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**Literature Review of the Site Aspecific Habitat Use and  
Feeding Habits  
of  
Threatened and Endangered Species  
Concerning the Los Alamos National Laboratory**

**G. Gonzales, R. Robinson, T. Foxx, S. Cross, D. Cram, J. Hagstrom, and H.  
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**Literature Review of the Site Aspecific Habitat Use and Feeding Habits  
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by

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**ABSTRACT**

During Fiscal Years 1996 and 1997, we conducted a systematic search of published and unpublished literature for information about biological species that are federally- or state-listed as threatened, endangered, or species of concern that have the potential to inhabit, use, or migrate through the 43 mi<sup>2</sup> of Los Alamos National Laboratory or adjacent lands. To date, we have entered 456 references related to these species in a bibliographic database called ProCite. We have developed habitat use and feeding habits tables for 21 species.

**1.0 INTRODUCTION**

Protecting biological species and habitat of species that are federal- and state-designated threatened or endangered species (TES), rare and sensitive species, candidate species, or species of concern requires knowledge of their biology and ecology. This information is needed for conducting biological assessments, floodplain and wetlands assessments, species surveys, and habitat evaluations, for developing monitoring plans, and for toxicological modeling and ecological risk studies. Specifically, information on habitat use requirements and feeding habits is needed for purposes of establishing TES habitat, selecting contaminant receptor surrogates for TES, developing contaminant pathways to TES and surrogates, assessing impacts in biological assessments, and developing TES-specific site monitoring plans.

**2.0 METHODS**

A review of literature of TES and other species of concern (Table 1) was conducted at or through libraries on the University of New Mexico (UNM) campus in Albuquerque, New Mexico. Any article or other publication deemed relevant was ordered for the Ecology group TES library at Los Alamos National Laboratory (LANL). At the UNM Centennial Science and Engineering Library, books and electronic BIOSIS files (January 1991-January 1997) were searched for each TES species potentially occurring in Los Alamos County. Many of the relevant articles were found within the library, and others were ordered through interlibrary loan. At UNM's Zimmerman Library, publications of the U. S. Forest Service (USFS), U. S. Fish and Wildlife Service (USFWS), and Bureau of Land Management were searched for relevant titles. Citation lists from articles, periodicals, and books were also examined for other sources of information.

<b>Table 1. Species for Which Habitat Use and Feeding Habit Information was Compiled</b>		
<b>Common Name/Scientific Name</b>	<b>Life Form</b>	<b>Protection Status</b>
1. Mexican Spotted Owl <i>Strix occidentalis lucida</i>	Bird	FT
2. Bald Eagle <i>Haliaeetus leucocephalus</i>	Bird	FT, ST
3. Peregrine Falcon <i>Falco peregrinus</i>	Bird	FE, ST
4. Southwestern Willow Flycatcher <i>Empidonax traillii extimus</i>	Bird	FE, SE
5. Jemez Mountains Salamander <i>Plethodon neomexicanus</i>	Amphibian	SOC, ST
6. Northern Goshawk <i>Accipiter gentilis</i>	Bird	SOC
7. New Mexico Meadow Jumping Mouse <i>Zapus hudsonius luteus</i>	Mammal	SOC, ST
8. Whooping Crane <i>Grus americana</i>	Bird	SE, FE
9. Black-footed Ferret <i>Mustela nigripes</i>	Mammal	FE
10. Spotted Bat <i>Euderma maculatum</i>	Mammal	SOC, ST
11. Common Black Hawk <i>Buteogallus anthracinus</i>	Bird	ST
12. Yellow Lady's Slipper Orchid <i>Cypripedium calceolus</i> var. <i>pubescens</i>	Plant	SE
13. Giant Helleborine Orchid <i>Epipactis gigantea</i>	Plant	SRS
14. Loggerhead Shrike <i>Lanius ludovicianus</i>	Bird	SOC
15. Occult Little Brown Bat <i>Myotis lucifugus occultus</i>	Mammal	SOC
16. Long-Legged Myotis <i>Myotis volans</i>	Mammal	SOC
17. Big Free-Tailed Bat <i>Nyctinomops macrotis</i>	Mammal	SOC
18. Goat Peak Pika <i>Ochotona princeps nigrescens</i>	Mammal	SOC
19. Flathead Chub <i>Platygobio gracilis</i>	Fish	SOC
20. White-Faced Ibis <i>Plegadis chihi</i>	Bird	SOC
21. Gray Vireo <i>Vireo vicinior</i>	Bird	ST

FT – Federal threatened, ST – State threatened, SE – State endangered, FE – Federal endangered, SOC – Federal species of concern, SRS – State rare and sensitive

Many government agencies were requested to supply listings of previous publications that might be relevant to the study. All appropriate USFWS recovery plans and their listing of articles were obtained for TES species. The complete listing of publications available through the USFS Intermountain Research Experiment Station in Fort Collins, Colorado was reviewed and ordered. The New Mexico Natural Heritage Program provided a listing of articles in their files concerning LANL TES.

We have established a reference listing on ProCite bibliographic software from Personal Bibliographic Software. ProCite can efficiently manage large databases containing thousands of variable length records and encompassing many different types of material.

Standard bibliographic fields and key words allow researchers to search the database for specific information.

### **3.0 RESULTS**

To date, we have accumulated and entered 456 references. From these references we have reviewed the literature for habitat use and feeding habit characteristics for the species shown in Table 1. Habitat use requirement and feeding habit information is summarized in Tables 1 through 21 in Appendix A. Our ProCite reference list on these and other species is presented in Appendix B.

## APPENDIX A

**Table 1. Habitat Use and Feeding Habits of the Mexican Spotted Owl**

HABITAT USE/REQUIREMENTS				
General	Roosting/Nesting	Forage	Location	Reference
Old growth/ mature conifer forest				Marcot & Holthausen, 1987; Forsman et al., 1984; Laymon, 1988; Ganey & Balda, 1989 and Thomas et al., 1990 In: Ganey, 1992
Old Growth/ uneven-aged forest				Rinkevich, 1995
>40° slopes				Rinkevich, 1995
	Virgin MC (roosting) More big logs, higher canopy closure, and > densities/basal area of trees & snags than random sites; Roosting > canopy closure, more big logs, and > densities than foraging sites	≥ expected in virgin MC/PP; < expected in managed forest	N. Arizona	Ganey & Balda, 1994
	Species Association:			
	Psme, 92%, > expected based on availability		Cascade Mts., Washington	Buchanan et al., 1993
	Psme, 87%		Oregon	Forsman et al., 1984
	Psme, 83%		California	LaHaye, 1988
	Most common nest type: those originally made by the N. Goshawk (55%)		Cascade Mts., Washington	Buchanan et al., 1993
<b>Home Range (Acres)</b>				
	Most common nest type: those originally made by the N. Goshawk (55%)		Cascade Mts., Washington	Buchanan et al., 1993
7,268 (pair)			Washington	Allen & Brewer, 1986
6,020 (pair)			Oregon	Forsman & Meslow, 1985
1,469			LANL, Generic for carnivore birds based on body wt	Peters, 1993

