comm., B. Lang, NMDGF
Amber Glass Snail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997
Western Glass Snail	human alteration of high elevation wetlands	pers. comm., B. Lang, NMDGF
Marsh Slug Snail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997
Texas Liptooth Snail	groundwater depletion, spring habitat alterations, wildfire, ground/surface water contamination, human habitat modification, saltcedar invasion, improper grazing practices	Metcalf and Smartt 1997, pers. comm., B. Lang, NMDGF
Sangre de Cristo Woodlandsnail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997
Jemez Woodlandsnail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997
Woodlandsnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Iron Creek Woodlandsnail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997
Cook's Peak Woodlandsnail	fire, mining, deforestation, improper grazing practices	Lang 2000, Lang 2005b, Sullivan 1997
Big Hatchet Woodlandsnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Animas Peak Woodlandsnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Spruce Snail	fire, mining, deforestation, road & bldg. construction	Lang 2000, Lang 2005b, Sullivan 1997
Big Hatchet Mountain Talussnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Organ Mountain Talussnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Franklin Mountain Talussnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997

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Common or Scientific Name ¹	Species Specific Factors	References
Dona Ana Talussnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Animas Talussnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Florida Mountain Talussnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
San Luis Mountains Talussnail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Northern Treeband Snail	fire, mining, deforestation	Lang 2000, Lang 2005b, Sullivan 1997
Crustaceans		
Akali Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
BLNWR cryptic species Amphipod	groundwater depletion, spring habitat alterations, wildfire, ground/surface water contamination, non-native molluscs	Lang 2005a, NMDGF 2005a, website ³
Sit. Bull Sp. cryptic species Amphipod	spring habitat alterations, wildfire, non-native molluscs and crayfish	Fernandez and Rosen 1996, Childs 1999, pers. comm., B. Lang, NMDGF, website ³
Noel's Amphipod	groundwater depletion, spring habitat alterations, wildfire, ground/surface water contamination, non-native molluscs	Lang 2005a, NMDGF 2005a, website ³
Beavertail Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Brine Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Colorado Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Conchas Crayfish	stream channel incisement/aggradation from poor watershed management practices, non-native molluscs and crayfish	Lang and Mehlhop 1996, Lodge <i>et al.</i> 2000, website ²
Crayfish	regulated flows, stream channel incisement/aggradation, non-native molluscs and crayfish	Taylor <i>et al.</i> 1996, Lodge <i>et al.</i> 2000, website ²
Northern (Canadian River) Crayfish	non-native molluscs and crayfish	Lang and Mehlhop 1996, website ²
<i>Cyzicus sp. (mexicanus)</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
<i>Eocyclus concavus</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003

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Common or Scientific Name ¹	Species Specific Factors	References
<i>Eocyzicus digueti</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
<i>Eulimnadia antlei</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
<i>Eulimnadia cylindrova</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
<i>Eulimnadia diversa</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
<i>Eulimnadia follismilis</i>	hydroperiod alteration	Lang and Rogers 2002
<i>Eulimnadia texana</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Great Plains Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Socorro Isopod	habitat vandalism, diminution/loss of spring flow	NMDGF 2004a
Knobblip Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
<i>Lepidurus lemmoni</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
<i>Lynceus brevifrons</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Mexican Beavertail Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Moore's Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Packard's Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Tadpole Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Sideswimmers / Scuds	groundwater depletion, spring habitat alterations, wildfire, ground/surface water contamination, non-native molluscs & crayfish	Fernandez and Rosen 1996, Childs 1999, pers. comm., B. Lang, NMDGF, website ³
<i>Streptocephalus n. sp. 1</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
<i>Streptocephalus n. sp. 2</i>	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003
Sublette's Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003

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Common or Scientific Name¹**Species Specific Factors****References**

Tularosa Springsnail	diminution/loss of spring flow, non-native species (tamarisk, molluscs, crayfish), wetland jurisdiction (SWANCC)	Fernandez and Rosen 1996, Childs 1999, Leibowitz and Nadeau 2003, pers. comm., S. Carmen, NMDGF, website ³
Versatile Fairy Shrimp	wetland jurisdiction, hydroperiod alteration, non-point discharge of contaminants	Lang and Rogers 2002, Leibowitz and Nadeau 2003

Other ArthropodsArachnids (Arachnida)

<i>Texella longistyla</i>	Alteration of cave environments.	NatureServe 2005
<i>Texella welbourni</i>	Alteration of cave environments.	NatureServe 2005
Cave Obligate Mite	Alteration of cave environments.	Diana Northup, NatureServe 2005
<i>Aphrastochthonius pachysetus</i>	Alteration of cave environments.	NatureServe 2005
<i>Chitrella welbourni</i>	Alteration of cave environments.	NatureServe 2005
<i>Neoallochernes incertus</i>	Alteration of cave environments.	NatureServe 2005
Peloncillo Scorpion	Local Endemic, none known	
Jemez Spider	Local Endemic, none known	

