5.1.3 Coordination With Natural Resource Agency Botanists

On April 3, 2002, the NNHP held its annual meeting in Reno, Nevada. Participants included state and federal agencies, academia, land resource managers, and private concerns. This meeting provides an opportunity for resource agencies to coordinate their efforts to protect rare plant species and make recommendations regarding species that may need or no longer need protection under state or federal laws and regulations. A representative from BN attended this year's meeting and reported on the design and implementation of long-term monitoring as described in the published *Adaptive Management Plan for Sensitive Plant Species on the Nevada Test Site* (BN, 2001a).

A report on *Astragalus oophorus* var. *clokeyanus* (Clokey's egg milkvetch), funded and prepared by NNHP, was submitted to BN for review and comment prior to final publication. The report is a comprehensive report on the species and incorporates into one document much of the data provided to NNHP over the years by BN (Anderson, 1998) and other entities working with this particular species. This concerted effort has resulted in the determination by the FWS that listing of this species is not necessary for its protection.

The National Park Service was present at the meetings and reported on an effort in Nevada to complete a flora of the mosses of Nevada. The emphasis on mosses in Nevada has resulted in the listing of five mosses and two liverworts as sensitive plant species during the past year. One of the moss species is known to occur in Rock Valley on the NTS.

5.2 Sensitive Animal Species

Some of the federally protected animals and animal species of concern listed in Table 1 have been sighted on the NTS, however no site-wide surveys to determine their distribution or abundance have been conducted. They include the threatened bald eagle (*Haliaeetus leucocephalus*), the formerly endangered American peregrine falcon (*Falco peregrinus anatum*), the candidate mountain plover (*Charadrius montanus*), and three bird species of concern: the ferruginous hawk (*Buteo regalis*), western least bittern *(Ixobrychus exillis hesperis*), and white-faced ibis (*Plegadis chihi*). All of these birds are uncommon transients to the NTS and are not expected to be impacted by NTS activities. Records of all bird sightings that are made opportunistically by EMAC biologists and other NTS workers are maintained to provide some data on these species' occurrence on the NTS.

Site-wide surveys for eight animal species of concern were initiated in 1996 (Steen et al., 1997). The species included chuckwallas (*Sauromalus obesus*), western burrowing owls (*Athene cunicularia hypugaea*), and six species of bats (Table 1). For chuckwallas, presence/absence data were gathered from all potential habitats in the southern portion of the NTS. These data were considered sufficient to identify chuckwalla habitat on the NTS (Steen et al., 1997). NNSA/NV impacts on chuckwalla will be monitored over time by identifying all historic and new projects that have, or will, disturb chuckwalla habitat. Collection of baseline data on western burrowing owls and bats was limited this fiscal year. Owl burrow monitoring was performed, and buildings scheduled for demolition were surveyed to identify bat roost sites. A major effort this year was summarizing ecological field data collected on western burrowing owls over the past four years.

Other sensitive animal species monitored this year included wild horses (*Equus caballus*) and raptors (birds of prey) (see Table 1). These species are visible and their welfare on the NTS is important to NNSA/NV stakeholders and NTS personnel. Some NTS activities could impact these species. For example, man-made water sources used by horses can be created or removed, affecting herd size and distribution, and potential raptor nest sites (e.g., Joshua trees, power poles) can be disturbed or removed. Although performed periodically on the NTS, census surveys of mule deer, a state game species, were not conducted this year

5.2.1 Western Burrowing Owl

5.2.1.1 Burrow Distribution

Three new burrowing owl burrow sites were found opportunistically while conducting other resource surveys. All three burrows were found in man-enhanced habitat with one located in a culvert, one in a roadcut, and one in a man-made earthen mound near a disturbed pad. At each new owl burrow, the following data were recorded: Universal Transverse Mercator coordinates; burrow type (e.g., predator-excavated burrow, culvert burrow); height, width, and aspect of burrow entrance; and the presence/absence and estimated age of owl sign. All survey data were entered into an Access database. Figure 5 illustrates the known distribution of the 117 documented burrowing owl locations (30 locations of owl sightings and 87 burrow sites) on the NTS.