**Table 1 (cont.).**

HABITAT USE/REQUIREMENTS				
General	Roosting/Nesting	Forage	Location	Reference
<b>Home Range (Acres) (cont.)</b>				
2,000			LANL	Keller, 1996
3,000-5,000 (pair)			Pacific NW	Payne, 1987 In: Thomas et al., 1990
5,178 (individual)			WA/OR	Marcot & Holthausen, 1987
Minimum Viable Population - Owl Pairs: 20			Pacific NW	Payne, 1987
Minimum Number Owl Territories in a Cluster - 20			Pacific NW	Lamberson et al., 1994
<b>Forage Composition</b>				
Woodrats ( <i>Neotoma</i> ), White-footed Mice ( <i>Peromyscus</i> ), Voles ( <i>Microtus</i> ) 61-83% of prey (59-88% of biomass)			Arizona	Ganey, 1992

**Table 2. Habitat Use and Foraging Habits of the Bald Eagle Potentially Pertinent to Wintering on LANL and Surrounding Areas**

HABITAT USE/REQUIREMENTS					
General	Roosting	Nesting	Perching/Foraging	Location	Reference
Migrant, winter resident and potentially breed along the Rio Grande and on adjacent LANL, LA County, BNM and SFNF lands.				Los Alamos, NM area.	Klingel, 1995.
Tends to center around nesting territory.					Snow, 1973
			Susceptible to DDE and potentially to other environmental pollutants.		Snow, 1973; Grubb et al., 1990; Vickery, 1995; Anthony et al., 1994.
	Canyons most extensively used as winter roost areas. Psme in northern exposures free from human interference most commonly used. More tolerant when same roosts are used.			Utah	Edwards, 1969
<b>Home Range (Acres):</b> 1.5436 (avg. resident pairs) (areas of highest use avg. <124 ac.; varies between breeding and nonbreeding periods; varies w/season and particular pairs)		Generally old-growth forest near shoreline.  Tree species use: Sitka spruce - 49% Psme - 40%	Habitat Association: Forage from perches in "mixed -mature conifers & river island hardwoods; not used according to availability;  <u>Habitat Breeding NB</u> O-G conif/brdlf 27% 21% Mat conif/brdlf 30% 38%	OR, WA - Columbia River Estuary	Garrett et al., 1993
2. >1265; considerable variation.			Catfish, carp & sucker ~ 66% Rabbit ~10 to 15%	C. Arizona, river dwelling.	USFWS, 1982

**Table 2 (cont.)**

General	Roosting	Nesting	Perching/Foraging	Location	Reference
			Habitat   Adult   Juvenile Conifer   43%   15% Deciduous 57%   85%  Conifer perches taller, in denser stands and of greater mean slope than deciduous.	N. central Mich., continuous mixed-forest	Bowerman et al., 1993
		Varies tremendously even w/in same state; dependent on tree species.			Snow, 1973
		All nests were in Psme, usually the tallest.		San Juan Island	Retfalvi, 1965.
		Usually in largest or stoutest pine, lodgepole pine, whitebark pine, or Psme.		Yellowstone	Murphy, 1965
		Sitka spruce most frequently used		Tongass Nat'l Forest, Alaska	Poulin, 1968 and Snow, 1973
		In Sitka spruce 90% of time		Admiralty Island, Alaska	
			Most (99%) foraging attempts for rainbow trout, in creek habitat (87%) vs river, and for live prey (87%).	N. Arizona	Snow, 1973

**Table 3. Habitat Use and Foraging Habits of the American Peregrine Falcon Potentially Pertinent to LANL and Surrounding Areas**

<b>HABITAT USE/REQUIREMENTS</b>				
<b>General</b>	<b>Nesting</b>	<b>Foraging</b>	<b>Location</b>	<b>Reference</b>
Summer resident and migrant on LANL, LA County, BNM, and SFNF lands.			Los Alamos, NM area.	Klingel, 1995
	Historically on cliffs (200 to 300 ft high), usually below 9,500 ft elev. in mountainous areas or near rivers or lakes; currently mainly on mountain cliffs in PP or PJ dependent on prey abundance and diversity, often near water.	Travel ~10 mi up to 17 mi to forage in areas including wetlands/ riparian habitats, gorges and mtn valleys. Diet includes terrestrial birds. Susceptible to DDT or, potentially to other environmental pollutants.	Rocky Mtn region; SW.	USFWS 1984
		Travel up to 7 mi.		World Wildlife Fund, 1990

**Table 4. Extrapolated Habitat Use and Foraging Habits of the Southwestern Willow Flycatcher**

HABITAT USE/ REQUIREMENTS			
GENERAL	NESTING	QUALIFICATION/LOCATION	REFERENCE
Occasional or rare in the Jemez Mountains. Possible breeding habitat on LANL and BNM lands.		Los Alamos, NM area.	
	≥20% cover	(not southwestern variety) British Columbia	Stein, 1963
	Salix > Rosa > Cornus, Lonicera > Alnus, Amelanchier (abundance-influenced)	British Columbia	Stein, 1963
Riparian: Cottonwood & willow, dryer habitat than the alder flycatcher but near water Swamps, willow thickets <i>Salix</i> spp. and fremont cottonwood ( <i>P. fremontii</i> ) Understory: mulefat ( <i>Baccharis salicifolia</i> ) and dense hoary nettle ( <i>Urtica dioica</i> ) Dry Habitats: have thorn bush ( <i>Crataegus</i> spp.) and crabapple	( <i>Malus</i> spp.) Wet Habitats: willow/poplar or willow/alder	LANL	Klingel 1995
			Browning, 1993
		River valley S. Sierra Nevada Mountains	Uyehara and Narins, 1995
		Ontario, Canada	Barlow and McGillivray, 1983
		Ontario, Canada	Barlow and McGillivray, 1983