Centipede (Chilopoda)

Cave Obligate Centipede	Alteration of cave environments.	
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Millipedes (Diplopoda)

Cave Obligate Millipede	Alteration of cave environments.	Diana Northup
Chihuahuan Millipede	Land Development	

Springtails (Entognatha)

<i>Oncopodura prietoi</i>	Alteration of cave environments	Christiansen and Bellinger 1980, NatureServe 2005
<i>Pseudosinella vita</i>	Alteration of cave environments	Christiansen and Bellinger 1980, NatureServe 2005
<i>Tomocerus grahami</i>	Alteration of cave environments	Christiansen and Bellinger 1980, NatureServe 2005

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Common or Scientific Name ¹	Species Specific Factors	References
<i>Insects (Insecta)</i>		
<i>Aphaenogaster punctaticeps</i>	Local Endemic, none known	
<i>Leptothorax bestelmeyeri</i>	Local Endemic, none known	
<i>Leptothorax colleenae</i>	Local Endemic, none known	
Capulin Mountain Artic	global warming, fire suppression, improper grazing practices. Over-collection	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
<i>Andrena mimbresensis</i>	Local Endemic, none known	
<i>Andrena neffi</i>	Local Endemic, none known	
<i>Andrena vogleri</i>	Local Endemic, none known	
<i>Perdita austini</i>	Local Endemic, none known	
<i>Perdita biparticeps</i>	Local Endemic, none known	
<i>Perdita claripennis</i>	Local Endemic, none known	
<i>Perdita geminata</i>	Local Endemic, none known	
<i>Perdita grandiceps</i>	Local Endemic, none known	
<i>Perdita maculipes</i>	Local Endemic, none known	
<i>Perdita mesillensis</i>	Local Endemic, none known	
<i>Perdita senecionis</i>	Local Endemic, none known	
<i>Perdita sidae</i>	Local Endemic, none known	
<i>Perdita tarda</i>	Local Endemic, none known	
<i>Perdita viridiotata</i>	Local Endemic, none known	
Centris Bee	Outside of aggregated nests, individuals never found, but never nest in same place twice. Nests must be protected when found	pers. comm., J. McIntyre, UNM
<i>Osmia phenax</i>	Local Endemic, none known	
<i>Osmia prunorum</i>	Local Endemic, none known	
Mason Bee	Limited distribution	pers. comm., J. McIntyre, UNM

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Common or Scientific Name ¹	Species Specific Factors	References
Melittid Bee	Local Endemic, none known	
<i>Pityophthorus franseriae</i>	Local Endemic, none known	
<i>Pityophthorus torridus</i>	Local Endemic, none known	
Anthony Blister Beetle	Habitat disturbance (ground activities) that would affect solitary bees. Pesticide spraying	USFWS Federal Register 1994, NatureServe 2005
Bonita Diving Beetle	degradation of habitat, loss of water or water quality	USFWS Federal Register 1994, NatureServe 2005
Southwestern Hercules Beetle	Highly prized by insect collectors. Loss of native riparian woodlands	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Glorious Jewel Beetle	Highly prized by insect collectors	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Leconte's Jewel Beetle	Highly prized by insect collectors	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Wood's Jewel Beetle	Highly prized by insect collectors. Loss of native riparian woodlands.	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Animas Minute Moss Beetle	Siltation, improper grazing practices	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Tiger Beetle	Over-collecting	
Glittering Tiger Beetle	Lowering of groundwater due to irrigation, drought. Over-collection.	pers. comm., B. Knisley, UNM, pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Guadalupe Mountains Tiger Beetle	Over-collection.	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM, NatureServe 2005
Los Olmos Tiger Beetle	Improper grazing practices and hydrologic developments. Over-collection.	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM, NatureServe 2005
Maricopa Tiger Beetle	Usual threats to riparian, improper grazing practices, withdrawal of water. Over-collecting.	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM, NatureServe 2005
Nevada Tiger Beetle	Increased agriculture and development, grading and drainage of playa. Over-collection.	pers. comm., B. Knisley, UNM, pers. comm., D. Lightfoot, UNM

