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Survey Results

Introduction

Burrowing Owl

Burrowing owl studies were conducted on the INEEL by Gleason (1978) during spring and summer in 1976 and 1977; 6 burrowing owl nests were located each year on the site, including nests at sites occupied both years. No burrowing owl nests were found near WAGs by Gleason (1978). Unpublished data for ongoing studies at the INEEL include 15 nests located on the INEEL in 1996 (L. D. Flake and N. A. Fahler, unpublished data); 1 nest less than 10 m outside the INEEL boundary was also located. Owls prefer short vegetation (often grazed by livestock or burrowing rodents such as prairie dogs), high burrow densities for nests, nearby perches, grassland areas, and fairly level topography.

The optimal nesting area in 1996 was found at Tractor Flats and consisted of grazed crested wheatgrass. Potential nesting burrow densities on INEEL do not approach optimal numbers according to the literature. Large grassy areas do exist on the site, but many are not grazed and the grass is tall, discouraging burrowing owl use. Grass dominated areas on the INEEL lack high densities of potential nesting burrows compared to black-tailed prairie dog towns (*Cynomys ludovicianus*).

Applicability of the Results

The best burrowing owl nesting habitat on the INEEL is probably not regarded as optimal for the species in the intermountain region. Optimal nesting habitat under our definition was optimal for the INEEL (the highest densities of burrowing owl nests we have observed on the INEEL). Densities of nesting burrowing owls on the INEEL are relatively low. Because of the time of year at which these surveys were conducted, inferences on nesting potential are based on known nest sites on the INEEL from our current studies and on the literature. Nesting surveys using taped calls and call backs and direct search

need to be conducted in the spring and early summer and cannot be conducted during this late summer survey. We have no data on minimal size habitat areas acceptable to burrowing owls on the INEEL; we have assumed 1 hectare as a minimal area because all of our nesting sites on the INEEL are in patches larger than 1 hectare. It is possible we will find burrowing owls nesting in patches of habitat smaller than 1 hectare in the future. Information on home range size is needed to estimate potential hunting areas but is not available for the INEEL and the data from the literature are highly variable. Without intensive telemetry studies, it would be impossible to define hunting areas for burrowing owls; we used our general observations and the literature to roughly estimate possible use of areas for hunting. No habitats near the WAGs could be ruled out as possible hunting sites for burrowing owls. We evaluated nesting habitat out to 200 m from the perimeter fence or out from the edge of lawns, gravel or buildings if no fence was present. This was a minimal distance but we could not evaluate beyond this distance in the time allotted for this survey. Two hundred meters may be sufficient for evaluating potential influences on burrowing owl nesting but there are no data to substantiate this distance. Burrowing owl home ranges from as far as 1 km away may overlap WAG boundaries.

Estimated Site/Area Population

A population estimate was not possible for any WAG at the time of this survey because the nesting season had ended; adults and juveniles had dispersed from the natal area. Time and personnel constraints did not allow intensive foot searches for abandoned nest burrows, and as a result of weathering, signs of heavy use by nesting owls such as pellet remains and whitewash would not have been necessarily evident.

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Raptors

Craig (1979) and Craig et al. (1984) conducted studies on the hawks (and eagles) of the INEEL site in the 1970's and 1980's. Hansen (1994) studied nesting and wintering hawks and eagles on the INEEL in the early 1990's (L. D. Flake, Principal Investigator). We used Hansen's more recent data to evaluate potential overlap of target species' nesting and wintering activities with each WAG. Hansen (1994) reported the UTM coordinates for ferruginous hawk nests in 1991, 1992, and 1993; the remaining target species were not observed nesting on the INEEL. Hansen also reported winter abundance of target species for selected roadside surveys but the exact location in relation to some WAGs is not available. Cieminski (1993) observed bird use of INEEL ponds over a three year period but only observed one of the target species, ferruginous hawks, at ponds; she reported only three observations.

Applicability of the Results

Nesting and wintering observations of the target species could not be conducted under the time frame of this late summer survey. Potential for target species use of areas in or near WAGs must be inferred from the 1991-1993 INEEL studies by Hansen (1994) or from earlier work in the 1970's and 1980's for which exact locations are not available. The studies from 1991 through 1994 encompassed the entire INEEL and, although some raptor nests in isolated sites or in extensive juniper forests were probably missed, it is probable that most active ferruginous hawk nests on the INEEL were observed. There was no specific attempt to emphasize searches near WAGs but these areas were also searched during 1991-1993 (Hansen 1994). It is probable that current field work during the nesting season would provide some different nest sites near the WAGs for ferruginous hawks. However, ferruginous hawks often return to old nest sites. It is highly unlikely that nesting in the other target species would be found on the INEEL even with updated searches.

We report nests within 6 km of WAGs

because Wakeley (1978) observed hunting activity out to 5-6 km from ferruginous nest sites in Utah. Thus, ferruginous hawks within this distance of any WAG may be hunting near there. However, it is possible that hunting ranges may be larger than reported in this study.

Data were collected for the entire INEEL without particular reference to WAG facilities from January through August of 1991, 1992, and 1993 (Hansen 1994). Nest searches for target species within several km of WAGs were relatively extensive. No current survey was conducted so conditions in 1996 were not pertinent.

Nesting Target Species: The only target species nests observed on the INEEL from 1991-1993 were ferruginous hawk nests. Peregrine falcons and northern goshawks are not known to nest on the INEEL.

Scattered Utah junipers (*Juniperus osteosperma*) are within 6 km of every WAG and could be used by nesting ferruginous hawks. Ferruginous hawks can also nest on higher ground but Hansen (1994) and Craig (1979) did not observe ground nesting.

Recent studies indicate a range of 11-15 nesting pairs of ferruginous hawks on the INEEL. These numbers are probably close to current populations. Several ferruginous nests occupied in 1993 were checked by L. D. Flake in summer of 1996 and occupancy rates remained high. Populations of ferruginous hawks are expected to remain stable on the INEEL except for minor declines due to loss of cottonwood trees. Artificial nesting platforms could help offset such losses.

Numbers of peregrine falcons and northern goshawks are low enough that short term surveys would likely indicate zero populations.

Wintering or Migrating Target Species: Craig (1979) and Hansen (1994) both observed wintering bald eagles on the INEEL in small numbers and they are regularly seen at the northern and western edges of the INEEL during the annual mid-winter eagle count (T. D. Reynolds, personal communication). Bald eagles

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sometimes concentrate in large numbers to feed on black-tailed jackrabbits (*Lepus californicus*) on private agricultural lands; such a concentration was observed southeast of Howe in 1993 (O. D. Markham, personal communication).

Craig (1979) observed a peregrine falcon on the INEEL near the Lost River Sinks in October 1975. Hansen (1994) records two sightings of peregrine falcons during winter, one near NRF and the other near Middle Butte. L. D. Flake observed a peregrine perched on a power line about 1.5 km north of ANL-W in July of 1996--several other records of peregrine falcons on the INEEL have been reported. Peregrines may perch or feed near all of the WAGs at various times but few individuals visit the INEEL. Northern goshawks were observed in small numbers by Craig (1979) but were not observed by Hansen (1994).

Breeding Birds

Breeding bird surveys (BBS) were conducted by the Environmental Science and Research Foundation on the INEEL from 1985 through the present. Results of these surveys for the period 1985-1991 were reported by Belthoff et al. (In press). These data, and those from subsequent years through 1996, were used to provide an assessment of whether nine species of special concern have inhabited the area surrounding the WAGs. This provided the basis for an inference about their continued use of the area. The birds of interest are trumpeter swan, black tern, loggerhead shrike, long-billed curlew, bald eagle, peregrine falcon, ferruginous hawk, northern goshawk, and burrowing owl.

Applicability of the Results

BBS data can be used to determine historical presence of species at the WAGs and can provide information about historical trends in populations. However, the population density estimates we present below are limited by the assumptions that each observation represents a separate individual and that habitat was uniform over the route. The estimate could be refined by identifying the habitat at each stop and determining whether the

species were using particular habitat types preferentially.

These data provide information about presence of species at a particular time in a particular year or set of years. If the habitat around a given facility has changed, the data may or may not represent current bird populations. The time of year at which these surveys are done influences the results. For example, the bald eagle is known to winter near the site but not to nest here. Therefore, it would not be expected to appear in the BBS. The peregrine falcon and the northern goshawk are infrequent visitors to the site and would also not be expected to appear.

As with any survey methodology, BBS cannot demonstrate with certainty the absence of a species. However, because these data encompass several years, the combined results provide confidence that, if the species were present during the time of year the survey was conducted, it would have been detected.

Sagebrush Lizard

We conducted a visual encounter survey for sagebrush lizards around the perimeter of each WAG. In most reptile surveys, it is difficult to determine if a species is not present in a certain locality; however, sagebrush lizards are territorial and are easily observed if surveyed during the correct times of the year.

Because these lizards are found in most of the habitat types on the INEEL (Stebbins 1985), an initial habitat survey was not warranted. However, sagebrush lizards are not known to occur in grass lawns, so locations around the WAG that had planted and maintained lawns were not surveyed. Neither the facility buildings, nor the wetland areas (sewage ponds, cooling ponds) of the WAGs were surveyed. The survey covers the area just outside of the boundary of the WAG.

Applicability of the Results

This survey was not comprehensive enough to make determinations of population size and densities of sagebrush lizards. The information obtained through this survey only applies to

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WAG being reported, and should not be made to apply to other areas of the INEEL. Sagebrush lizards are capable of dispersing into an area, so information that suggests the lizards do not inhabit a given WAG should be used with caution.