**Table 5. Extrapolated Habitat Use and Foraging Habits of the Jemez Mountains Salamander**

HABITAT USE/REQUIREMENTS	QUALIFICATION/LOCATION	REFERENCE																					
Confirmed on Los Alamos County, BNM, and Santa Fe National Forest lands and is believed to be on LANL lands as well.	Los Alamos, NM area.	Klingel, 1995																					
Habitat Association/Relationship: + w/talus, organic surface layer, & N. aspect; - w/mineral soils, exposed substrates, S. aspect, & conifer/tan oak type; None w/forest age or canopy cover.	Del Norte Salamander; North Coastal California	Diller and Wallace, 1994																					
Dominant Habitat Associations/Relationships: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 20%; text-align: center;"><u>ensatina</u></th> <th style="width: 20%; text-align: center;"><u>W. redback</u></th> </tr> </thead> <tbody> <tr> <td>Forest Age Rank (NS)</td> <td></td> <td></td> </tr> <tr> <td>    young</td> <td style="text-align: center;">39%</td> <td style="text-align: center;">48%</td> </tr> <tr> <td>    old-gr moderate</td> <td style="text-align: center;">19%</td> <td style="text-align: center;">8%</td> </tr> <tr> <td>    old-growth dry</td> <td style="text-align: center;">17%</td> <td style="text-align: center;">35%</td> </tr> <tr> <td>    old-growth wet</td> <td style="text-align: center;">8%</td> <td style="text-align: center;">3%</td> </tr> <tr> <td>    mature</td> <td style="text-align: center;">17%</td> <td style="text-align: center;">6%</td> </tr> </tbody> </table> (Note: old-gr wet habitat type contained very few salaman. of either spp) Cover Type (highest assoc.)      snag bark                      log bark Degree of snag/log decomposition      intermed                      intermed Snag/log (course woody debris) size      10 to 30 cm                      10 to 30 cm  No correlation between slope or aspect.		<u>ensatina</u>	<u>W. redback</u>	Forest Age Rank (NS)			young	39%	48%	old-gr moderate	19%	8%	old-growth dry	17%	35%	old-growth wet	8%	3%	mature	17%	6%	Psme-dominated stands, Cascade Range, WA	Szaro 1988
	<u>ensatina</u>	<u>W. redback</u>																					
Forest Age Rank (NS)																							
young	39%	48%																					
old-gr moderate	19%	8%																					
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old-growth wet	8%	3%																					
mature	17%	6%																					

**Table 6. Habitat Use and Foraging Habits of the Northern Goshawk**

<b>HABITAT USE/REQUIREMENTS</b>					
<b>General</b>	<b>Nesting</b>	<b>Forage</b>	<b>Dispersal</b>	<b>Location</b>	<b>Reference</b>
Ponderosa Pine, Mixed Conifer, Spruce/Fir. Prefers deep conifer-dominated mixed woodlands, especially in mountains. Breeding confirmed on LA County, LANL, BNM and SFNF lands.		Preys on birds and mammals as large as cottontail rabbit.		Los Alamos, NM area	Klingel, 1995
11 active nest sites, 5 in Jemez mtns., SFNF; 5 in Pinos Altos mtns., Gila NF; 1 in Peloncillo mtns. sw NM Elevation: 1800 to 2560 m. Narrow ridges, escarpments, mtn. slopes, terraces, alluvial land. Avg. annual precip. = 40 to 45 cm. Pinyon-juniper, mixed associations of chaparral, ponderosa pine, grasslands, and riparian. Suggests old growth is preferred if available. (not in Jemez, due to logging)	Stands: 27% - Ponderosa pine/Gambels oak, 27% - Pond. pine/gray oak, 18% - mixed conifer (white & Douglas fir/ pond. pine/Gambels oak) 74% nests in pond. pine. Mean tree height = 25.9 m; mean nest height - 16.9 m. No preference for nest exposure. Often <1 km from permanent water. Density mean = 959.3 trees/ha. Avg dbh = 21.5 cm. avg basal area = 21.1 m <sup>2</sup> /ha.	Hunt in areas 0.8 km to 8 km from nest.		NM	Kennedy, 1986
Timber stands reach goshawk habitat suitability when site is 25 m at age 75. Prefer late successional forests. Noted proximity of nests to water source. Noted limited info available on foraging habits. In AZ, 1.1 pairs per 1000 ha.	Mature to old growth forest, dbh: 20 to 75 cm. •8 ha. density = 450 trees/ha. range: 270 to 1530 trees/ha. canopy cover 40% to 89% (higher end preferred). often open understory, on flat benches or lower 1/3 of hillside. slopes 0% to 45%. No preference for exposure in NM. Often near clearings, small logging roads, streambeds, or other natural paths of flight. Most w/in 0.4 km of an opening 0.04 - 0.4 ha. Shift sites every 1 to 5 years. Don't re-nest if disturbed.			Northern Rockies	Lilieholm et al., 1993
Used alarm, wailing, and begging calls to determine location of goshawk's nest sites. Most likely to find when w/in 200 m of nest.	23 of 27 nesting sites in ponderosa pine and 4 of 27 were in mixed conifer dominated by Douglas-fir and white fir.			North-central NM & AZ.	Kennedy & Stahlecker, 1993
Study found that goshawks moved southward in September and returned to nesting site in March/April. Snow storms caused movement farther south.	Found in lodgepole pine & aspen at lower elevations; subalpine fir & Engelmann spruce at higher elevations, w/sagebrush/prairie around woodlands.			South-central Wyoming	Squires and Ruggiero, 1995

**Table 6 (cont.)**

<b>HABITAT USE/REQUIREMENTS</b>					
<b>General</b>	<b>Nesting</b>	<b>Forage</b>	<b>Dispersal</b>	<b>Location</b>	<b>Reference</b>
Compared with eggs of sharp-shinned and Cooper's hawk, the goshawk's have less chlorinated hydrocarbons.		Small mammals and non-migratory birds.	Tend to be non-migratory.	Ontario	Elliott and Martin, 1994
	Breeds first week in April. Density of territorial pairs is 2.56 per 100 km <sup>2</sup> , of laying pairs: 2.15 per 100 km <sup>2</sup> . Cold/rainy weather decreased breeding success. Built stick nests.	Pigeons		Germany	Kostrzewa and Kostrzewa, 1990
Mass = 800-1200 g; survives cold better. Can go >10 consecutive days w/ little/no food.				Germany	_____, 1991
Ponderosa pine, mixed (often Douglas fir and white fir), spruce-fir. Mosaic of young to old trees. Large trees >18 in. dbh, snags, downed logs >12-in. dia. and 8 ft long, woody debris, small openings <4 acres, some herbaceous and shrubby understories. Home range ~6000 acres. Food and available nest sites limit density of goshawks.	Area ~30 acres, on a northerly aspect (shady) in a drainage or canyon, often near stream. ~1 stand of large old trees, dense canopy cover. Mar. to Sept. Post fledging family area (PFA) ~420 acres, patches of dense trees, herbaceous and/or shrubby understory, snags, downed logs, small openings.	~5400 acres around PFA. Hunt from tree perches. Open understory. Squirrels, rabbits, woodpeckers, jays, and grouse.		Southwest, U.S.	Reynolds, et al., 1992
12 breeding pairs, in 150 km <sup>2</sup> studied.		Winter: pigeon, jay & pheasant. Reproductive season: pigeon, blackbird, starling, jay, rabbit.		Germany	Opdam, et al., 1977
No nests were found on LANL, but 2 nests on SFNF, near LANL were found. Foraging on LANL.	Ponderosa pine, mixed species, and spruce-fir forests.	Prey habitats: snags, downed logs, woody.		LANL, NM	Sinton and Kennedy, 1994
	Predation primary cause of nestling deaths.	More food, female - at nest		SFNF, NM	Ward & Kennedy, 1996