5.2.1.2 Burrow Use

Monthly monitoring of burrows was completed in December, yielding three full years of continuous burrow use data. This information is important in order to identify the seasons of immigration, emigration, and breeding of owls on the NTS. Each time a burrow was visited, all owl sign (i.e., pellets, scat, prey remains, feathers, and tracks) on and around the burrow apron and under perching sites near the burrow were documented and then removed. This enabled BN biologists to document monthly owl activity at each burrow. If sign was detected at just one burrow at a site where multiple burrows occurred, then the burrow site was considered active.

5.2.1.3 Topical Report

The most notable accomplishment regarding burrowing owl monitoring on the NTS this year was the completion of the draft document relating to the ecology of the western burrowing owl on the Nevada Test Site. This report summarizes the results of more than four years of data collected while monitoring burrowing owls on the NTS. Major sections of the report include: distribution, burrow use, reproduction and activity patterns, food habits, disturbance effects, winter burrow temperatures, and management implications. This report is important because it represents the first comprehensive study of burrowing owls in Nevada. The final document will be published and distributed next fiscal year as an NNSA/NV topical report.

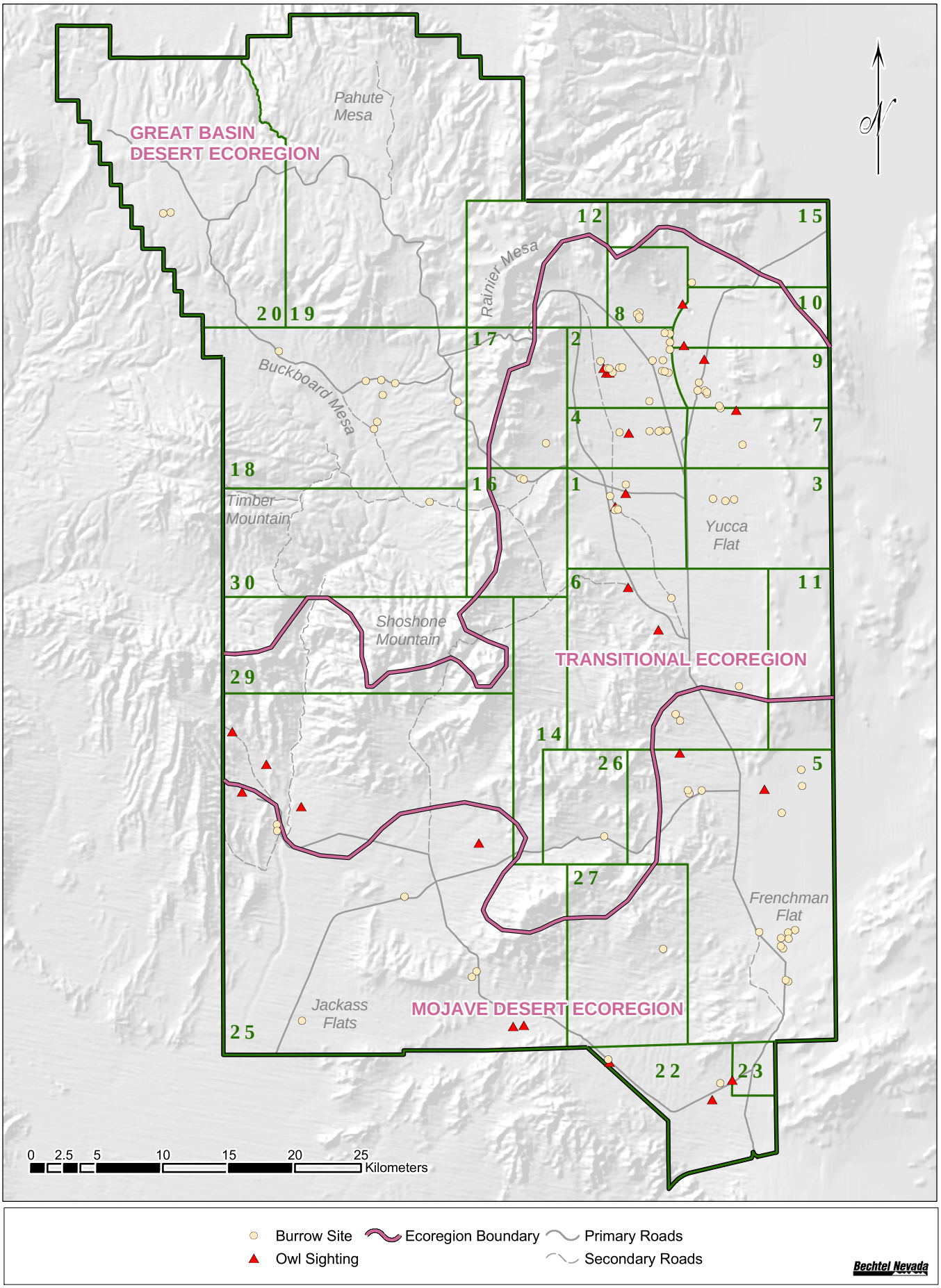

Figure Known western burrowing owl distribution on the NTS

5.2.1.4 Coordination With Other Wildlife Agencies/Biologists

The FWS asked BN biologists to review a draft of the document they prepared titled *Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States* (Anderson *et al.*, 2001). This plan includes a state-by-state summary. BN biologists submitted substantial comments to the plan, particularly for the Nevada state summary, including valuable information from burrowing owl monitoring on the NTS.

5.2.2 Bat Species of Concern

No bat monitoring using mist nets or the ultrasonic call recording system (Anabat II) occurred this year. Two water sources on the NTS that have never been monitored for bats were scheduled to be monitored during the spring. However, when the water sources were checked, they were found to be dry so they were not monitored.