Estimated Site/Area Population

The brief surveys conducted here were not comprehensive enough to make estimates of population density at any WAG. A high-end estimate for the entire INEEL is presented in the Site-wide Summary report.

Bats

This report describes the results of acoustical and visual encounter surveys for Townsend's big-eared bats, long-eared myotis, small-footed myotis, and western pipistrelle around WAGs on the INEEL. The goal of this survey was to determine whether or not these species of bats use the WAGs for roosting or obtaining water to drink. As described in the survey protocol, surveys at all WAGs focused on the sewage and/or industrial waste ponds early in the evening and moved to light sources later in the night.

Applicability of the Results

The methodology used in this survey was not sufficiently comprehensive to estimate population densities or size for these species of bats. Survey results will apply only to the individual WAGs, and should not be extrapolated to other areas of the INEEL. Because bats are capable of utilizing a relatively large area, absence of particular species does not necessarily indicate that the taxa in question do not use the area(s) in other times of the year.

Estimated Site/Area Population

No data collected to date on the INEEL will allow population density estimates for the target species. Population estimates at the WAGs would require more intensive survey methodologies such as mark and recapture surveys.

Merriam's Shrew

This report describes the results of a pitfall trapping survey for Merriam's shrew near WAGs on the INEEL. The purpose of this survey was to determine whether this species occurred near any of the WAGs.

Applicability of the Results

The methodology used in this survey is not comprehensive enough to make determinations of population size and densities of Merriam's shrews. Information obtained through this survey only applies to the particular WAG surveyed, and should not be extrapolated to other areas of the INEEL. These shrews are capable of dispersing into an area. Moreover, most trapping methodologies underestimate or miss shrews when in fact they are present (Sarah George, personal communication). Merriam's shrews are particularly difficult to detect because, although they are associated with sagebrush, they are uncommon throughout their range (Armstrong and Jones 1971). Therefore, any information indicating that Merriam's shrews do not inhabit a certain WAG locality should be projected to future shrew distributions with great caution.

Gray Wolf

Although there exists anecdotal evidence of isolated wolves occurring on the INEEL, it is not likely that wolves regularly hunt or breed here. If such a pack did exist on the INEEL, it would tend to avoid all the WAGs because of human activity. Therefore, as described in the protocol document, the assessment for gray wolves did not occur on a WAG by WAG basis. Instead, historical observations were analyzed for the INEEL in particular and southeastern Idaho, in general.

Documentation on the distribution of Idaho wolves throughout the 1800's is scarce and consists primarily of historical journals, predator control records, and Idaho Fish and Game biennial reports. Based on this information, wolves were thought to be most numerous in the southeast portion of the state in association with large ungulate populations, primarily bison

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(Kaminski and Hansen 1984). Journals from 1812-1840 document wolves in the foothills and basins of the Lost, Pashimeroi, Lemhi, Portneuf, Blackfoot, Bear, and Snake Rivers. Wolves were also observed throughout the Lemhi Range, the Lost River Range, and along the Malad River (Kaminski and Hansen 1984). It is important to note that information based on these manuscripts is limited to the areas traveled by trappers, frontiersman, and settlers. Until the 1860's interior Idaho was generally avoided.

By the 1860's ungulate populations in southeast Idaho had been drastically reduced. Conversely, livestock numbers were on the increase. Conflicts arose and every possible means was used to destroy wolves. It is believed that most wolves were removed from southeast Idaho and adjacent areas by the late 1920's and, by the late 1930's the last wolf in Idaho was exterminated. However, reports of animals continued along the Lemhi Range and in the upper Pashimeroi Basin throughout the 1940's and 1950's. During this time, there were also many reports of lone wolves in the Stanley Basin and Sawtooth National Forest. From 1960 on, reports of wolves in the Targhee National Forest and throughout the Lemhi Range were more consistent.

Kaminski and Hansen (1984) compared a total of 29 wolf reports on the Challis National Forest from 1974 through June 1, 1984. Twenty-four of these were considered probable and five possible (based on a scoring system devised by the authors). During the same period, the Targhee National Forest had 28 total wolf reports, three probable and 25 possible. Using a similar criteria system, the Wolf Ecology Project, University of Montana, compiled nearly 400 reports between 1972 and 1979 from western Montana, Idaho, and northwest Wyoming (Ream and Mattson 1982). Seventy four of these reports were from southwest Montana.

Today, a large and varied prey base may support wolves in southeast Idaho. The sand Creek elk herd, which summers in the southwest corner of Yellowstone National Park, winters just northwest of Rexburg and southeast of Dubois (Singer 1988). From 1981 to 1987, Singer

estimated the population at 4900 individuals. An elk herd numbering upwards of 250 individuals is resident on the INEEL. Mule deer could also provide a substantial portion of the prey base. Mule deer tend to summer in the Island Park area and winter in Junipers-Sand Creek area. An unknown number of Mule deer inhabit the INEEL.

Since 1990, there have been 12 wolves seen in nine separate reports on or near the INEEL (Table 3).

Pygmy Rabbit

The purpose of this survey was to determine the likelihood of the presence of pygmy rabbits in areas immediately adjacent to INEEL WAGs. The survey consisted of a two phase approach, the first phase of which was designed to determine the likelihood that a given WAG is located in appropriate pygmy rabbit habitat. The selection criteria were developed based on characteristics of known pygmy rabbit sites on the INEEL. The criteria are most successful in predicting where pygmy rabbits will NOT be located. No pygmy rabbits were found in thirty randomly chosen locations predicted not to contain pygmy rabbits. This indicates a high predictability for determining non-pygmy rabbit locations.

The second phase of the survey involved field surveys for evidence of pygmy rabbit use around WAGs which could not be excluded in the preliminary screening. This was necessary because the predictability of the GIS index for pygmy rabbit areas is only about 58%. Thus some areas predicted to contain rabbits based on the GIS analysis may, in fact, not contain them.

Applicability of the Results

The limitations of the first phase of the survey include exclusion of a WAG that may contain potential pygmy rabbit habitat. This exclusion could result from two factors. The initial determination of whether WAGs contain potential habitat was based on Geographic Information System (GIS) computer files for vegetation and geology. If these files were

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Table . Gray wolf sightings on and near the INEEL since 1990.

Date	County	Location	Observer	Comments
7 Oct 90	Butte	Birch Creek Drainage	Taylor, D.	1 seen for 15 min. @ 300 yd.
15 Apr 92	Clark	Highway 28	Jolly, G.	1 seen for 15 min. @ 200 yd.
20 Oct 92	Butte	South Fork Pass Creek, Blue Dome	Hook, M.	2 seen @ 500 yd.
1993?	Butte	Howe Highway	Arco teacher	1 + live
21 Jan 93	Butte	Birch Creek	Hansen, R.	tracks
2 Mar 93	Butte	Hwy. 22, 4 mi. N of Hwy. 33	Hansen, R.	2 seen for 2 min. @ 250 yds.
1993-94	Butte	Mouth of Birch Creek Valley	BLM employee	3-4 seen @ 1/2 mi.
1996	Jefferson	Tractor Flats Road (UTM 4838783.2 N, 377180.4 E)	Cooper, S.	1 seen for 30 sec. @ 40 m
1996	Bingham	North of East Twin Butte	Smith, T., Bacon, W., and Goessling, J.	1 seen for 5-30 sec. @ 100 yds.

inaccurate, it could lead to an error in assessing the area around the WAG. The second possible source of error is in the reliability of the habitat suitability model. Though these errors exist, they should be minimal. The GIS overlays have proven to be highly accurate regarding geology and habitat characteristics. The previous work with determining areas not used by pygmy rabbits based on these two overlays has also proven to be highly accurate. Of 30 randomly chosen sites predicted to be non use areas, field surveys have failed to find evidence of rabbits in all sites.

Plants

A survey of the INEEL for rare plants was conducted by Cholewa and Henderson and the results published by the DOE in a 1984 publication. They reported on the presence of three of the target species from this study. These are plains milkvetch, wing-seeded evening-primrose, and spreading gilia. The last species, Lemhi milkvetch, was discovered on the INEEL

in 1993 by J. Glennon. The range of the species in this survey include the INEEL and large portions of the Great Basin but they are found in rocky undisturbed foothill areas.

To characterize the target species, Cholewa and Henderson (1984) and studies by J. Glennon (personal communication) have determined diagnostic data that include the following:

Plains milkvetch, a perennial, is only found in the extreme north end of the INEEL on the tip of the Beaverhead Range on a "rocky, limestone slope with little soil development."

Wing-seeded evening-primrose, an annual, is found in the northwestern edge of the INEEL in the rocky foothills of the Lemhi Mountains. The species is found on both limestone and volcanic slopes but it occurs in a Juniper/Low sagebrush plant community.

Spreading gilia, an annual, is found on "rocky slopes of volcanic origin." It is found in

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the north and northwest foothills in communities composed of black sagebrush or Salmon River wildrye. Lemhi milkvetch, a perennial, occurs on rocky, limestone slopes on the western foothills of the INEEL in the Lemhi Mountains.

These criteria were used to help determine the presence of the target species at all WAGs.