**Table 6 (cont.)**

<b>HABITAT USE/REQUIREMENTS</b>					
<b>General</b>	<b>Nesting</b>	<b>Forage</b>	<b>Dispersal</b>	<b>Location</b>	<b>Reference</b>
Mature forests preferred. <20 ha patch size preferred. Avg. Range: 5700 ha.	Boreal forest.	Large patches of mature forests. Spruce Winter: squirrels. Breeding: pigeon, black grouse, hooded crow.		Sweden	Widen, 1989
	Forests 50 to 1000 ha surrounded by fields.	> 90% birds, pigeons, domestic hens, jays, woodpeckers, thrushes, corvids, voles, hares, and squirrels.		Poland	Goszczynski & Pilatowski, 1986

**Table 7. Habitat Use and Foraging Habits of the New Mexico Meadow Jumping Mouse**

<b>HABITAT USE/REQUIREMENTS</b>					
<b>General</b>	<b>Nesting</b>	<b>Forage</b>	<b>Dispersal</b>	<b>Location</b>	<b>Reference</b>
Found in riparian, mixed conifer, spruce/fir areas. Prefers lush grassy/weedy ground cover. Hides under heavy vegetation. Hibernates in winter. Requires water nearby. Confirmed on LA County and SFNF lands, possibly on LANL lands.	In hollow logs or in short burrows.			Los Alamos, NM area.	Klingel, 1995
Boreal from Canada to Alaska and the Eastern US. Some near water sources, some not. Near roadside ditches w/tall grasses, open woodlands, grasslands associated w/trees/shrubs, or tall grass prairie, primarily big and little bluestem & Indian grass with an avg. height of 60 to 90 cm. Prefer deep litter.			Roadsides with mesic tall grass. Riparian corridors with tall grass.	Kansas	Choate et al., 1991
High mountains, lush grasses & sedges among willows & alders along cool streams is preference in NM. Home ranges of 0.08 to 0.35 ha. some along Rio Grande valley.	Early fall burrow, hibernate until late April.	Reproductive parts of grasses & dicots. Insects.		NM	Findley, 1987
Study trapped over 50 sites in NM, found in Jemez (Upper Guadalupe River drainage), Rio Grande valley. Mesic habitats in lowland valleys & along montane streams. Narrow grass-forb-willow streamside riparian zone, along permanent waterways. May persist along man-made waterways.				NM	Morrison, J. L., 1992
Moist, lowland habitats: willow-alder thickets or grass/sedge meadows near water. Dense ground cover, few/no trees. Can swim across river.					
Dense grass and sedge cover near water. Proximity to water crucial. Density 82.9/ha seemed high.		Grass seeds		MN	Tester, et al., 1993

**Table 8. Habitat Use and Feeding Habits of the Whooping Crane**

<b>HABITAT USE/REQUIREMENTS</b>					
<b>General</b>	<b>Nesting/Roosting</b>	<b>Forage</b>	<b>Dispersal/Migration</b>	<b>Location</b>	<b>Reference</b>
Migrant along Rio Grande and Cochiti Reservoir. Doesn't stop on LANL, but flies over. Often same location, every year. Rivers/streams/marshes.	Roosts on sand bars				Klingel, 1995
Favor wetlands pH = 7.6 to 8.3. Time budget - daylight hours in staging area & summer - 40% to 73% is foraging. Mean home range is 4.1 km <sup>2</sup> . Predators: black bear, wolverine, gray wolf, red fox, lynx, bald eagle, northern raven. Threats: hurricanes to wintering ground, contaminant spills, collisions with objects (especially power lines), degradation of habitat by humans, human disturbance, loss of gene diversity.	<b>Roosting:</b> Most wetlands used are <4 ha w/in 1 km of feeding site. >40% were <0.5 ha. Heavily vegetated wetlands generally not used. Do not perch in trees. Older chicks roost on small islands or clumps of vegetation. Older birds roost in water 13 to 20 cm deep. <b>Nesting Territories</b> range from 1.3 to 47.1 km <sup>2</sup> . Once disturbed, they will usually not re-nest. Faithful to breeding territories. Nests ≥300 m apart. Often built on a shallow-water island made of surrounding vegetation	On a variety of croplands. In breeding grounds: mollusks, crustaceans, aquatic insects, minnows, frogs, and snakes. Migration: frogs, fish, plant tubers, crayfish, insects, and waste grains in harvested fields. Winter: crabs, clams. In upland: acorns, snails, mice, voles, crayfish, grasshopper, and snakes. Croplands account for 70% of feeding sites for non-families. Wetlands account of 67% of feeding sites for families.	Wild #1: Migrates north end of March to begin of April. Migrates south, arrives late Oct. to mid-Nov. Wild #2 - migrates north in early Feb., follows Rio Grande north, stages in San Luis Valley (CO), arrives north in April, early May. Arrives in NM in Nov., 48 to 180 km south of Albuquerque.	3 wild flocks, 4 captive. Wild #1 Flock: nests in Wood Buffalo Nat'l Park & winters Gulf Coast., TX. Wild #2 Flock: summer ID. w. WY, SW MT & winter in middle Rio Grande Valley of NM. Wild #3 Flock - Florida.	Lewis, 1995
Lakes/marshes dried up and cranes left area in the 1930s drought.	If disturbed, often abandon nest. Large marshes of grassland are excellent breeding habitat.	Shallow water, near nest.		Saskatchewan, Canada.	Hjertaas, 1994
Home ranges: 12.0 to 18.9 km <sup>2</sup> for isolated breeding pairs. Areas where "non-breeders" are found. Breeding ranges go in a southern direction.	Return to same area. Novice pairs may nest some distance from running water, but as older, move nests closer to stable water. Core nest areas: 3.2 to 4.2 km <sup>2</sup>			Wood Buffalo National Park, Canada.	Kuyt, 1993