5.2.2.1 Building Roost Site Surveys

Bats or bat sign were documented at seven buildings this year during biological surveys of 84 buildings scheduled for demolition (see Section 1.0). Five live bats (two California myotis [*Myotis californicus*], one Brazilian free-tailed bat [*Tadarida brasiliensis*], and two unknown myotis species [*Myotis* spp.]) and eight dead bats (four Brazilian free-tailed, one California myotis, one pallid bat [*Antrozous pallidus*], and 2 unknown species) were observed during these surveys. At one of the buildings, bat droppings from an unknown species were found. None of the identified species are species of concern.

Bats in buildings were found on three other occasions by NTS workers who then contacted Ecological Services biologists. One female western pipistrelle (*Pispistrellus hesperus*) and one male California myotis were found day roosting in Building 550 in Mercury. Two California myotis females were found in a building in Area 25. None of these were bat species of concern. All bats were taken out of the buildings and released a substantial distance away.

Results from biological surveys of buildings and reports by others of bats in buildings enables BN biologists to increase their knowledge about bat roosting sites on the NTS. These data are valuable because little information on specific bat roost sites exists for the NTS. Figure 6 shows the 28 known bat roost locations on the NTS to date. Roost site locations will continue to be documented in the future and stored in the EGIS bat database.

5.2.2.2 Coordination With Other Wildlife Agencies/Biologists

A BN biologist attended a meeting of the Nevada Bat Working Group in March 2002. The Nevada Bat Working Group discussed the final format and content of the Nevada Bat Conservation Plan that was written to address the status and conservation strategies for all bat species occurring in Nevada. The BN biologist provided input as one of the contributing authors to the *Nevada Bat Conservation Plan*, which was published and distributed in July 2002 (Altenbach et al., 2002). Information from bat monitoring on the NTS was included in the plan.