Applicability of the Results

The two perennial species (plains milkvetch and Lemhi milkvetch) are easily identified throughout the field season and therefore pose little difficulty in determining their presence or absence in the survey area. The other species (wing-seeded evening-primrose and spreading gilia) are annuals and determining their status is much more difficult. They only grow in the spring and early summer and by the time of these surveys, late summer, they would have dried, broken off, and blown away. Compounding this is the yearly variation due to climatic conditions. In dry years annuals often fail to germinate or are smaller and more ephemeral than in wetter years. The survey year, 1996, had a wet spring and the probability of the germination and growth of these annuals was very high, but, depending on micro-habitats, the areas around the survey areas could be different from the recorded conditions in other areas of the INEEL.

To optimize the finding of the target species the survey should be conducted in early summer. Due to the time of year this survey was conducted, the presence or absence of these species was assessed by determining whether the areas contained the necessary habitat for the target species. If the specific habitat requirements of the species were not available in the survey area, they were very unlikely to be found there. On the other hand, if the habitat was available but the species could not be found, their presence could not be entirely ruled out, and further surveys may need to be conducted in following years.

At each WAG, the survey area included a wide area outside the fenced perimeter with a

visual survey for any possible habitat inside the perimeter that would need further study. It excluded any disturbed, non-native habitat near a road, building or other man-made structure.

WAG 1

Burrowing Owl

The burrowing owl habitat survey was conducted at WAG 1 on August 19, 1996. No optimal habitat for burrowing owl reproduction was located within 200 m of the WAG 1 perimeter. During habitat surveys, we observed no signs (droppings, pellets, etc. at potential nest burrows) nor did we observe any living or dead burrowing owls on the survey areas.

In the 200-m perimeter surrounding WAG 1, none of the habitat was type 1 (optimal nesting habitat), 55 % of the habitat was type 2 (moderate nesting habitat), 35 % of the habitat was type 3 (low use nesting habitat), and none of the habitat was type 4 (unsuitable nesting habitat).

Historical Sightings and Anticipated Future Use

We found 15 burrowing owl nests on the INEEL in 1996, but none were located within 600 m of any WAG. Similarly, of the 6 nests found by Gleason (1978), all were greater than 600 m from facilities. However, breeding bird surveys have revealed burrowing owls on the TAN (WAG 1) route (Table 4).

Burrowing owls often return to previously used sites, thus WAG 1 is a likely candidate site for burrowing owl use in the future. At least one recorded sighting at WAG 1 was within or very near 600 m from the perimeter.

Raptors

Nesting Target Species

The only ferruginous hawk nest located within 6 km of WAG 1 was located 1993 at 48306 N, 3447 E on an artificial nest platform (Table 4). Ferruginous hawks often repeatedly use old nest sites so it is likely some of these nest sites were active in 1996.

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Table . Sensitive species identified on Breeding Bird Survey routes near Idaho National Engineering and Environmental Laboratory Waste Area Groups (WAGs) from 1985 through 1996.

WAG	Common Name	Survey Year	Number of Sightings
1	ferruginous hawk	1985	1
		1986	2
		1987	2
		1989	3
	loggerhead shrike	1985	3
		1986	3
		1987	1
		1988	1
		1990	2
	burrowing owl	1994	3
2	ferruginous hawk	1985	1
	loggerhead shrike	1985	6
		1986	1
		1990	1
		1991	1
		1996	2
3	burrowing owl	1985	1
	ferruginous hawk	1987	2
4	ferruginous hawk	1986	1
		1990	1
		1991	1
	loggerhead shrike	1985	2
		1986	5
		1987	1
		1989	1
		1991	5
		1994	7
		1995	1
5	ferruginous hawk	1985	1
		1986	2
	loggerhead shrike	1985	7
		1986	11
		1987	9
		1989	1
		1990	4

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WAG	Common Name	Survey Year	Number of Sightings
5	loggerhead shrike	1991	3
		1994	3
		1996	3
7	loggerhead shrike	1985	12
		1986	5
		1987	3
		1989	5
		1990	4
		1991	4
		1994	5
		1996	1
9	burrowing owl	1985	2
		1986	4
	loggerhead shrike	1985	9
		1986	10
		1987	5
		1991	2
		1995	1

In addition to scattered Utah junipers, WAG 1 also has narrowleaf cottonwood (*Populus angustifolia*) substrates within a few km that could be used by nesting ferruginous hawks.

Wintering or Migrating Target Species

Bald eagles have been observed within potential hunting range of WAG 1. Peregrines may perch or feed near WAG 1 at various times but few individuals visit the INEEL.

Anticipated Site Use

WAG 1 will remain within the home range or potential home range of nesting pairs of ferruginous hawks. Bald eagle use of areas near WAG 1 may increase as population recovery continues. Likewise, population recovery in the peregrine falcon will likely increase the occurrence of this species on the INEEL as a migrating or wintering raptor. Nesting is not likely near WAG 1.

Estimated Site/Area Population

One ferruginous hawk nest was identified within 6 km of WAG 1. This is probably close to the current population size. Numbers of peregrine falcons and northern goshawks are low enough that short term surveys would likely indicate zero populations.

Breeding Birds

The BBS survey route around WAG 1 is 19.2 km long with 60 stops. Stops were 0.32 km apart. The habitat along the route is described by the BBS surveyors (Belthoff et al. In press) as 40 % big sagebrush, winterfat (*Kraschennikovia lanata*), and green rabbitbrush (*Chrysothamnus viscidiflorus*); 15% indian rice-grass (*Achnatherum hymenoides*), green rabbitbrush, and prickly pear (*Opuntia polycantha*); and 40% saltbush (*Atriplex nuttalli*), winterfat, and indian rice-grass.

Three of the species of concern appeared in the BBS around WAG 1 from 1985 through 1996: burrowing owl, ferruginous hawk and

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loggerhead shrike (Table 4). Burrowing owls did not appear in the survey until 1994 and have not appeared since then. There were 3 total observations of burrowing owls in 1994.

There were eight total observations of ferruginous hawk.. Although the BBS methodology makes it unlikely, observations which occurred on the same or subsequent days may have been the same bird. Because ferruginous hawks tend to return to the same nest sites, observations in subsequent years may have been the same bird.

Loggerhead shrikes were observed 10 times from 1985-1996 (Table 4).

Anticipated Future Use

Ferruginous hawks and loggerhead shrikes observed at WAG 1 have demonstrated a tendency to use the area over a period of several years. There is no reason not to expect continued use. However, ferruginous hawks tend to avoid areas frequented by humans. For this reason, it is unlikely that ferruginous hawks will nest or hunt at contaminated sights within the WAG. Loggerhead shrikes, on the other hand, have both nested and hunted within areas of human occupation and have been observed inside contaminated areas at other WAGs. There is a possibility that loggerhead shrikes will become contaminated at WAG 1.

Burrowing owls only appeared in the survey in 1994. This may imply that they have begun colonizing area but, because burrowing owls tend to return to former burrow sites and have not been observed since 1994, their status at WAG 1 is uncertain.

Estimated Site/Area Population

We estimated the density of burrowing owls, ferruginous hawks, and loggerhead shrikes at WAG 1 to be 0.07, 0.19, and 0.24 km⁻², respectively.

Sagebrush Lizard

WAG 1 was the only area surveyed in which no lizards were found. The TAN area was surveyed on August 23 and September 1, 1996.

The area surveyed consisted of the area outside of the TAN enclosure fence. On August 23, the survey was conducted by moving in a counterclockwise direction starting in the main TAN parking area on the Southwest end of the facility. The weather on this day was clear and calm, with the 0930 air temperature at 22 C, warming to 27 C at 1200. The September 1 survey began in the north-central area of the facility and followed a clockwise direction. The weather on September 1 was similar to the previous survey. The weather was clear and calm, although smoke from nearby range fires made the sky appear hazy. The 0930 air temperature was 22 C, and the noon temperature was 27 C. The habitat of the area mainly consisted of mixed grassland communities, with a few scattered sagebrush and rabbitbrush shrubs in certain localities. The north and northeast areas on TAN are the most undisturbed grassland areas around the facility. These areas were searched during the 1-hour time-constrained search on both survey days. The west and south areas are disturbed by construction areas, gravel areas, contamination ponds, and borrow pits.

Historical Sightings and Anticipated Future Use

Although no lizards were observed during the two survey days, it is likely that sagebrush lizards are found in the area and just were not observed. Sagebrush lizards are known to inhabit grassland areas, and were observed near the TAN area in similar habitat in 1994.

Bats

The bat surveys were conducted at WAG 1 on September 14, 1996. The sky was clear; the wind was breezy with occasional gusts; the high temperature was 13.9 °C and the low was 8.3 °C. Three bats were found using acoustical surveys. One, the big brown bat (*Eptesicus fuscus*), is not a species of interest. However, two small-footed myotis were observed; one was passing through the area and one was actively hunting (Table 5).

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Table . Small-footed myotis detected during an acoustical and visual survey of the Waste Area Groups (WAGs) on the Idaho National Engineering and Environmental Laboratory. All bats were detected with acoustic sensors near a water source.

WAG	Pass ¹	Feeding Buzz ²
1	1	1
2	2	2
3	1	1
7	1	1
9	1	1

¹Number of bats detected passing through the area.

²Number of bats actively feeding

Historical Sightings and Anticipated Future Use

No historical data are available for bat use of the WAG 1 ponds. However, two small-footed myotis were found in the area and one was actively hunting. This implies that further use of the WAG 1 ponds can be expected by these species.