**Table 8 (cont.)**

<b>HABITAT USE/REQUIREMENTS</b>					
<b>General</b>	<b>Nesting/Roosting</b>	<b>Forage</b>	<b>Dispersal/Migration</b>	<b>Location</b>	<b>Reference</b>
Low tolerance for human presence. Winter - salt flats, marshes, barrier islands. Salt grass, saltwort, popping cane, glasswort, sea ox-eye, cord grass.	Poorly drained. Overstory black spruce, tamarack, willow.	Blue crabs, clams.	South - mid. Sept., arrive in mid. Nov. at wintering grounds.	Wood Buffalo National Park, Canada - Aransas Nat'l Wildlife Refuge, TX	Matthews, ed., 1990
pH = 7.6 to 8.3.	Bullrush, cattails, sedges, spike rush, musk-grass, bentgrass, arrow grass.	Shallow holes for wading & feeding. Insects & crustaceans, some amphipods, snails, fiddler crabs, eels, snakes, acorns. (Allen, 1952 - freshwater minnows, marsh onions, prairie lily, roots of three-square, crops - potatoes & sprouting corn.) Allen & Uhler study - polychaete worm, pistol shrimp, mud shrimp, blue crabs, crayfish, short razor clams, green razor clams. Juveniles - berries, insects, aquatic invertebrates. Chance prey: fish, insects, reptiles.	Eat egg masses of frogs & toads, insects, and fish. North - April. South - leave end Sept. arrive mid - Nov. Wade in 5 - 10 in deep. Drink brackish water.	Wood Buffalo National Park, Canada - Aransas Nat'l Wildlife Refuge, TX (WBNP-ANWR)	Johnsgard, 1983
		Mollusks, insects, crab shrimp, some: grasshoppers, reptiles, crops.	North - April	(WBNP-ANWR)	Walkinshaw, 1973
Remote from human activities. Winter - Marshes - salt grass, saltwort, cordgrass, glasswort, sea ox-eye. Interior: oak brush, grassland, swales, ponds, live oak, redbay, bluestem.	Overstory: white spruce, black spruce, tamarack, willow. Understory: dwarf birch, labrador tea, bearberry.	Cropland - 70% - non-families, Wetlands - 67% - families. Probe. Brackish bays, marshes, salt flats: blue crabs, clams, wolf-berry. Upland: acorns, snails, crayfish, insects.	Roost in marshy wetlands < 4 a & w/in 1 km of feeding site. South - mid. Sept., arrive - Nov. North - April.	(WBNP-ANWR)	U.S. Fish and Wildlife Service, 1994
39% of fledged in Rocky Mtn. population die from collisions w/ power lines. Markers helped.				San Luis Valley, CO	Brown and Drewien, 1995

**Table 8 (cont.)**

<b>HABITAT USE/REQUIREMENTS</b>					
<b>General</b>	<b>Nesting/Roosting</b>	<b>Forage</b>	<b>Dispersal/ Migration</b>	<b>Location</b>	<b>Reference</b>
	Roost: 0.04 to 78.1 ha wetland. Baltic rush, sedges, spicerushes, and greasewood. Water <30 cm away from shore lines. Sparse understory, extensive visibility w/in 90 m. Avoid humans.	Sites: plowed barley fields harvested potato fields - size 1/8 to 1/4 section.	ID to NM, stages in San Luis Valley. Rio Grande flows through. Elevation 2100 m to 2400 m. Wetlands.	San Luis Valley, CO.	Shenk and Ringelman 1992
	Pile of grass or marsh hay (about 3 ft. diameter) w/ a small indentation in middle for nest. Some built on muskrat houses. Often built in water on a small island. In shallow water w/ emergents to build nesting platform.			Saskatchewan Canada. (WBNP-ANWR)	Hjertaas, 1994. Walkinshaw, 1973
	Roost in shallow water wetlands.			(WBNP-ANWR)	Group B
Wetlands, like: marshes, lake margins, sloughs, and potholes. Prefer shallow water. Dominant emergent: bulrush, cattail, and sedge.				(WBNP-ANWR)	Group A

Group A = Lewis, 1995; Walkinshaw, 1973; Hjertaas, 1994; Mathews, 1990; Johnsgard, 1983; and U.S. Fish and Wildlife Service 1994.

Group B = Lewis, 1995; Walkinshaw, 1994; Kuyt, 1993; Johnsgard, 1983; and U.S. Fish and Wildlife Service, 1994.

**Table 9. Habitat Use and Foraging Habits of the Black-footed Ferret**

<b>HABITAT USE/REQUIREMENTS</b>					
<b>General</b>	<b>Nesting</b>	<b>Forage</b>	<b>Dispersal</b>	<b>Location</b>	<b>Reference</b>
Prairie. Not likely on LANL or LA County lands.		Main prey - prairie dog.		LANL, LA County.	Klingel, 1995
Preyed upon by great-horned owls, golden eagles, and coyotes. Prairies of the Great Plains. 40 to 60 ha of prairie dog colony to support one ferret. No known wild populations (1990). Captive breeding efforts. Problem - distemper, genetic diversity.	Prairie dog burrows. Breeds: March/April.	Mainly prairie dog, also mice, voles, ground squirrels, gophers, birds, and insects. Nocturnal.		North America. (Historic: Great Plains & intermontane in Rockies.	Matthews, ed., 1990 and U.S. Fish and Wildlife Service, 1988
50 ha of prairie dog town/ferret. (Forrest et al., 1985). 2500 ha for sustainable population. Problem - distemper.				North America.	Flesness 1989. In: Seal et al., 1989
Thought extinct - 1972. Found small population in Meeteetse, WY - 1981. Last wild - 1987. Captive breeding. Reintroducing - current. Suitable site: 10,000 acres.	In prairie dog burrows. Young born - May/June.	Prairie dogs. Drag kill to burrow.		North America. (Looking at MT, SD, WY, CO, UT, and AZ for reintroduction.	U.S. Fish and Wildlife Service
Population >100 increases survival chances. 1 adult female per 57 ha (Forrest, et al.)	1 ferret litter/36 ha (Hillman and Linder)			CO	Thorne, et al., 1988
Prairie dog towns. Few records indicate former range in lowlands of central NM.	March/April - mating.	Nocturnal. Prairie dogs, ground squirrels.		NM	Findley, 1987
Plains from ND and MT south to TX. In CO - plains east of mountains up to 9200 ft. Few west of divide.		Main: prairie dogs. Other: small animals.		CO	Warren, 1942

**Table 10. Habitat Use and Foraging Habits of the Spotted Bat**

<b>HABITAT USE/REQUIREMENTS</b>					
<b>General</b>	<b>Nesting/Roosting</b>	<b>Forage</b>	<b>Dispersal/Migration</b>	<b>Location</b>	<b>Reference</b>
Distributed from MT to Mexico & southern CA to NM. Ponderosa pine & pinon-juniper.	Roosts: cracks in cliffs. Single young in May/June.	Open meadows, after midnight.		CO	Armstrong, et al., 1994
Western North America. Canyon bottoms. Low elevation. In diverse habitat types.		Open meadows, throughout night. 1 per 50-m range. Insects. Flew 10 to 30 m high.		Dinosaur Nat'l Mon. CO-UT.	Storz, 1995
	Roost: cliffs. Exits w/in 30 min. after sunset. Return time varies. Faithful to day roost.	Marshes, open ponderosa pine. Return to same areas. Moths, while in flight. Flew 5 to 15 m high. Does not support exclusive foraging territories.		British Columbia.	Wai-Ping and Fenton, 1989
Western North America. Wide elevations & variety of habitats. Often in dry, rough, desert terrain.	Roost: rock crevices.	Moths, some June beetles (Ross, 1962, Easterla, 1965). After midnight.		North America.	Watkins, 1977
Variety of habitats. No vegetation restriction. Used riparian areas in canyons.	Roost: canyon walls.	Soon after dark. Throughout night. Flew >10 m high. Not restricted to vegetation type.		Dinosaur Nat'l Mon. CO-UT.	Navo, et al., 1992
Active from sunset to sunrise. Not in heavy rain.	Roost: high, steep cliff faces. Appeared faithful to roost. Left w/in 1 hr. after sunset. Singly.	Alone, territorial. Old fields. Prefer: open area surrounded by ponderosa pine. Flew 10 m high. Insects. Moths (Ross, 1967, Poche, 1981).		British Columbia.	Leonard and Fenton, 1982
Variety of habitats. Arid/semiarid w/sage & rabbitbrush & short grasses, or open ponderosa pine.	Cracks/crevices between loose rocks on high, steep cliff faces.	Near ponderosa pine forest edge in clearings. Flies 10 to 30 m high. Moths.		LANL, NM.	Tyrell & Brack, 1992
No habitat preference.				Western	

