

Appendix D – Attributes and Indicators

Attribute	Indicator	Indicator Rating				References
		Poor	Fair	Good	Very Good	
Bell's Vireo (<i>Vireo bellii</i> and <i>Vireo bellii pusillus</i>)						
habitat	riparian vegetation	No shrub cover			Dense shrub understory up to 3 m [10 ft] high; tree overstory either relatively open or absent	Averill-Murray et al. (1999)
habitat degradation	water diversion - distance to water				< 1,000 m [0.6 mi] from water; standing water is an important habitat element	Kus et al. (2010)
parasitism	cowbird abundance	increased parasitism with decreased density of understory vegetation			parasitism decreases with increased density of understory vegetation	Kus et al. (2010)
Desert Bighorn Sheep (<i>Ovis canadensis nelsoni</i>)						
Disease	Proximity to domestic livestock				a minimum of 13.5 km between sheep & domestic livestock	Beecham et al. (2007), Singer et al. (2001)
Habitat	Habitat fragmentation	Increased human disturbance			Little to no human disturbance	Beecham et al. (2007), King and Workman (1985)
Climate	effect on vegetation	higher temps - decreased precip			normal to higher levels of rainfall	Beecham et al. (2007)

Attribute	Indicator	Indicator Rating				References
		Poor	Fair	Good	Very Good	
Desert tortoise (<i>Gopherus agassizii</i>)						
habitat	size	<200 sq mi	200-500 sq mi	500-1,000 sq mi	>1,000 sq mi	Brussard et al. (1994)
predation	common ravens	abundant	fairly common	rare	absent	Brussard et al. (1994)
habitat degradation	exotic ephemerals	abundant, ineradicable	fairly common and widespread	scarce and patchy	none	Brussard et al. (1994)
Desert tortoise (<i>Gopherus morafkai</i>)						
habitat	size	<200 sq mi	200-500 sq mi	500-1,000 sq mi	>1,000 sq mi	Brussard et al. (1994)
predation	common ravens	abundant	fairly common	rare	absent	Brussard et al. (1994)
habitat degradation	exotic ephemerals	abundant, ineradicable	fairly common and widespread	scarce and patchy	none	Brussard et al. (1994)
Golden Eagle (<i>Aquila chrysaetos</i>)						
habitat loss or degradation	urban development	present	--	minimal	absent	Kochert et al. (2002)
habitat degradation	livestock grazing and agriculture	existing or planned	--	--	absent	Beecham and Kochert (1975)
habitat degradation	fire	>40,000 ha of shrublands burned	--	burned territory; adjacent vacant unburned	unburned territories	Kochert et al. (1999)
habitat degradation	mining and energy development	present	--	--	absent	Phillips and Beske (1982)
habitat	vegetation	disturbed areas, grasslands, agriculture			shrubland/open grassland	Marzluff et al. (1997), Peterson (1988)
habitat/nest sites	topography	--	--	--	cliffs within 7 km of shrubland	Menkens and Anderson (1987), McGrady et al. (2002), Cooperrider et al. (1986)

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		Poor	Fair	Good	Very Good	
mortality	infrastructure (roads, power lines, wind turbines)	--	--	--	infrastructure absent	Franson et al. (1995)
Illness mortality	poisoning from pesticides and other toxins	high levels of contaminants	--	--	low/no contaminants	Franson et al. (1995), Harmata and Restani (1995), Kramer and Redig (1997), Pattee et al. (1990)
habitat loss or degradation	urban development	present	--	minimal	absent	Kochert et al. (2002)
Le Conte's Thrasher (<i>Toxostoma lecontei</i>)						
habitat degradation	invasive grasses				revegetation at disturbed sites of desert thorn (<i>Lycium</i>) and saltbush (<i>Atriplex</i>) species;	Weigand and Fitton (2008)
habitat	Habitat fragmentation -	>10 km distance between habitat fragments			maximum of 2 km distance between habitat fragments	Weigand and Fitton (2008)
Lowland Leopard Frog (<i>Lithobates yavapaiensis</i>)						
habitat	elevation	>8,200 ft	6,400 - 8,200 ft	-	<6,400 ft	AZGFD (2006)
predation	American bullfrog	present	-	-	absent	Jennings and Hayes (1994)
habitat	water development	present			absent	Center for Biological Diversity & S. Utah Wilderness Alliance- Petition to list

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		Poor	Fair	Good	Very Good	
Lucy's Warbler (<i>Oreothlypis luciae</i>)						
habitat	Loss & degradation of riparian mesquite habitat	extensive development			no development	Otahal 2006, Johnson et al. 1997
interspecific interactions	brood parasitism	prevalent			not present	Otahal 2006, Johnson et al. 1997
habitat	Overgrazing of mesquite scrub	present			not present	Otahal 2006, Johnson et al. 1997
Mountain Lion (<i>Puma concolor</i>)						
prey	ungulate density	low	medium	high	very high	Julander and Jeffrey (1964)
habitat degradation	road density	.6 km/sq km	0.4	0.2	0	Van Dyke et al. (1986)
habitat	cover & terrain	very dense or open cover	-	-	rugged terrain with mixed cover	Riley (1998)
habitat degradation	human development	Highly developed	moderate developed	low developed	no development	Van Dyke et al. (1986)
Mule Deer (<i>Odocoileus hemionus</i>)						
habitat degradation	distance from oil wells	<2.7 km	-	-	>3.7 km	Sawyer et al. (2006)
habitat degradation	distance from roads	>200m	-	-	>500 m	
habitat	loss, fragmentation, drought, fire, low quality					http://www.ndow.org/wild/animals/facts/mule_deer.shtml
habitat	vegetation/food preference as associated with fire suppression	Large, hot fires			small, cool, frequent fires (early successional plants)	WAFWA Mule Deer Working Group - Western Assoc. of Fish & Wildlife agencies, 2003

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Southwest Willow Flycatcher (<i>Empidonax traillii extimus</i>)						
habitat	proximity to surface water	>100 m	50-100 m	25-50 m	0-25 m	Sogge and Marshall (2000)
connectivity	distance between occupied sites	>30 km	15-30 km	2-15 km	<2 km	Finch et al. (2002)
habitat degradation	recreation	present in high intensity	present in moderate intensity	present in low intensity	absent	Marshall and Stoleson (2000)

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Photo: Nurse tree. Arizona-Sonora Desert Museum