Merriam's Shrew

The pitfall trap for this survey was constructed on September 21, 1996 near the TAN pond (43°51.6686' N, 112°44.0551' W, at an elevation of 1440 m, as determined by GPS). No small mammals were collected.

Historical Sightings and Anticipated Future Use

There are no historical records of Merriam's shrews at WAG 1 and we did not observe them during this survey.

Gray Wolf

Since 1990, there have been 12 wolves seen in nine separate reports on or near the INEEL (Table 3). Most sightings have occurred on the north end of the site at the mouth of the Birch

Creek Valley. Thus, if wolves are present on the INEEL, WAG 1 seems the most likely to impact them.

Pygmy Rabbit

This WAG site was eliminated from further consideration during the preliminary screening process. Based on GIS analyses of vegetal, slope, and geologic characteristics, it was determined that this site was outside of the range needed to support pygmy rabbits. Thus we have a high level of confidence that no pygmy rabbits occur within or near WAG 1.

Historical Sightings and Anticipated Future Use

No pre-existing data are available on the occurrence of pygmy rabbits at this WAG site. We do not anticipate any future use of the area by pygmy rabbits.

Plants

The field portion of this limited survey of WAG 1 was conducted on 7 September 1996. The four target species were not observed in the WAG area.

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WAG 1 is the area closest to the known distribution of all four of the species of concern in this survey. The habitats around WAG 1 are a complex mixture, including loess and saltbush playas, wind-blown sand and well-drained gravel beds. The required habitats for the survey species were not found in the area and the target species are not to be expected in the WAG area or its immediate vicinity.

Historical Sightings and Anticipated Future Use

There are no records of the occurrence of these species at WAG 1 in the past and numerous searches by Glennon over the last six years and during this survey have found no evidence of the species in the WAG area. The habitat requirements and their present distribution on the INEEL support the conclusion that these species are not expected to occur at WAG 1.

WAG 2

Burrowing Owl

The burrowing owl habitat survey was conducted at WAG 2 on August 20, 1996. No optimal habitat for burrowing owl reproduction was located within 200 m of the WAG 2 perimeter. During habitat surveys, we observed no signs (droppings, pellets, etc. at potential nest burrows) nor did we observe any living or dead burrowing owls on the survey areas.

In the 200-m perimeter surrounding WAG 2, all of the habitat was type 4 (unsuitable nesting habitat). WAG 2 is one of three WAGs without any type 1 or type 2 habitats within the 200 m perimeter survey area. However, it does have a significant amount of grassland located within 1 km of its perimeter that may be occupied by nesting burrowing owls. These owls might potentially hunt within the contaminated area of the WAG but, because we have no information about hunting habitat on the INEEL, it is impossible to determine the likelihood of this.

Historical Sightings and Anticipated Future Use

We found 15 burrowing owl nests on the INEEL in 1996, but none were located within 600 m of any WAG. Similarly, of the 6 nests found by Gleason (1978), all were greater than 600 m from facilities. Breeding bird surveys have not recorded burrowing owls on the TRA (WAG 2) route. Given the lack of suitable habitat, there is no reason to expect burrowing owls to inhabit the site in the future.

Raptors

Nesting Target Species

During our studies on the INEEL from 1991-1993, we observed one active ferruginous hawk nest within 6 km of WAG 2 (Table 4). That nest was occupied in 1993 and may still be active.

In addition to scattered Utah junipers, WAG 2 has narrowleaf cottonwood substrates within a few km that could be used by nesting ferruginous hawks.

Wintering or Migrating Target Species

Bald eagles have been observed within potential hunting range of WAG 2. Peregrines may perch or feed near WAG 2 at various times but few individuals visit the INEEL.

Anticipated Future Use

WAG 2 will remain within the potential home range of nesting pairs. Bald eagle use of areas near WAG 2 may increase as population recovery continues. Population recovery in the peregrine falcon will likely increase the occurrence of this species on the INEEL as a migrating or wintering raptor. Nesting is not likely near WAG 2.

Estimated Site/Area Population

One ferruginous hawk nest was located within 6 km of WAG 2. This is likely similar to the current population size. Numbers of peregrine falcons and northern goshawks are low enough that short term surveys would likely indicate zero populations.

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Breeding Birds

The BBS survey route around WAG 2 is 10.2 km long with 32 stops. Stops were 0.32 km apart. The habitat along the route is described by the BBS surveyors (Belthoff et al. In press) as big sagebrush, thick-spiked wheatgrass (*Elymus lanceolatus*), and needle-and-thread grass (*Hesperostipa comata*).

Two of the species of concern appeared in the BBS around WAG 2 from 1985 through 1996: ferruginous hawk and loggerhead shrike (Table 4). Ferruginous hawk was observed once, in 1985. Loggerhead shrikes were observed 10 times from 1985-1996 (Table 4).

Anticipated Future Use

Loggerhead shrikes observed at WAG 2 have demonstrated a tendency to use the area over a period of several years. Continued use should be expected. Loggerhead shrikes have both nested and hunted within areas of human occupation and have been observed inside contaminated areas at other WAGs. There is a possibility that loggerhead shrikes will become contaminated at WAG 2. However, ferruginous hawks tend to avoid areas frequented by humans. For this reason, it is unlikely that ferruginous hawks will nest or hunt at contaminated sites within the WAG.

Estimated Site/Area Population

We estimated the density of ferruginous hawks and loggerhead shrikes at WAG 2 to be 0.04, and 0.4 km⁻², respectively.

Sagebrush Lizard

WAG 2 was surveyed on August 26, 1996. The survey found one lizard (?).

The survey was performed by making a clockwise loop around the TRA boundary fence beginning at the southwest corner parking lot. The weather on August 28 was sunny, slightly hazy, and calm. The air temperature at 0930 was 23 C, warming up to 30 C by 1200. The habitat in the area is mostly sagebrush/rabbitbrush, or disturbed grasses,

with a few scattered rocky areas. The soil is gravelly alluvium from the Big Lost River. A large man-made rock pile exists on the northwest end of TRA, and a small natural basalt outcrop exists on the northeast end of the site.

The one lizard that was located was found during the time-constrained search at 1222, 10 m from the southwest corner of TRA in sagebrush habitat. The juvenile lizard escaped into a burrow, so a sex determination could not be made.

The best areas for sagebrush lizards at WAG 2 are the undisturbed sagebrush flats on the west and southwest ends, and the natural rock outcrop on the northeast end of the boundary fence.

Historical Sightings and Anticipated Future Use

Sagebrush lizards have been previously observed near the TRA. We expect that lizards will continue to inhabit the area in the future.

Bats

The bat surveys were conducted at WAG 2 sewage lagoons on September 7, 1996. The sky contained scattered clouds; the wind was breezy; the high temperature was 16.6 °C and the low was 12.3 °C. The WAG 2 waste ponds were surveyed on September 13, 1996. The sky was clear; the wind was calm; the high temperature was 14.4 °C (no low temperature was recorded).

Three bats were found on each date using acoustical surveys. One species, the big brown bat, is not a species of interest. However, two small-footed myotis were observed on each date; one was passing through the area and one was actively hunting (Table 5).

Historical Sightings and Anticipated Future Use

No historical data are available for bat use of the WAG 2 ponds. However, two small-footed myotis were found in the area and one was actively hunting. This implies that further

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Table . Location and characteristics of sagebrush lizards (*Sceloporus graciosus*) found in a survey of the area surrounding Waste Area Groups (WAGs) on the Idaho National Engineering and Environmental Laboratory.

WAG	Time	Easting ¹ (m)	Northing ¹ (m)	Age ²	Sex ³	Activity ⁴	Distance from WAG Boundary (m)
2	1222	341416	482720	J	U	AIO	10
3	1145	343821	4826953	A	M	AIO	15
4	1000	342593	4821472	A	F	AIO	10
4	1017	342588	4821485	A	M	AIO	15
4	1040	342623	4821629	H	U	AIO	15
4	1104	343294	4820795	A	U	UB	20
4	1110	342626	4821999	A	U	AIO	20
4	1230	343390	4820802	A	F	RIO	85
4	1235	342560	4821414	H	U	AIO	10
5	1120	351994	4821219	A	M	AIO	40
6	1155	337532	4819927	H	U	AIO	10
7	1130	335460	4818400	A	U	AIO	10
7	1155	335150	4818369	A	U	AIO	10
7	1235	335564	4818034	A	F	AIO	15
9	1230	366728	4828078	A	M	AIO	60

¹UTM's are given in meters, in NAD 27 datum format.

²A = adult, H = hatchling, J = juvenile

³M = male, F = female, U = unknown

⁴AIO = active in open, RIO = resting in open, UB = under board

use of the WAG 2 ponds can be expected by these species.

Merriam's Shrew

The pitfall trap for this survey was constructed on September 21, 1996 near the evaporation ponds (43°35.1364' N, 112°57.2244' W, at an elevation of 1425 m, as determined by GPS). No Merriam's shrews were collected. One sagebrush vole (*Lemmiscus curtatus*) was collected on September 28, 1996.

Historical Sightings and Anticipated Future Use

There are no historical records of Merriam's shrews at WAG 2 and we did not observe them during this survey.

Gray Wolf

Although, since 1990, there have been 12 wolves seen in nine separate reports on or near the INEEL (Table 3), most sightings have occurred on the north end of the site at the mouth of the Birch Creek Valley. Thus, although wolves may be present on the INEEL, there is no evidence that wolves regularly visit the vicinity of WAG 2.