**Table 11. Habitat Use and Feeding Habits of the Common Black Hawk**

<b>HABITAT USE/REQUIREMENTS</b>				
<b>General</b>	<b>Habitat</b>	<b>Foraging</b>	<b>Study Location</b>	<b>Reference</b>
Confirmed on BNM lands.	JS, PJ			Klingel, J. 1995
Adult Length: 43 to 56 cm. Mass: males: 790 g; females: 1,200 g. Highly acrobatic.	Obligate riparian nester. Remote, mature, gallery forest corridors. Perennial streams. Breeding: SA to UT. Migratory in the U.S. Overwintering: Glenwood, NM. Unconfirmed sighting: Bosque del Apache NM. Gila/Bill Williams rivers in AZ and NM, Colorado River drainage. Rio Grande: historic nesting site.	Opportunistic feeder/broad diet. Prey: locates from perch: most abundantly available; small to medium-sized vertebrates/ invertebrates; fish, crayfish, aquatic animals. Food stored.	CO, TX, AZ, NM.	Schnell, 1994
		Fish (86%), Invertebrates (2%), Amphibians (2%), Reptiles (10%)	Durango, Mexico.	Hiraldó et al., 1991
	Riparian areas/Mesquite and Pithecellobium.	Specialist in habitats not favored by other species.	Sonora, Mexico.	Rodríguez-Estrella & Brown, 1990

**Table 12. Habitat Characteristics of Yellow Lady Slipper Orchid**

General	Habitat	Structural Characteristics	Study Location	Reference
Confirmed on BNM lands.	Riparian, MC; requires moist soil			Klingel, J. 1995
	Range: North Temperate.			De Pauw & Remphrey, 1992
	Swamp to Upland. Occurrence: Newfoundland, south to LA, west to NM.	Height: 10 to 80 cm. Labelum: large >4 cm. Lateral petals and sepals greenish yellow; spotted/streaked with maroon.	Great Lakes region.	Case, 1993
Problems: extensive genetic diversity.	Northern cedar-fir fens, limestone barrens, mixed deciduous, roadside ditches.			Case, 1994
Rarest of Rocky Mountain wildflowers	Isolated areas.	Height: 8-24 in. Large, yellow, inflated lip		Nelson, 1969
Herbaceous perennial.	Newfoundland, BC, GA, NM, AZ. Bogs, meadows, damp woods. NM: elev. 8000 to 11000 ft.	Height: 10 to 20 in. Leaves 4 to 6 per stem; large, elliptic-lanceolate, glandular hairs.		Martin & Hutchins, 1981

**Table 13. Habitat Characteristics of the Giant Helleborine Orchid**

General	Habitat	Study Location	Reproduction	Reference
Confirmed on LA county lands.	Riparian, JS, PJ; requires springs, seeps, etc.			Klingel, J. 1995
Height: 20 to 100cm. 4 to 12 alternating ovate-lanceolate leaves clasped to stem. ≤15 flowers: greenish yellow with purple veins, lobbed lip.	Lake shores, seepages, rivers, & streams. Calcareous, porous substrates; thin, partially decomposed, wet organic substrates. Open areas rather than in forests. Site Characteristics: open, wet sites adjacent to hot springs; mossy and shady areas along rivers and streams, meadows, seeps, hanging gardens from warm desert shrubs. Spruce communities.	Southern BC, MT, CA, AZ, NM, SD; Mexico.	Flies known pollinator. Bloom time: March-August. Reproduction: Aerially dispersed seed and rhizome shoots. Forms dense stand, but will grow in small or large groups.	<a href="http://itl-2.ucsf.edu/na_orchids/genera/epipactis/gigantea.gigantea.html">http://itl-2.ucsf.edu/na_orchids/genera/epipactis/gigantea.gigantea.html</a>
Height: 8 to 40 in. Leafy stem. Pink, purplish, greenish flowers. Pointed leaf-like bract.	Wet meadows, seeping springs, base of cliffs.	Arbuckle Mtns., OK, TX, Grand Canyon, AZ, WY, CA, central and western CO.	Associations: maiden-hair fern, ( <i>Adiantum</i> ). Spreading underground stems, forms large clumps.	Nelson, 1969

**Table 13 (cont.)**

<b>General</b>	<b>Habitat</b>	<b>Study Location</b>	<b>Reproduction</b>	<b>Reference</b>
Height: 32 in. Leaves alternate. Flowers: 1.5 in., slender cluster.	In NM: Damp woods, seeping slopes, damp canyons. Elev.: 7000 to 8500 ft.	MT, BC, TX, AZ, CA, NM.	Perennial herb. Non-parasitic, non- saprophytic.	Martin & Hutchins, 1981

**Table 14. Habitat Use and Feeding Habits of the Loggerhead Shrike**

General	Habitat	Foraging	Study Location	Reference
Confirmed on LA County, BNM, and SFNF lands.	JS, PJ, PP, MC.			Klingel, J. 1995
		Short grass. Hunting: elevated perches; dead trees, tall shrubs, utility wires.	Alberta and Saskatchewan, Canada.	Telfer, 1992
	Open nest cup: twig substructure. Dense shrubs, trees: 1 to 8 meters high. Shrub Species: Sagebrush, bitterbrush, greasewood.		Sw. ID.	Cade and Woods, 1997
	Average nest height: 2.97 m; range: 0.98 to 7.20 m. Shrub species: osage orange, hackberry, Chinese elm, cottonwood, and juniper. Average nest height: 2.03 m; range 0.92 to 7.52m. Nests: 70% in elms, willows, cottonwoods, and Russian olive.		Sw. OK. CO.	Tyler, 1994
		Species taken: Herptiles: 42% Mammals: 31% Birds: 27%	Comanche County, OK.	Tyler, 1991