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Common or Scientific Name ¹	Species Specific Factors	References
Buchholz's Boisduval's Blue	Forest management practices, global warming	
Mogollon Rim Greenish Blue	Forest management practices, global warming	
<i>Hemileuca (chinotiensis) comwayae</i>	Unknown.	Richard Holland, pers. Comm. March 2005
<i>Hemileuca (nevadensis) artemis</i>	Unknown.	Richard Holland, pers. Comm. March 2005
<i>Hemileuca hera magnifica</i>	Urban development	Richard Holland, pers. Comm. March 2005
Mountain Checkered-Skipper	Forest management practices, global warming	
Chalcedon Checkerspot	Improper grazing practices	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Sacramento Mountain Checkerspot	OHV's, development, invasive plants, improper grazing practices. Over-collection	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
Tawny Crescent	Improper grazing practices	
Mescalero Camel Cricket	No specific threats, local endemic.	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Organ Mountains Camel Cricket	No specific threats, local endemic	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Rodent Burrow Camel Cricket	Extripation of blacktailed and Gunnison's prairie dogs, and other large burrowing rodents	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Gypsum Sand-Treader Camel Cricket	No specific threats, protected by White Sands National Monument	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
White Sands Sand-Treader Camel Cricket	No specific threats, protected by White Sands National Monument	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Carlsbad Cave Cricket	Alteration of cave environments	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM

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References

Mesdalero Sands Jerusalem Cricket	Herbicide control of shin-oak, off-highway vehicles	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Arroyo Darner	Fires, lumbering and improper grazing practices, especially removal of grass along streams	NatureServe 2005
Ellis Dotted-Blue	Improper grazing practices, invasive exotics, particularly cheatgrass.	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Spalding's Dotted- Blue	Exotic invasives, particularly cheatgrass	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Bleached Skimmer Dragonfly	improper grazing practices, possibly predation from fish or competition with other dragonflies	Robert Larsen, AZGF 2002
Scudder's Duskywing	Unknown	
Dusty-Wing	Local Endemic, none known	
Desert Elfin	Unknown	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
<i>Caenotus inornatus</i>	Unknown	
<i>Caenotus minutus</i>	Unknown	
<i>Chrysotus parvulus</i>	Local Endemic, none known	
<i>Neurigona perbrevis</i>	Local Endemic, none known	
<i>Thinophilus magnipalpus</i>	Local Endemic, none known	
Mydas Fly	Sand dune habitats threatened by development and off-road vehicles	
<i>Efferia cuervana</i>	Sand dune habitats threatened by development and off-road vehicles	
<i>Furcilla delicatula</i>	Unknown	
<i>Megaphorus lascrucensis</i>	Playa grasslands highly impacted by improper grazing practices	
Soldier Fly	Local Endemic, none known	

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Common or Scientific Name ¹	Species Specific Factors	References
Capitan Mountains Fritillary	Forest management	
Freija Fritillary	Improper grazing practices	
Nitocris Fritillary	Colonies are small and isolated., Herbicide, improper grazing practices, hydrology changes. Some colonies extirpated.. Over-collection	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Nokomis Fritillary	Colonies are small and isolated, Herbicide, improper grazing practices, hydrology changes, overcollecting	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
Raton Mesa Fritillary	Suburban development, improper grazing practices, forest management	
Silver-Bordered Fritillary	Improper grazing practices, forest management, hydro modification	
<i>Aeoloplides rotundipennis</i>	Habitat distruction from agricultural developments	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM, NatureServe 2005
<i>Cibolacris samalayucaae</i>	Off-highway vehicles	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM, NatureServe 2005
Band-Winged Grasshopper	Hydrologic developments, improper grazing practices	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Hebard's Blue-Winged Desert Grasshopper	No specific threats, isolated small populations limited to specific microhabitats	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Lichen Grasshopper	No specific threats, isolated small populations limited to specific microhabitats	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
Nevada Point-Headed Grasshopper	Improper grazing practices, disturbance to montane meadows	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM, NatureServe 2005
Shotwell's Range Grasshopper	Improper grazing practices, especially stock tanks and heavy impacts around tanks	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM, NatureServe 2005
<i>Melanoplus calidus</i>	Improper grazing practices	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM, NatureServe 2005

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Common or Scientific Name¹**Species Specific Factors****References**