Pygmy Rabbit

The initial GIS screening indicated that appropriate habitat did occur in this area. The survey was conducted on the September 8, 1996. Weather conditions were clear. An area approximately 250 m around the fence

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encompassing the WAG was searched systematically at 100 m intervals. No appropriate pygmy rabbit habitat was found within the boundary of the WAG.

Near the northeast corner of WAG 2 where two sets of power lines originate, there is a patch of high, dense sagebrush. The area is relatively small but it does represent high quality pygmy rabbit habitat and two deserted pygmy rabbit burrows and some scat were found (UTM coordinates 341900 east, 4828100 north). No sign was found in the rest of the surrounding area of this WAG. If this site is used by pygmy rabbits at higher densities, it would be a minor satellite locations. It would likely contain only a few (less than 10) animals.

Historical Sightings and Anticipated Future Use

No pre-existing data are available on the occurrence of pygmy rabbits at this WAG site. Although we found no current evidence of pygmy rabbits, they evidently used the area in the past. If densities increase, it would be reasonable to expect them to use the area in the future.

Plants

The field portion of this limited survey of WAG 2 was conducted on 8 September 1996. The four target species were not observed during this survey.

WAG 2 is near the south end of the site in areas characterized by a complex mixture of lava flows, sand deposits, gravel beds, and old river channels near the Big Lost River. All four of the species of concern in this survey occur in the northern portions of the site in the rocky foothills. The required habitats for the survey species were not found in the area and the target species are not to be expected in the WAG area or its immediate vicinity.

Historical Sightings and Anticipated Future Use

There are no records of the occurrence of these species at WAG 2 in the past and

numerous searches by Glennon over the last six years and during this survey have found no evidence of the species in the WAG area. The habitat requirements and their present distribution on the INEEL support the conclusion that these species are not expected to occur at WAG 2.

WAG 3

Burrowing Owl

The burrowing owl habitat survey was conducted at WAG 3 on August 20, 1996. No optimal habitat for burrowing owl reproduction was located within 200 m of the WAG 3 perimeter. During habitat surveys, we observed no signs (droppings, pellets, etc. at potential nest burrows) nor did we observe any living or dead burrowing owls on the survey areas.

In the 200-m perimeter surrounding WAG 3, none of the habitat was type 1 (optimal nesting habitat), 16 % of the habitat was type 2 (moderate nesting habitat), 23 % of the habitat was type 3 (low use nesting habitat), and 61 % was type 4 (unsuitable nesting habitat).

Historical Sightings and Anticipated Future Use

We found 15 burrowing owl nests on the INEEL in 1996, but none were located within 600 m of any WAG. Similarly, of the 6 nests found by Gleason (1978), all were greater than 600 m from facilities. However, breeding bird surveys recorded one burrowing owl on the ICPP (WAG 3) route (Table 7).

Burrowing owls often return to previously used sites, thus WAG 3 is a likely candidate site for burrowing owl use in the future. The one recorded sighting at WAG 3 was within or very near 600 m from the perimeter.

Raptors

Nesting Target Species

During our studies on the INEEL from 1991-1993, we observed one active ferruginous hawk nest within 6 km of WAG 3 (Table 4).

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That nest was occupied in two consecutive years (1991 and 1992). The nest is located in an isolated Utah juniper at 48277 N, 3491 E.

In addition to scattered Utah junipers, WAG 3 has narrowleaf cottonwood substrates within a few km that could be used by nesting ferruginous hawks.

Wintering or Migrating Target Species

Bald eagles have been observed within potential hunting range of WAG 3. Peregrine falcons may perch or feed near WAG 3 at various times but few individuals visit the INEEL.

Anticipated Future Use

WAG 3 will remain within the potential home range of nesting pairs. Bald eagle use of areas near WAG 3 may increase as population recovery continues. Population recovery in the peregrine falcon will likely increase the occurrence of this species on the INEEL as a migrating or wintering raptor. Nesting is not likely near WAG 3.

Estimated Site/Area Population

One ferruginous hawk nest was within 6 km of WAG 3 and this has not likely changed significantly since 1995. Numbers of peregrine falcons and northern goshawks are low enough that short term surveys would likely indicate zero populations.

Breeding Birds

The BBS survey route around WAG 3 is 8 km long with 25 stops. Stops were 0.32 km apart. The habitat along the route is described by the BBS surveyors (Belthoff et al. In press) as big sagebrush, thickspiked wheatgrass, and needle-and-thread grass.

Two of the species of concern appeared in the BBS around WAG 3 from 1985 through 1996: burrowing owl and ferruginous hawk (Table 4). There was one observation of a burrowing owl in 1985. Two ferruginous hawks were observed on the same day in 1987 (Table 4).

Anticipated Future Use

Both species observed at WAG 3 were observed only once in the late 1980's. However, given that both species tend to return to previous nesting areas, there is reason to expect continued use by both species. Given that so little information is available on burrowing owl hunting habitat, use of contaminated areas near ANL-W to obtain food cannot be ruled out. Ferruginous hawks tend to avoid areas frequented by humans so there is little possibility that they will become contaminated at WAG 3.

Estimated Site/Area Population

We estimated the density of burrowing owls and ferruginous hawks at WAG 3 to be 0.06, and 0.1 km⁻², respectively. This may be a gross overestimate because these species have not been seen in the BBS since the late 1980's.

Sagebrush Lizard

WAG 3 was surveyed on August 27, 1996. The weather on this day was partly cloudy, breezy, and cool, with a 60% cloud cover. The air temperature at 0930 was 23 C, warming to 29 C by 1200. The survey found 1 lizard during the walk-around primary search (?).

The survey was conducted by making a clockwise loop around the ICPP fence line beginning at the northwest parking lot. The habitat in the area is primarily consists of sagebrush/rabbitbrush or grassland communities. The quality of the habitat in the area is spotty, and ranges from undisturbed sagebrush flats on the north and west sides, to mostly disturbed grasses and sage on the east and south sides. The Big Lost River runs along the northwest boundary, and was searched during the time-constrained search. The soil in the area is gravelly alluvium washout from the Big Lost River.

The only observed lizard was located at 1145 on a fallen telephone pole about 15 m east of ICPP, in a small patch of undisturbed sagebrush/rabbitbrush-grass community, between a leeching pond and a construction

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unit. The lizard escaped under the telephone pole, so a positive sex determination could not be made. No rock outcrops are found around the ICPP area, so the best area to look for lizards would be the undisturbed sagebrush areas along the north and west sides.

Historical Sightings and Anticipated Future Use

Sagebrush lizards have been previously observed near the ICPP in 1994. We expect that lizards will continue to inhabit the area in the future.

Bats

The bat surveys were conducted at WAG 3 on September 6, 1996. The sky was clear; the wind was slightly breezy; the high temperature was 8.8 °C and the low was 4.0 °C. Four bats were found at WAG 3 using acoustical surveys. One, the big brown bat, is not a species of interest and one myotis could not be identified to species. However, two small-footed myotis were observed; one was passing through the area and one was actively hunting (Table 5).

Historical Sightings and Anticipated Future Use

Keller et al. (1993) reported detecting 3 individual bats (big brown bat, little brown myotis [*Myotis lucifugus*], and an unidentified myotis) at the ICPP sewage lagoons. Two of these were not target species for this survey although the unidentified myotis may have been a small-footed myotis. In this survey two small-footed myotis were found in the area and one was actively hunting. A third, unidentified myotis also passed through the area during the survey. This implies that further use of the WAG 3 ponds can be expected by these species.

Merriam's Shrew

The pitfall trap for this survey was constructed on September 21, 1996 near the industrial waste ponds (43°33.7503' N,

112°56.1334' W, at an elevation of 1540 m, as determined by GPS). No Merriam's shrews were collected. Two sagebrush voles were collected on September 28, 1996.

Historical Sightings and Anticipated Future Use

There are no historical records of Merriam's shrews at WAG 3 and we did not observe them during this survey.

Gray Wolf

Although, since 1990, there have been 12 wolves seen in nine separate reports on or near the INEEL (Table 3), most sightings have occurred on the north end of the site at the mouth of the Birch Creek Valley. Thus, although wolves may be present on the INEEL, there is no evidence that wolves regularly visit the vicinity of WAG 3.

Pygmy Rabbit

The initial GIS screening indicated that appropriate habitat did occur in this area. The survey was conducted on the September 7, 1996. Weather conditions were clear. An area approximately 250 m around the fence encompassing the WAG was searched systematically at 100 m intervals. No appropriate pygmy rabbit habitat occurred within the boundary of WAG 3 and no pygmy rabbit sign was found.

Historical Sightings and Anticipated Future Use

No pre-existing data are available on the occurrence of pygmy rabbits at this WAG site. Based on this survey, we do not expect pygmy rabbits to inhabit the area immediately surrounding WAG 3.

Plants

The field portion of this limited survey of WAG 3 was conducted on 8 September 1996.

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The four target species were not observed in the WAG area.

WAG 3 is near the south end of the site in areas characterized by a complex mixture of lava flows, sand deposits, and gravel beds and old river channels near the Big Lost River. All four of the species of concern in this survey occur in the northern portions of the site in the rocky foothills. The required habitats for the survey species were not found in the area and the target species are not to be expected in the WAG area or its immediate vicinity.

Historical Sightings and Anticipated Future Use

There are no records of these species' occurrence in the past and numerous searches by Glennon over the last six years and during this survey found no evidence of the species in the WAG area. The habitat requirements and their present distribution on the INEEL support the conclusion that these species are not expected to occur at WAG 3.