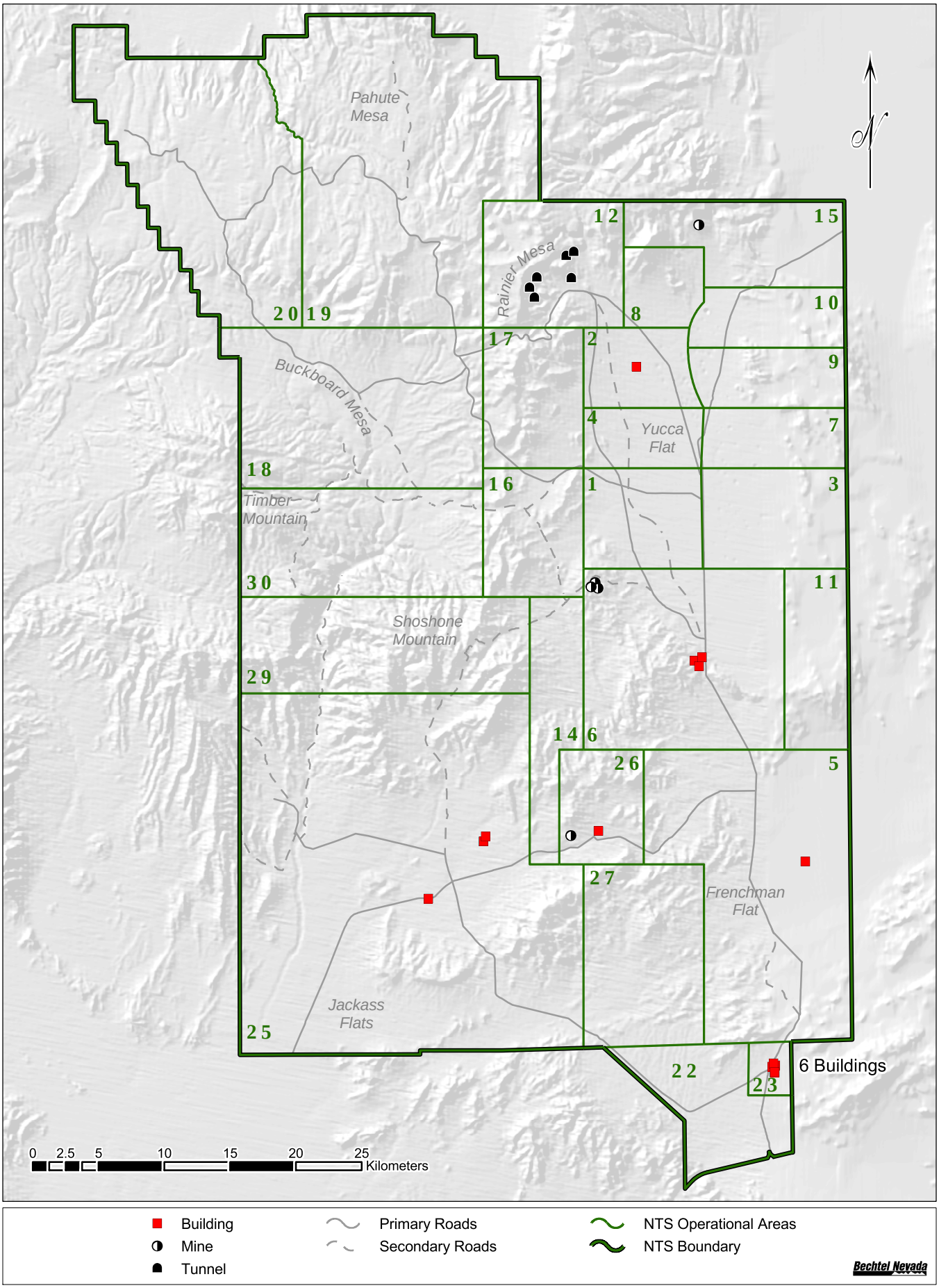

Figure 6. Known bat roost sites on the NTS

5.2.3 Wild Horses

Cattle and other livestock were removed from the NTS prior to testing of nuclear weapons in 1951, but a small herd of horses was not removed (Greger and Romney, 1994a). There were no efforts to monitor the size of that herd from 1951 through the 1970s, although O'Farrell and Emery (1976) reported that "A band of about 20 mustangs is located in the vicinity of Rainier Mesa… . Their numbers have not increased markedly over the last few years." In 1989, a program was initiated to estimate the abundance of horses annually by identifying and photographing all horses seen during systematic surveys. That monitoring has continued through 2002 and has provided excellent information on the abundance, recruitment (i.e., survival of horses to reproductive age), and distribution of the horse population on the NTS. Information on abundance and recruitment during 1990-1998 is summarized in Greger and Romney (1999). In FY 2002, BN biologists determined horse abundance and recorded horse sign along roads. Also, selected natural and man-made water sources were visited in the summer to determine their influence on horse distribution and movements and to determine the impact horses are having on NTS wetlands.