<i>Melanoplus magdalenae</i>	Improper grazing practices, impacts to montane meadows	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM, NatureServe 2005
Ilavia Hairstreak	Unknown	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
Poling's Hairstreak	Improper grazing practices, possible exotic weeds. Maintenance of oaks important, over-collection	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Sandia Hairstreak	Relatively widespread and no known threat, over-collection	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
Oslar's Soapberry Hairstreak	Unknown	
Xami Hairstreak	Small colonies with narrow habitat requirements. South TX population extirpated	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
Mescalero Sands Katydid	Herbicide control of shin-oak, off-highway vehicles	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM
<i>Hexagenia bilineata</i>	Siltation, pollution, damming, withdrawal of water	pers. comm., G. Jacobi, UNM, pers. comm., Pat McCafferty
<i>Homoeomuria alleni</i>	Local Endemic, none known	
<i>Lachlania dencyannae</i>	Improper grazing practices, excessive lumbering, or fires destabilize stream flow	Jerry Jacobi, Pat McCafferty
<i>Leucrocuta petersi</i>	Improper grazing practices, excessive lumbering, or fires destabilize stream flow	Jerry Jacobi, Pat McCafferty, NatureServe 2005
Arizona Metalmark	improper grazing practices, hydrology changes. Over-collection	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Moth	Unknown	Richard Holland, pers. Comm. March 2005
Borer Moth	Drying of region, improper grazing practices, burning	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
Albarufan Dagger Moth	Unknown	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
Geometrid Moth	Unknown	Richard Holland, pers. Comm. March 2005

Appendix I Cont.

Common or Scientific Name ¹	Species Specific Factors	References
Noctuid Moth	Unknown	Richard Holland, pers. Comm. March 2005
<i>Euhyparpax rosea</i>	Development, fires, alien weed impact	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
<i>Oligocentria delicata</i>	Limited range, urbanization	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
Pyralid Moth	Urban development	Richard Holland, pers. Comm. March 2005
Tiger Moth	Over-collection	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Mirid Plant Bug	Local Endemic, none known	
Dashed Ringtail	Improper grazing practices, excessive lumbering, or fires destabilize stream flow	Robert Larsen, AZGF 2002, NatureServe 2005
Cassus Roadside-Skipper	Forest & fire management, improper grazing practices	
Large Roadside-Skipper	Forest & fire management, improper grazing practices	
Slaty Roadside-Skipper	Improper grazing practices	
Texas Roadside-Skipper	Improper grazing practices	
Silkmoth	Unknown	Richard Holland, pers. Comm. March 2005
Zephyr Eyed Silkmoth	Spraying programs and different managemenet programs in fragmented ranges, over-collection	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Apache Skipper	Forest & fire management, improper grazing practices	
Arizona Agave Borer Skipper	Improper grazing practices, fire management	
Carlsbad Agave Borer Skipper (Orange Giant Skipper)	Impacts to Host Plant, over-collection.	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Viola's Yucca Borer Skipper	Impacts to host plants	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005

Appendix I Cont.

Common or Scientific Name ¹	Species Specific Factors	References
Western Crossline Skipper	Fire management, improper grazing practices	
Deva Skipper	Fire management, improper grazing practices	
Mary's Giant Skipper	Fire management, improper grazing practices	
Poling's Giant Skipper	Unknown	
Ursine Giant Skipper	Impacts to host plants. Over-collection.	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Western Hobomok Skipper	Forest & fire management, improper grazing practices	
Moon-Marked Skipper	Forest & fire management, improper grazing practices	
Sunrise Skipper	Hydro modification, improper grazing practices	
Yuma Skipper	Impacts to riparian areas, one small isolated colony in NM	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Four-Spotted Skipperling	Improper grazing practices, gullyng, drainage of wet meadows. Over-collection.	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
Arizona Snaketail	Water degradation, timber harvest, improper grazing practices and fires that destabilize stream flow.	Robert Larsen, AZGF 2002 NatureServe 2005
West's Primrose Sphinx	Unknown.	NatureServe 2005
Vega Sphinx	No specific threats, other than possible relative lack of protected populations, over-collection.	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM, NatureServe 2005
<i>Capnia caryi</i>	Improper grazing practices and fire	
<i>Isoperla jewetti</i>	Hydrologic modification, streamflow regulation & manipulation, water quality	
<i>Taenionema jacobii</i>	Stream disturbance, water developments, turbid runoff from improper grazing practices	NatureServe 2005
Arizona Viceroy	Impacts to riparian areas, improper grazing practices, over-collection	pers. comm., S. Cary, NMDGF, pers. comm., J. McIntyre, UNM
Tarantula Hawk Wasp	No specific threats, other than possible relative lack of protected populations	pers. comm., D. Lightfoot, UNM, pers. comm., S. Brantley, UNM

Appendix I Cont.

Common or Scientific Name ¹	Species Specific Factors	References
<i>Dasymutilla homole</i>	Local Endemic, none known	
<i>Odontophotopsis augusta</i>	Local Endemic, none known	
<i>Odontophotopsis grata</i>	Local Endemic, none known	
Chiricahua White	Forest & fire management	

¹ Scientific name provided for species with no recognized common name. Scientific names of other species can be found in Appendix C.

² <http://el.erdc.usace.army.mil/zebra/zmis/>

³ <http://www.esg.montana.edu/aim/mollusca/nzms/nzmsbib.html>