WAG 4

Burrowing Owl

The burrowing owl habitat survey was conducted at WAG 4 on August 22, 1996. No optimal habitat for burrowing owl reproduction was located within 200 m of the WAG 4 perimeter. During habitat surveys, we observed no signs (droppings, pellets, etc. at potential nest burrows) nor did we observe any living or dead burrowing owls on the survey areas.

In the 200-m perimeter surrounding WAG 4, none of the habitat was type 1 (optimal nesting habitat), 23 % of the habitat was type 2 (moderate nesting habitat), 22 % of the habitat was type 3 (low use nesting habitat), and 55% was type 4 (unsuitable nesting habitat).

Historical Sightings and Anticipated Future Use

We found 15 burrowing owl nests on the INEEL in 1996, but none were located within 600 m of any WAG. Similarly, of the 6 nests

found by Gleason (1978), all were greater than 600 m from facilities. However, breeding bird surveys have revealed burrowing owls on the CFA (WAG 4) route (Table 7).

Burrowing owls often return to previously used sites, thus WAG 4 is a likely candidate site for burrowing owl use in the future. The one recorded sighting at WAG 4 was within or very near 600 m from the perimeter.

Raptors

Nesting Target Species

During our studies on the INEEL from 1991-1993, we did not observe any nests of the target species within 6 km of WAG 4.

Scattered Utah junipers and narrowleaf cottonwood substrates are within 6 km of WAG 4 and could be used by nesting ferruginous hawks.

Wintering or Migrating Target Species

No observations of the target species have been made near WAG 4.

Anticipated Site Use

Because of the existence of suitable nesting structures nearby, WAG 4 will remain within the potential home range of nesting pairs of ferruginous hawks. Bald eagle use of the INEEL may increase as population recovery continues. Likewise, population recovery in the peregrine falcon will likely increase the occurrence of this species on the INEEL as a migrating or wintering raptor. Nesting is not likely near WAG 4.

Estimated Site/Area Population

None of the 11-15 nesting pairs of ferruginous hawks identified on the INEEL during recent studies was within 6 km of WAG 4. Likewise, bald eagles have not been observed near WAG 4. Numbers of peregrine falcons and northern goshawks are low enough that short term surveys would likely indicate zero populations.

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Breeding Birds

The BBS survey route around WAG 4 is 9.6 km long with 42 stops. In 1985, only 2 stops were used. Stops were 0.32 km apart. The habitat along the route is described by the BBS surveyors (Belthoff et al. In press) as 75 % big sagebrush, green rabbitbrush, and bottlebrush squirreltail (*Elymus elymoides*); and 25% big sagebrush, thickspiked wheatgrass, and needle-and-thread grass.

Two of the species of concern appeared in the BBS around WAG 4 from 1985 through 1996: ferruginous hawk and loggerhead shrike (Table 4). There were three total observations of ferruginous hawk. Loggerhead shrikes were observed 22 times.

Anticipated Future Use

Both species observed at WAG 4 have demonstrated a tendency to use the area over a period of several years and should be expected to continue doing so. However, ferruginous hawks tend to avoid areas frequented by humans and it is unlikely that they will nest or hunt at contaminated sites within the WAG. Loggerhead shrikes, on the other hand, have both nested and hunted within areas of human occupation and have been observed inside contaminated areas at other WAGs. There is a possibility that loggerhead shrikes will become contaminated at WAG 4.

Estimated Site/Area Population

We estimated the density of ferruginous hawks and loggerhead shrikes at WAG 4 to be 0.1 and 0.7 km⁻², respectively.

Sagebrush Lizard

WAG 4 was surveyed on August 28, 1996 by two individuals. This survey found the most lizards of any of the WAGs searched, with 7 lizards observed during the four-hour survey period (?).

The area was surveyed by walking the outskirts of the CFA boundary in areas that were not maintained or watered. Both survey persons

began at the northwest end on Central behind CF-689, then moved in opposite directions, one moving clockwise and the other moving counterclockwise, until they met at the southeast end of the facility. The weather on this day was clear with light winds. The 0930 air temperature was 18 C, and by 1200 it warmed to 25 C. A brief rainstorm the previous night left the ground moist in some areas. The western end of the facility appeared to be the most likely place to observe lizards, and this area was searched during the time-constrained search.

Four of the lizards were found in or near rock outcrops on the west side. The other three lizards were found at other areas of the facility, in mixed grassland and sagebrush communities. Six adult and 2 hatchling lizards were observed. It is evident that sagebrush lizards are abundant in this area, with the largest populations on the western end around the basalt outcrops.

Historical Sightings and Anticipated Future Use

Sagebrush lizards were observed near the CFA in 1994. Because of the abundant suitable habitat, we expect that lizards will continue to inhabit the area in the future.

Bats

The bat surveys were conducted at the WAG 4 sewage lagoons on September 21, 1996. The sky was cloudy; it was windy; the high temperature was 17.8 °C and the low was 14.4 °C. No bats were found at WAG 4 using acoustical surveys.

Historical Sightings and Anticipated Future Use

Keller et al. (1993) surveyed ponds at WAG 4 using acoustical surveys and failed to observe any bat use. Because bats were not observed during the current survey, we assume bats make limited use of the WAG 4 facilities.

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Merriam's Shrew

The pitfall trap for this survey was constructed on September 21, 1996 near the WAG 4 sewage lagoon pond (43°31.3830' N, 112°55.9992' W, at an elevation of 1620 m, as determined by GPS). One western harvest mouse (*Reithrodontomys megalotis*) was collected on that date. On September 28, 1996, one harvest mouse, one montane vole (*Microtus montanus*), one Great Basin pocket mouse (*Perognathus parvus*), and two Merriam's shrews were collected.

Historical Sightings and Anticipated Future Use

There are no historical records of Merriam's shrews at WAG 4. However, two were observed during this survey. It is likely they will continue to use the area in the future.

Gray Wolf

Although, since 1990, there have been 12 wolves seen in nine separate reports on or near the INEEL (Table 3), most sightings have occurred on the north end of the site at the mouth of the Birch Creek Valley. Thus, although wolves may be present on the INEEL, there is no evidence that wolves regularly visit the vicinity of WAG 4.

Pygmy Rabbit

The initial GIS screening indicated that appropriate habitat did occur in this area. The survey was conducted on the September 7, 1996. Weather conditions were clear. An area approximately 250 m around the WAG was searched systematically at 100 m intervals. Appropriate pygmy rabbit habitat within the WAG was also searched.

High quality pygmy rabbit habitat was found along the western edge of the WAG (UTM coordinates 342500 m, 4821200 m). The habitat consisted of tall, dense sagebrush. No active rabbit sign was found in this area but some deserted and caved-in burrows and old

scat were found. The rest of the area appeared to be inappropriate habitat for pygmy rabbits and no sign was found in these areas. Based on the existence of pygmy rabbit burrows, this area was used by the species in the past but is currently not in use. It is likely rabbits would recolonize the area at higher population densities. Because of the lack of active sign, it is difficult to estimate what number of rabbits might use the area when it is occupied.

Historical Sightings and Anticipated Future Use

No pre-existing data are available on the occurrence of pygmy rabbits at this WAG site. There are anecdotal accounts of pygmy rabbits being found in and near this WAG but no actual confirmed reports were found. Given the existence of high quality habitat near this WAG and the evidence of past use, we expect that, as populations increase, pygmy rabbits may again inhabit the area surrounding WAG 4.

Plants

The field portion of this limited survey of WAG 4 was conducted on 7 September 1996. The four target species were not observed during the survey.

WAG 4 is near the south end of the site in the gravel flats near the Big Lost River. All four of the species of concern in this survey occur in the northern portions of the site in the rocky foothills. The required habitats for the survey species were not found in the area and the target species are not to be expected in the WAG area or its immediate vicinity.

Historical Sightings and Anticipated Future Use

There are no records of the occurrence of these species near WAG 4 in the past and numerous searches by Glennon over the last six years and during this survey found no evidence of the species in the WAG area. The habitat requirements and their present distribution on the INEEL support the conclusion that these species are not expected to occur at WAG 4.

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WAG 5

Burrowing Owl

The burrowing owl habitat survey was conducted at WAG 5 on August 21 and 22, 1996. The Power Burst Facility (PBF) and the Auxiliary Reactor Area (ARA) were surveyed on different days. No optimal habitat for burrowing owl reproduction was located within 200 m of any facility perimeter. During habitat surveys, we observed no signs (droppings, pellets, etc. at potential nest burrows) nor did we observe any living or dead burrowing owls on the survey areas.

In the 200-m perimeter surrounding PBF, none of the habitat was type 1 (optimal nesting habitat), 14 % was type 2 (moderate nesting habitat), none was type 3 (low use nesting habitat), and 86 % was type 4 (unsuitable nesting habitat). In the 200-m perimeter surrounding ARA, 26 % of the habitat was type 1 (optimal nesting habitat), 46 % was type 2 (moderate nesting habitat), none was type 3 (low use nesting habitat), and 28 % was type 4 (unsuitable nesting habitat).

Historical Sightings and Anticipated Future Use

We found 15 burrowing owl nests on the INEEL in 1996, but none were located within 600 m of any WAG. Similarly, of the 6 nests found by Gleason (1978), all were greater than 600 m from facilities. Breeding bird surveys have not recorded burrowing owls on the PBF/ARA (WAG 5) route. Given the lack of suitable habitat, there is no reason to expect burrowing owls to inhabit the site in the future.