5.2.3.1 Abundance Survey

A count of individual horses was taken to estimate abundance on the NTS. The count was conducted during 20 nonconsecutive days between April and September. A standard road course on the NTS was driven to locate and identify horses (Figure 7). Individuals were identified by their unique physical features. The direct population count in FY 2002 was 33 individuals (Table 8) and does not include foals. None of the 11 foals observed last year survived to yearlings. Only five foals were observed with their mares in 2002, of which all were missing by the end of the summer. Three adult males and 1 adult female (> 3 years old) that were observed on the NTS last year were not observed this year.

From 1995 to 1998, the feral horse population declined 31 percent, from 54 to 37 adult individuals (Table 8). Over the past five years, the population appears to be stable. Six of the 16 foals observed in 1999 and 2000 survived to yearlings during the past two years. This resulted in stabilizing the horse population decline from the previous five years (1995-99). The addition of younger horses increases the herd's viability. The overall population declines from 1995 appear to be the result of low recruitment due to low foaling rates, poor foal survival, none to very low immigration of new adults, and moderate adult mortality. Also, older male horses have tended to disappear from the population over time, with only 8 males presently known in the NTS population (Table 8). It is not known how much of this decline is due to mortality versus emigration.

The horse population has been significantly impacted by drought this year. Poor physical condition was noted in numerous older adult horses during late summer. A decline in available forage or forage quality during a drought year could contribute to poor nutrition of adults and low foaling rates. Poor recruitment of younger horses (if it continues) will lead to an aging horse population, and older horses are more susceptible to death from drought-related stress than young horses. Old horses that are past their prime reproductive age also have lower foal production. Over the past ten years, observed causes of mortality among adults have included predation