**Table 14 (cont.)**

<b>General</b>	<b>Habitat</b>	<b>Foraging</b>	<b>Study Location</b>	<b>Reference</b>
Shrike Larders: prey impaled on barbed wire, thorns.		Animal material: arthropods, small vertebrates. Winter: vertebrates > 50% of the total food intake.	Comanche County, OK.	Tyler, 1991
	Territorial range: 0.77 to 17.6 ha. Must include suitable hunting perches and a nest site.		MacArthur Agro-ecology Research Center (MAERC) Highlands County, FL.	Reuven & Grubb, 1994

**Table 15. Habitat Use and Feeding Habits of the Occult Little Brown Bat**

General	Habitat	Foraging	Study Location	Reference
Mixed spruce-birch forest, willow/alder shrubland, grassy meadows bordering rivers.		Aquatic insects: midges (Chironomide), caddisflies (Trichoptera), being staples. Moths, hoppers (Cicadellidae, Cercopidae), other flies (Diptera), and smaller beetles.	Salcha, Alaska.	Whitaker and Lawhead, 1992
Predators: Birds of prey; hawks, falcons, and owls. Males smaller with respect to body mass and wing loading. Females have a significantly larger head and body and longer forearms.		Trembling aspen, white spruce, fescue pine. Species is known to forage over the surface of calm water and within clutter.	Saskatchewan, Canada.	Kalcounis and Brigham, 1994
	Night roost not influenced by lunar conditions.	Small (3 to 10 mm long) flying insects: Coleoptera, Diptera, Ephemeroptera, Homoptera, Isoptera, Lepidoptera, and Trichoptera.	Saskatchewan, Canada.	Negraeff and Brigham, 1995

**Table 15 (cont.)**

General	Habitat	Foraging	Study Location	Reference
Small (7 to 10 g) aerial feeding, insectivorous species	Each female gives birth to 1 pup, nurses 3 to 4 weeks.	Young begin to fly and feed on their own. Able to fly at 14 to 15 days.	NM.	Powers et al. 1991
Adult mass = 5 to 8g	Fat reserves: 30% or less of body mass at the start of hibernation. Fat stores = 320 mg could fuel metabolism for a hibernation period of up to 200 days. Mating takes place during autumn and winter. Males are nomadic.	Low over water on aerial prey, especially chironomids, which are abundant only for a short time after sunset. Lodgepole pine, Douglas fir, mixed coniferous and deciduous, (especially trembling aspen) forests and open grasslands. Opportunistic: diet reflects insect abundance.	Windsor County, Quebec, Canada.  Kananaskis Valley, Canada.	Thomas and Cloutier, 1991  Barclay, 1991
Occur in NM, AZ. Size: Related to the number of coexisting species of <i>Myotis</i> , the more sympatric species the larger the local <i>M. lucifigus</i> .	Roosts: Ponderosa pine and mixed conifer habitats. In the vicinity of large permanent water sources. Summer Roosts: above 3• up to 55• centigrade.	Aquatic insects are major component of diet. Selects prey by taxon and size.	New Mexico.	<a href="http://www.fw.vt.edu/fishex/nmex_main/nm4_list/nm050032.htm">http://www.fw.vt.edu/fishex/nmex_main/nm4_list/nm050032.htm</a>

**Table 16. Habitat Use and Feeding Habits of the Long-legged Myotis**

General	Habitat	Foraging	Study Location	Reference
Summer residents on LANL, LA County, BNM, and SFNF lands.	PJ, PP, MC; roosts in PP and MC snags			Klingel, J. 1995
Small, long-lived, slowly reproducing animals; adapted to stable environments.	Roosts: important limiting resources; influencing social behavior, population size, community diversity. Habitat: caves, topographic relief (hills, river gorges, mountains). Roosts: caves, rock crevices, buildings, trees. Roosting strategy: generalist.		TX	Scheel et al., 1995
<i>M. volans</i> : efficient at capturing elusive prey; [moths], selects habitats where such prey is abundant.		Feeding: high above ground, along cliff edges. Lepidopterans; Coleoptera, Diptera, Heteroptera, Neuroptera. First 2 h after sunset. <i>Myotis volans</i> : high-level, open-air forager.	Southern Alberta, Canada. Milk River, Alberta, Canada.	Saunders & Barclay, 1992
		Mean digestive efficiency: 77.0 ± 2.06%.		Barclay & Dolan, 1990

**Table 16 (cont.)**

<b>General</b>	<b>Habitat</b>	<b>Foraging</b>	<b>Study Location</b>	<b>Reference</b>
Native of New Mexico.	Present in NM: May 10-Sept. 28. PP zone or above. Roosting: Large snags, mines, live pines with long vertical snags and loose bark. Births: mid-July/early August.	Shrub Steppe: PP, mixed conifer habitat, PJ habitat. Carnivore: Arthropods. Aerial pursuers. 10 meters over the canopy and along the river bank.		<a href="http://www.fw.vt.edu/fishex/nmex_main/nm4_list/nm050059.htm">http://www.fw.vt.edu/fishex/nmex_main/nm4_list/nm050059.htm</a>

**Table 17. Habitat Use and Feeding Habits of the Big Free-tailed Bat**

General	Habitat	Foraging	Study Location	Reference
Confirmed migrant on LA County, BNM, and SFNF lands.	PJ, PP, MC; Roosts on cliffs.			Klingel, J. 1995
Native to NM. Arrives NM: 5/22 [earliest], leaves 10/22 [latest]. Large bat: glossy, red-brown hairs on its back. Adverse: Pesticides; Organic Chemicals.	Roosting: Rocky cliffs with crevices/fissures required. Elev.: 8,000 to 6,000 ft. Litter size: 1/yr. Nest sites: caves, under rocks. Female: care provider. Nesting Behavior: Colonial	Sycamore, cottonwood, rabbitbrush riparian habitats. Interior DF, cottonwood-willow, interior PP, PJ. Carnivore: Arthropoda Insecta, Lepidoptera. Feeds in groups. Fast flyers. Forages in air.		<a href="http://www.fe.vt.edu/fishex/nmex_main/nm4_list/nm050037.htm">http://www.fe.vt.edu/fishex/nmex_main/nm4_list/nm050037.htm</a> (NMGF)

**Table 18. Habitat Use and Feeding Habits of the Goat Peak Pika**

General	Habitat	Foraging	Study Location	Reference
Confirmed in LA County, SFNF, BNM lands.	MC, SF, boulder piles and rock slides.			Klingel, J. 1995
	Severely restricted by temperature, which decreases with increasing latitude and increasing elevation. Restricted to cool, moist microhabitats on higher peaks or along watercourses.			Hafner, 1991
	Distribution: fragmented; cool, mesic, high-elevation sites. Mountain ranges surrounded by woodland, grassland, desert. Rocky habitat is essential.		Southern Rocky Mountains : CO, NM, UT, WY.	Hafner, 1994
Two species recognized: collared pika of Alaska and adjacent Can., America pika of western Can. and the U.S.	Clear-cutting of forests and overgrazing of alpine meadows often produce new talus habitats by creating severe erosion. Virtually every patch of talus, whether produced by freeze-thaw conditions or by clear-cutting for timber or construction of ski runs, is occupied by pikas. Pikas are found $\leq 5$ km from current alpine permafrost conditions.		Jemez Mtns., NM. Southern Rocky Mountains	Hafner & Sullivan, 1995