Raptors

Nesting Target Species

During our studies on the INEEL from 1991-1993, we did not observe any active ferruginous hawk nest within 6 km of WAG 5.

Scattered Utah junipers are within 6 km of WAG 5 and could be used by nesting ferruginous hawks.

Wintering or Migrating Target Species

No observations of the target species have been made near WAG 5.

Anticipated Future Use

Because of the existence of suitable nesting structures nearby, WAG 5 will remain within the potential home range of nesting pairs. Population recovery in the peregrine falcon will likely increase the occurrence of this species on the INEEL as a migrating or wintering raptor. Nesting is not likely near WAG 5.

Estimated Site/Area Population

None of the 11-15 nesting pairs of ferruginous hawks identified on the INEEL during recent studies was within 6 km of WAG 5. Likewise, bald eagles have not been observed near WAG 5. Numbers of peregrine falcons and northern goshawks are low enough that short term surveys would likely indicate zero populations.

Breeding Birds

The BBS survey route around WAG 5 is 9 km long with 28 stops. In 1986, 30 stops were made. Stops were 0.32 km apart. The habitat along the route is described by the BBS surveyors (Belthoff et al. In press) as 80 % big sagebrush, green rabbitbrush, and bottlebrush squirreltail; and 20 % green rabbitbrush and big sagebrush.

Two species of concern appeared in the BBS around WAG 5 from 1985 through 1996: ferruginous hawk and loggerhead shrike (Table 4). There were 3 observations of ferruginous hawk. Because ferruginous hawks tend to return to the same nesting area, sightings in consecutive years may, or may not, represent the same bird. Loggerhead shrikes were represented by 40 observations over the study period.

Anticipated Future Use

Loggerhead shrikes and ferruginous hawks have used the area at WAG 5 over a period of several years. There will continue to do so.

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Shrikes are known to frequent areas of human habitation and have been observed inside contaminated areas. It is likely that shrikes will continue to use the area around WAG 5 and they may become contaminated. Ferruginous hawks, however, tend to avoid areas frequented by humans. There is no reason to expect them to use contaminated areas at WAG 5.

Estimated Site/Area Population

We estimated the density of ferruginous hawks and loggerhead shrikes at WAG 5 to be 0.2 and 2 km⁻², respectively.

Sagebrush Lizard

WAG 5 was surveyed on August 29, 1996 by two individuals. The weather on this day was cool, clear, calm, and slightly hazy. The 0930 air temperature was 18 C, warming up to 25 C by noon.

The areas surveyed were the non-contaminated areas around the remains of the north and south ARA facilities. The survey at both facilities began at the road on the southwest end of the facility, and moved in a counterclockwise direction. Most of the PBF facility was restricted because of the large number of high security or contaminated areas. Although this part of the WAG was not surveyed, it was visually examined for its habitat types. The plant communities in both ARA and PBF were similar, consisting mainly of sagebrush and mixed grass communities.

WAG 5 was the only area in which more than one species of lizard was found. We observed one adult male sagebrush lizard during the time constrained search around the north ARA site (?). The lizard was in a rock outcrop on the northwest end of the facility. This was the only rocky area found in close proximity to any of the WAG 5 facilities surveyed. We also found one adult short-horned lizard on the northeast side of the south ARA facility in a sagebrush and crested wheatgrass community.

The WAG 5 area appears to be good habitat for both lizard species. In addition, some contaminated areas appeared to be appropriate

habitat for lizards, although these areas were not surveyed.

Historical Sightings and Anticipated Future Use

Sagebrush lizards have been previously observed near the PBF/ARA. We expect that lizards will continue to inhabit the area in the future.

Bats

The bat surveys were conducted under lights at WAG 5 on September 20, 1996. The sky was cloudy; the wind was strong with occasional gusts; temperature was not recorded. No bats were found at WAG 5 using acoustical surveys.

Historical Sightings and Anticipated Future Use

No historical data are available for bat use of the WAG 5 ponds.

Merriam's Shrew

Because there was no open source of water, no pitfall traps were placed at WAG 5.

Historical Sightings and Anticipated Future Use

There are no historical records of Merriam's shrews at WAG 5. The lack of mesic habitat makes it unlikely that WAG 5 is important for shrews. It is not impossible that shrews will use the area in the future but such use would likely be infrequent.

Gray Wolf

Although, since 1990, there have been 12 wolves seen in nine separate reports on or near the INEEL (Table 3), most sightings have occurred on the north end of the site at the mouth of the Birch Creek Valley. Thus, although wolves may be present on the INEEL, there is no evidence that wolves regularly visit the vicinity of WAG 5.

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Pygmy Rabbit

The initial GIS screening indicated that appropriate habitat did occur in this area. The survey was conducted on September 15, 1996. Weather conditions were clear.

An area approximately 250 m around the fences encompassing the various buildings of this WAG was searched systematically at 100 m intervals. No appropriate pygmy rabbit habitat occurred within the boundary of the WAG building sites. No pygmy rabbit sign was found.

Historical Sightings and Anticipated Future Use

No pre-existing data are available on the occurrence of pygmy rabbits at this WAG site. Given the lack of appropriate habitat, we do not expect pygmy rabbits to inhabit the area in the future.

Plants

The field portion of this limited survey of WAG 5 was conducted on 8 September 1996. The four target species were not observed during this survey.

WAG 5 is near the south end of the site in areas characterized by lava flows and well drained sand and gravel deposits. All four of the species of concern in this survey occur in the northern portions of the site in the rocky foothills. The required habitats for the survey species were not found in the area and the target species are not to be expected in the WAG area or its immediate vicinity.

Historical Sightings and Anticipated Future Use

There are no records of these species' occurrence at WAG 5 in the past and numerous searches by Glennon over the last six years and during this survey found no evidence of the species in the WAG area. The habitat requirements and their present distribution on the INEEL support the conclusion that these species are not expected to occur at WAG 5.

WAG 6

Burrowing Owl

The burrowing owl habitat survey was conducted at WAG 6 on August 19, 1996. No optimal habitat for burrowing owl reproduction was located within 200 m of any facility perimeter. During habitat surveys, we observed no signs (droppings, pellets, etc. at potential nest burrows) nor did we observe any living or dead burrowing owls on the survey areas.

In the 200-m perimeter surrounding EBR-I/BORAX, all of the habitat was type 4 (unsuitable nesting habitat).

Historical Sightings and Anticipated Future Use

We found 15 burrowing owl nests on the INEEL in 1996, but none were located within 600 m of any WAG. Similarly, of the 6 nests found by Gleason (1978), all were greater than 600 m from facilities. Given the lack of suitable habitat near WAG 6, there is no reason to expect burrowing owls to inhabit the site in the future.

Raptors

Nesting Target Species

During our studies on the INEEL from 1991-1993, we observed one active ferruginous hawk nest within 6 km of WAG 6 (Table 4). The nest was occupied for two consecutive years (1992-1993) and may still be occupied. The nest substrate was a Utah juniper (*Juniperus osteosperma*) located at Universal Transverse Mercator (UTM) coordinates of 48202 N, 3324 E.

Additional scattered Utah junipers are within 6 km of WAG 6 and could be used by nesting ferruginous hawks.

Wintering or Migrating Target Species

Hansen (1994) records two sightings of peregrine falcons during winter, one near NRF and the other near Middle Butte--several other records of peregrine falcons on the INEEL have been reported. These falcons may cross WAG 6

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during migration. Peregrines may perch or feed near all of the WAGs at various times but few individuals visit the INEEL. Northern goshawks were observed in small numbers by Craig (1979) but were not observed by Hansen (1994).

Anticipated Future Use

Because of the existence of nearby nesting substrates, WAG 6 will remain within the potential home range of nesting pairs of ferruginous hawks. Population recovery in the peregrine falcon will likely increase the occurrence of this species on the INEEL as a migrating or wintering raptor. Nesting is not likely near WAG 6.

Estimated Site/Area Population

One of the ferruginous hawk nests identified during recent studies was within 6 km of WAG 6. None of the recent observations of bald eagles were near WAG 6. Numbers of peregrine falcons and northern goshawks are low enough that short term surveys would likely indicate zero populations.

Breeding Birds

A Breeding Bird Survey (BBS) route has not been established around WAG 6. Thus no inferences are directly available. However, because of the close proximity and similar habitat, information on breeding birds may be extrapolated from the surveys at WAG 7 (RWMC). Those surveys revealed the presence of loggerhead shrikes at an estimated density of 2.9 km⁻². See the WAG 7 report for details.

Sagebrush Lizard

WAG 6 was surveyed on August 30, 1996. The weather on this day was clear but smoky from a nearby range fire. The winds were light, and the air temperature was 21 C at 0930, warming to 30 C by noon.

The area surveyed consisted of the outer perimeter of the EBR-I fence and outside of the BORAX boundary ropes. The EBR-I section of the survey began at the south parking lot and

proceeded in a clockwise direction. BORAX was surveyed in a counterclockwise direction, beginning at the northwest end.

The habitat of both areas was similar, consisting mainly of sagebrush and rabbitbrush communities. On the northwest end of the BORAX facility a rock outcrop appeared to be the best habitat for lizards, and this area was searched during the time-constrained search effort.

We observed one sagebrush lizard during the primary walk-around search at BORAX (?). It was a hatchling, and quickly fled into a hole. Although only one lizard was observed, the young age of this lizard and the uniform habitat in the area suggests that this species is likely found throughout the WAG area.