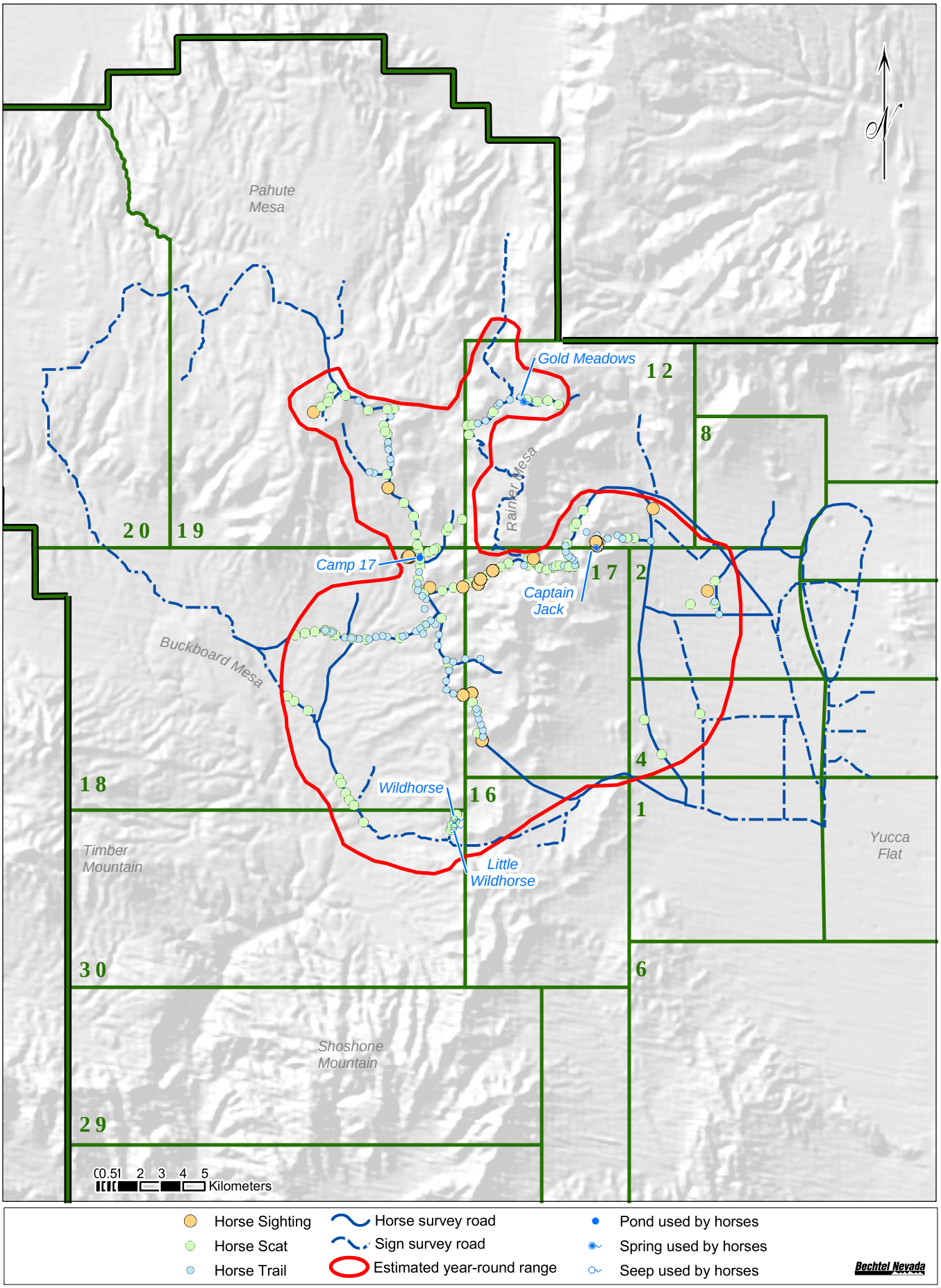

Figure Feral horse sightings and horse sign observed on the NTS during FY 2002

Table 8. Number of horse individuals observed on the NTS by age class, gender, and year since 1995

Age Class	Number of Individuals Observed															
	1995		1996		1997		1998		1999		2000		2001		2002	
Foals	1		1		3		8		5		11		11		5	
Yearlings	3		0		0		0		0		4		2		0	
Adults	M*	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2 Year Olds	0	0	0	1	0	0	0	0	0	0	(2)**	0	0	4	0	2
3 Year Olds	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4
> 3 Year Olds	22	29	21	24	19	20	16	21	11	20	13	21	11	20	8	19
Total (excluding foals)	54		46		40		37		31		38		37		33	

*M = male; F = female ** ( ) = dead

(four), collisions with vehicles (two), and drowning (one). An additional four adult horses have been found dead from unknown causes. Many horses have disappeared and are presumed dead.

5.2.3.2 Annual Range Survey

The annual population census of horses has routinely been conducted in the summer when horses are nearer to water sources and thus easier to find. These census surveys provide an adequate estimate of the summer range of horses on the NTS but does not totally describe their annual range (winter and summer). During FY 2002, selected roads were driven within and along the boundaries of the suspected annual horse range and all fresh sign (estimated to be < 1 year old) located on and adjacent to the roads were recorded. Seven days of effort were expended for the road surveys.

Horse sign data collected during the road surveys and horse use at natural and man-made water sources indicate that the FY 2002 NTS horse range includes Kawich Canyon, Gold Meadows, Yucca Flat, southwest foothills of the Eleana Range, and southeast Pahute Mesa (Figure 7). Overall, the annual horse range appears not to have changed greatly from previous years. During the summer, horses are dependent on Captain Jack Spring, the only known water source in the Eleana Range (Figure 7). Man-made water sources on Yucca Flat have been removed in past years, and the increased distances horses must travel back and forth to Captain Jack Spring probably limits the herds grazing range to the north and east.