**Table 18 (cont.)**

<b>General</b>	<b>Habitat</b>	<b>Foraging</b>	<b>Study Location</b>	<b>Reference</b>
Predators: Yellow-bellied marmot.		Grasses and forbs.	King's Canyon National Park, CA.	Peterson, 1992
	Three highest-elevation vegetation units: alpine meadows and barren, western spruce-fir forest, southwestern spruce-fir forest. Short summers: <20 d per yr w/ high temp. >35° C. Long winters:>180 d per yr w/ high temp. <0° C. Short freeze period: <90 d per yr. Mean annual precip.: >30 cm.			Hafner, 1994

**Table 18 (cont.)**

<b>General</b>	<b>Habitat</b>	<b>Foraging</b>	<b>Study Location</b>	<b>Reference</b>
Predators: weasels. Relatively long-lived, stable populations.	Generally set up territories next to opposite-sexed neighbors. Talus slopes of alpine habitat. Territorial on talus.	Kleptoparasitic. Herbaceous material such as alpine avens ( <i>Acomastylis rossii</i> ) American bistort ( <i>Bistorta bistortoides</i> ). Distance to talus constrains where pikas forage. Pikas collect and store vegetation. Caching/Haying: a predominant activity in July and August. Travel to adjoining meadows or to patches of vegetation within the talus.	Niwot Ridge, CO: elev. 3300 m. Elk Mtns., CO: elev. 3200 m. Pipit Tarn, CA: elev. 3350 m.	McKechine et al., 1994

**Table 19. Habitat Use and Feeding Habits of the Flathead Chub**

General	Habitat	Foraging	Study Location	Reference
Confirmed in the Rio Grande between Espanola and the Cochiti Reservoir.			Little Missouri River, ND.	Kelsch, 1993
Habitat: rivers with high turbidity, highly variable/intermittent flow, shifting sediments, limited aquatic vegetation, relatively steep gradients.		Terrestrial insects, plant material. Can feed off of bottom because of body size & head shape.	Perry Creek, IA.	Hesse, 1994
	Sexual Maturity: 2 years. Fully Mature: 4 years. Lifespan: 10 years. Spawning: mid-July to mid-August Water temperatures: 18 to 25° C.	Terrestrial insects, plant material. Can feed off of bottom because of body size & head shape.	Perry Creek, IA.	Hesse, 1994

**Table 20. Habitat Use and Feeding Habits of the White-Faced Ibis**

General	Habitat	Foraging	Study Location	Reference
Occurrence: Summer resident and migrant on the Rio Grande and adjacent LA County and SFNF lands.	Rivers/marshes.		SE Uruguay.	Amat & Rilla, 1994
	Flock size: wetlands (26.6) grasslands (12.0).		Argentina.	Antas, 1994
	Breeding: Argentine wetlands.		NM.	Ryder & Manry, 1994
First state record in NM: 1973.	Eggs: mid-June/early August. Sagebrush, saltbush, cattail, giant burreed. Freshwater marshes: reed, torpedo-panic grass, cordgrass. 10,000 nests: 55% saltwater marshes; 45% freshwater marshes. Arrive at breeding areas: April Leave: Sep-Oct.	3 to 6 km from breeding range. Crayfish, fish, frogs, snails, bivalves. Chironomid flies. Breeding adults and recently fledged young range 40 to 48 km from colonies.	NV. LA. CO. TX, LA. UT, IA IA.	Ryder & Manry, 1994

**Table 20 (cont.)**

General	Habitat	Foraging	Study Location	Reference
<p>length = 46 to 56 cm weight = 450 to 525 g Predators: raccoons, striped/spotted skunks, coyotes, long-tailed weasels. Predation: negligible on adults Peregrine Falcons, Red-tailed Hawks, large raptors attack ibises on feeding grounds.</p>	<p>Cattail/bulrush marshes Nests: flat/columnar, well-formed open cup. Can be a few dozen plant stalks arranged haphazardly on ground. Breeding range: locally from CA, OR, ID, MT, ND/ SD, IA, Durango and Jalisco, Mexico. Largest breeding colonies: UT, NV, OR, TX, LA. Colony sites: used over several years. Nests: emergent vegetation, low trees/shrubs over shallow water; ground on small islands. Roosts communally, travels in flocks between feeding, nesting, and roosting areas. Defends area about 1 m around nest. Landing, preening perches up to 3 m away from nest. Nests in colonies. Nests are vulnerable to predators when water levels drop. Nest height: highly variable. UT: 20.2 to 99.0 cm. San Luis Valley, CO. avg. of 54.1 cm. IO: 66 to 113 cm. OR avg. of 21.9 cm.</p>	<p>Flooded hay meadows, agricultural fields, estuarine wetlands. Feeds in large flocks (up to or &gt;1000). Aquatic, moist soil insects, crustaceans, earthworms, larval insects, leeches snails. Forages in flocks.</p>		<p>Ryder &amp; Manry, 1994</p>

**Table 20 (cont.)**

<b>General</b>	<b>Habitat</b>	<b>Foraging</b>	<b>Study Location</b>	<b>Reference</b>
Oldest known bird in the wild: 14.5 years. DDT-DDE contamination causes eggshell thinning, abnormal eggshell ultra-structure. DDT-DDE: effects on adults are unclear.	Winter range: LA, TX; Guerrero, Puebla, and Tobasco, Mex., and Costa Rica, and Salton Sea, CA, Colorado River Valley, AZ.	DDE residues >3 to 4 ppm in ibis eggs linked to high incidences of damaged eggs, lower hatching success, reduced reproductive output, and possibly delayed breeding.		Ryder & Manry, 1994

**Table 21. Habitat Use and Feeding Habits of the Gray Vireo**

General	Habitat	Foraging	Study Location	Reference
Confirmed on LA County, BNM, and SFNF lands.	Riparian, JS, PJ.			Klingel, J. 1995
	Breeding: sw. US, northern Mexico. Winter: coastal deserts; Gulf of CA Wintering: 7 months a year. Vireos banded in 1985-1986: 71% return rate. Wintering habitat: elephant trees, open PP, juniper woodland; ecotone between this and lower-elevation chaparral habitats.	Primarily insectivorous in the breeding season. Seasonally frugivorous. Territorial throughout the winter. <i>Bursera microphylla</i> .	Sonora, Mexico. N Mexico, SW AZ, TX, CA, S NV, and UT, S AZ, N Coahuila, Mexico.	Bates, 1992

## APPENDIX B

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