Historical Sightings and Anticipated Future Use

Sagebrush lizards have been previously observed near the EBR-I/BORAX. We expect that lizards will continue to inhabit the area in the future.

Bats

The bat surveys were conducted at WAG 6 on September 21, 1996. The sky was cloudy; it was windy; the high temperature was 18.0 °C and the low was 14.0 °C. No bats were found at WAG 6 using acoustical surveys.

Historical Sightings and Anticipated Future Use

No historical data are available for bat use of WAG 6.

Merriam's Shrew

The pitfall trap for this survey was constructed on September 22, 1996 near EBR-I (43°30.6502' N, 113°06.3686' W, at an elevation of 1575 m, as determined by GPS). No Merriam's shrews were collected in the pitfall trap at WAG 6. On September 28, we did collect one montane vole and one deer mouse (*Peromyscus maniculatus*).

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Historical Sightings and Anticipated Future Use

We did not observe Merriam's shrews during this survey. However, Mullican (1985) trapped an unknown number of them near EBR-I (WAG 6), indicating that the animals inhabit the area. As noted above, Merriam's shrews are uncommon throughout their range and are thus difficult to detect. It is likely that Merriam's shrews inhabit the more mesic sagebrush areas on and near WAG 6.

Gray Wolf

Although, since 1990, there have been 12 wolves seen in nine separate reports on or near the INEEL (Table 3), most sightings have occurred on the north end of the site at the mouth of the Birch Creek Valley. Thus, although wolves may be present on the INEEL, there is no evidence that wolves regularly visit the vicinity of WAG 6.

Pygmy Rabbit

The initial GIS screening indicated that appropriate habitat did occur in this area. The survey was conducted on September 14, 1996. Weather conditions were clear.

An area approximately 250 m around the fence encompassing the WAG was searched systematically at 100 m intervals. No appropriate pygmy rabbit habitat was found within the boundary of the WAG. No pygmy rabbit sign was found.

Historical Sightings and Anticipated Future Use

No pre-existing data are available on the occurrence of pygmy rabbits at this WAG site. Given the lack of appropriate habitat, we do not expect pygmy rabbits to inhabit the area in the future.

Plants

The field portion of this limited survey of WAG 6 was conducted on 6 September 1996. The four target species were not observed in the WAG area.

WAG 6 is near the south end of the site in areas characterized by a complex mixture of lava flows and well drained sand and gravel deposits. All four of the species of concern in this survey occur in the northern portions of the site in the rocky foothills. The required habitats for the survey species were not found in the area and the target species are not to be expected in the WAG area or its immediate vicinity.

Historical Sightings and Anticipated Future Use

There are no records of these species' occurrence at this WAG in the past and numerous searches by Glennon over the last six years and during this survey found no evidence of the species in the WAG area. The habitat requirements and their present distribution on the INEEL support the conclusion that these species are not expected to occur at WAG 6.

WAG 7

Burrowing Owl

The burrowing owl habitat survey was conducted at WAG 7 on August 21, 1996. No optimal habitat for burrowing owl reproduction was located within 200 m of the WAG 7 perimeter. During habitat surveys, we observed no signs (droppings, pellets, etc. at potential nest burrows) nor did we observe any living or dead burrowing owls on the survey areas.

In the 200-m perimeter surrounding WAG 7, none of the habitat was type 1 (optimal nesting habitat) or type 2 (moderate nesting habitat). Seven percent of the habitat was type 3 (low use nesting habitat) and 93 % was type 4 (unsuitable nesting habitat). WAG 7 is one of three WAGs without any type 1 or type 2 habitats within the 200 m perimeter survey area.

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Historical Sightings and Anticipated Future Use

We found 15 burrowing owl nests on the INEEL in 1996, but none were located within 600 m of any WAG. Similarly, of the 6 nests found by Gleason (1978), all were greater than 600 m from facilities. Breeding bird surveys have not recorded burrowing owls on the RWMC (WAG 7) route. Given the lack of suitable habitat, there is no reason to expect burrowing owls to inhabit the site in the future.

Raptors

Nesting Target Species

During our studies on the INEEL from 1991-1993, we did not observe any active ferruginous hawk nest within 6 km of WAG 7.

Scattered Utah junipers and narrowleaf cottonwood substrates are within 6 km of WAG 7 and could be used by nesting ferruginous hawks.

Wintering or Migrating Target Species

Hansen (1994) records two sightings of peregrine falcons during winter, one near NRF and the other near Middle Butte--several other records of peregrine falcons on the INEEL have been reported. These falcons may cross WAG 7 during migration. Peregrines may perch or feed near all of the WAGs at various times but few individuals visit the INEEL. Northern goshawks were observed in small numbers by Craig (1979) but were not observed by Hansen (1994).

Anticipated Future Use

Because of the existence of nearby nesting substrates, WAG 7 will remain within the potential home range of nesting pairs. Population recovery in the peregrine falcon will likely increase the occurrence of this species on the INEEL as a migrating or wintering raptor. Nesting is not likely near WAG 7.

Estimated Site/Area Population

One of the ferruginous hawk nests identified during recent studies was within 6 km of WAG 7. These numbers are probably close to current

populations. None of the recent bald eagle observations were near WAG 7. Numbers of peregrine falcons and northern goshawks are low enough that short term surveys would likely indicate zero populations.

Breeding Birds

The BBS survey route around WAG 7 is 5.8 km long with 18 stops. Stops were 0.32 km apart. The habitat along the route is described by the BBS surveyors (Belthoff et al. In press) as big sagebrush, bluebunch wheatgrass (*Pseudoroegneria spicata*), and green rabbitbrush.

One of the species of concern appeared in the BBS around WAG 7 from 1985 through 1996: loggerhead shrike (Table 4). There were 37 observations of this bird.

Anticipated Future Use

Loggerhead shrikes have demonstrated a tendency to use the area at WAG 7 over a period of several years. There will likely continue to use the area. Shrikes are known to frequent areas of human habitation and have been observed inside contaminated areas. It is likely that shrikes will continue to use the area around WAG 7 and they may become contaminated.

Estimated Site/Area Population

We estimated the density of loggerhead shrikes at WAG 7 to be 2.9 km⁻².

Sagebrush Lizard

WAG 7 was surveyed on August 25, 1996. Three lizards were found during the main walk-around survey.

The weather on August 25 was sunny and hazy with a light breeze. The temperature at 0930 was 24 C, warming to 30 C by 1200. The survey consisted of a counterclockwise loop around the RWMC fence, beginning at the parking lot on the northeast side of the facility. Two of the three lizards observed were seen on rock outcrops around the northeast side of the facility, while the other lizard was seen in

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sagebrush flats on the southeast end of the area (?).

The habitat in the area consists primarily of sagebrush flats with scattered rock outcrops. The northwest and southwest ends are the most disturbed areas, with construction areas, disturbed grasses, and contamination areas. The best lizard habitat is on the southwest and northwest ends of the facility in scattered rock outcrops. In addition to the rock outcrops, the undisturbed sagebrush flats in the area are also good sagebrush lizard habitat.

Historical Sightings and Anticipated Future Use

Sagebrush lizards have been previously observed near the RWMC. We expect that lizards will continue to inhabit the area in the future.

Bats

The bat surveys were conducted at the WAG 7 sewage lagoons on September 28, 1996. The sky was clear; the wind was mostly calm with occasional gusts; the high temperature was 21.0 °C and the low was 14 °C. Three bats were found at WAG 7 using acoustical surveys. One, a big brown bat, was not a species of interest. However, two small-footed myotis were observed; one was passing through the area and one was actively hunting (Table 5).

Historical Sightings and Anticipated Future Use

No historical data are available for bat use of WAG 7.

Merriam's Shrew

The pitfall trap for this survey was constructed on September 28, 1996 near the WAG 7 sewage lagoons (43°29.5675' N, 113°02.3121' W, at an elevation of 1500 m, as determined by GPS). One Western harvest mouse was captured on September 28, 1996. No Merriam's shrews were collected in the pitfall trap at WAG 7.

Historical Sightings and Anticipated Future Use

There are no historical records of Merriam's shrews at WAG 7 and we did not observe them during this survey. However, Mullican (1985) trapped an unknown number of Merriam's shrews near EBR-I (WAG 6), indicating that the animals inhabit the area. As noted above, Merriam's shrews are uncommon throughout their range and are thus difficult to detect. It is likely that Merriam's shrews inhabit the more mesic sagebrush areas on and near WAG 7.

Gray Wolf

Although, since 1990, there have been 12 wolves seen in nine separate reports on or near the INEEL (Table 3), most sightings have occurred on the north end of the site at the mouth of the Birch Creek Valley. Thus, although wolves may be present on the INEEL, there is no evidence that wolves regularly visit the vicinity of WAG 7.

Pygmy Rabbit

The initial GIS screening indicated that appropriate habitat did occur in this area. The survey was conducted on the September 8, 1996. Weather conditions were clear.

An area approximately 250 m around the fence encompassing the WAG was searched systematically at 100 m intervals. No appropriate pygmy rabbit habitat was found within the boundary of the WAG. No pygmy rabbit sign was found.

Historical Sightings and Anticipated Future Use

No pre-existing data are available on the occurrence of pygmy rabbits at this WAG site. Given the lack of appropriate habitat, we do not expect pygmy rabbits to inhabit the area in the future.