As in previous years, the NTS horse herd appears to consist of two components, one larger group of horses (about 20-25 individuals) that spends summers west of the Eleana Range and one smaller group (7-10 individuals) that summers east of the Eleana Range on Yucca Flat. These groups of horses probably intermix during the winter in the Eleana Range. As in 2001, some horses were observed during FY 2002 during the winter season (December-February) in the Eleana Range in Areas 17 and 18. These observations suggest that horses do not move off the NTS during the winter.

5.2.3.3 Use of NTS Water Sources

The NTS horse population is dependent on several natural and man-made water sources in Areas 18, 12, and 30 (Figure 7) during different seasons. Man-made water source availability has not changed greatly on the NTS over the last six years. Wildhorse and Little Wildhorse seeps, both located in Area 30, are important winter-spring water sources. Two other natural water sources (Captain Jack Spring in Area 12, Gold Meadows Spring in Area 12) and one man-made pond (Camp 17 Pond in Area 18) were used by horses this summer, as in past years. Overall, Captain Jack Spring and Camp 17 Pond were the most important summer-fall water sources for horses based on the presence and quantity of horse sign and trampled and grazed vegetation. Horses often use ephemeral water sources in winter such as rock tanks and natural pools that collect water from rain and snowmelt. They appear to be much less dependent on man-made sources in winter.

Wildhorse and Little Wildhorse seeps were used by several bands of horses (numbering about 20-23 individuals) during the spring of 2002 (as in previous years) when water was available. Horse usage declined during early summer as these springs dried up. The paucity of fresh sign in

this region indicates that horses moved to higher elevations earlier than normal in FY 2002, and were dependent on Camp 17 Pond for the remainder of the summer. Gold Meadows Spring was dry during July - September 2002 due to low summer rainfall in the area. The drying of water sources during 2002 probably restricted horse movements to higher elevations more than during a normal rainfall year.

There are presently six other man-made water sources within or on the edge of the annual horse range, however none of them were used by horses in FY 2002 (see section 5.3.2, Figure 10). Only two of these six water sources are permanent year-round: the E-Tunnel Containment Ponds and Area 12 Sewage Ponds. The other water sources are semipermanent, plastic-lined sumps, that occur at ER 19-1, ER 12-1, U10j, and U2gg (see Figure 10); they contain water only in the winter and spring. No horse sign have ever been found at these ponds, suggesting that horses do not drink from them.

5.2.4 Raptors

Several raptors occur and breed on the NTS which are not protected under the ESA and are not species of concern. They are, however, protected by the federal government under the Migratory Bird Treaty Act and by the state of Nevada. Raptors include all vultures, hawks, kites, eagles, ospreys, falcons, and owls. Because these birds occupy high trophic levels of the food chain, they are regarded as sensitive indicators of ecosystem stability and health. Including the burrowing owl (see Section 5.1.2.1), there are nine raptors (Table 9) which are known to breed on the NTS (Greger and Romney, 1994b). During FY 2002, surveys to locate new raptor nests were discontinued. Work this year was focused on monitoring nests found during previous years and those found this year by BN biologists or other NTS workers in buildings or at sites close to ongoing disturbances.

Table 9. Raptor species that are known to breed on the NTS

Raptor Species	Common Name
Aquila chrysaetos	Golden eagle
Asio otus	Long-eared owl
Bubo virginianus	Great-horned owl
Buteo jamaicensis	Red-tailed hawk
Buteo swainsoni	Swainson's hawk
Falco mexicanus	Prairie falcon
Falco sparverius	American kestrel
Speotyto cuniculaia	Western burrowing owl
Tyto alba	Barn owl

5.2.4.1 Nest Sites

Fourteen previously located nests and four new nests were visited from April through July to check for reproduction (Table 10). One known nest (A27-PP1) was not visited, but NTS workers reported active breeding. A total of six nests were active this year (Table 10, Figure 8). Two active Great-horned owl nests, one in Area 6 (A6-B1) and one in Area 3 (A3-B2) were found in buildings in Yucca Flat and represent the second consecutive year of documented breeding of this species on the NTS. The building in Area 3 was demolished this year after two young fledged from the nest.

Breeding pairs of American kestrels were documented from two locations on Yucca Flat during FY 2002. At the U1a facility in Area 1 (A1-CR1), an active nest containing three chicks and one egg was found by NTS workers in an elevated metal crane boom. A BN biologist was notified. Upon consultation with the Las Vegas FWS office, the biologist relocated the chicks and the egg to a nest box that was placed on top of a building near the crane. These birds did not survive due to subsequent abandonment of the nest after relocation. A second American kestrel nest site (A6-B2) was somewhere inside a new building being constructed at the Atlas facility in Area 6. NTS workers reported to BN biologists that young birds appeared to be trapped in the building. An NTS worker found one young kestrel dead in the building and captured one young inside the building and released it outside. A third juvenile escaped from the building on its own. The cavity nest could not be found inside the building.

It was reported to BN biologists that a Red-tailed hawk was nesting in Area 27 on a powerline pole nest. This nest (A27-PP1; Table 10) has been used for four consecutive years.

5.2.4.2 Mortality Records

Few raptor mortalities have been recorded at the NTS. Wildlife observations, made opportunistically by BN biologists and other NTS workers, are maintained by BN biologists in a computerized database. Accounts of injured and dead animals are also usually reported to BN biologists and are stored in the same database. Over the last 12 years, from 1990 to 2002, 31 incidents of dead raptors have been recorded on the NTS (Table 11). The known causes of death include seven roadkills, three electrocutions, two suspected drownings, three predator kills, and two entrapments in buildings. Also, a total of seven chicks have been found dead and seven adult birds found dead of unknown causes.

5.3 Wetlands and Wildlife Water Sources

Natural wetlands and man-made water sources on the NTS provide unique habitats for mesic and aquatic plants and animals and attract a variety of other wildlife. Natural NTS wetlands may qualify as jurisdictional wetlands under the Clean Water Act (CWA). Characterization of these mesic habitats to determine their status under the CWA, and periodic monitoring of their hydrologic and biotic parameters were started in FY 1997 as components of the EMAC program. Periodic wetland monitoring may help identify annual fluctuations in measured parameters that are natural and unrelated to NNSA/NV activities. Also, if a spring classified as a jurisdictional wetland were to be unavoidably impacted by an NNSA/NV project, mitigation for the

Table 10. Status of known raptor nests on the NTS

			Number of Young Observed				
Nest ID	**Species**	**Nest Type**	**FY 1998**	**FY 1999**	**FY 2000**	**FY 2001**	**FY 2002**
A12-C1	Golden eagle	Cliff stick nest	1		~~*	~~	~~
A16-C1	Golden eagle	Cliff stick nest	--**	1	~~	~~	~~
A4-Y1	Red-tailed hawk	Joshua tree nest	3	~~	~~	~~	~~
A6-Y1	Red-tailed hawk	Joshua tree nest	2	~~	~~	~~	~~
A6-Y2	Red-tailed hawk	Joshua tree nest	1	~~	~~	~~, collapsed	~~, collapsed
A6-C1	Red-tailed hawk	Cliff stick nest	1	~~	~~	~~	~~
A3-Y1	Red-tailed hawk	Joshua tree nest	--	3	~~	~~	~~
A3-PP1	Red-tailed hawk	Powerline pole nest	--	--	1	~~, collapsed	~~, collapsed
A5-W1	Red-tailed hawk	Willow tree nest	--	--	1	~~	~~
A6-Y3	Red-tailed hawk	Joshua tree nest	--	--	3	3	~~
A27-PP1	Red-tailed hawk	Powerline pole nest	--	??***	2	3	??
A4-Y2	Swainson's hawk	Joshua tree nest	2	~~	~~	~~	~~
A25-B1	Barn owl	Cavity nest in building	--	--	??	8	building demolished
A23-B1	Barn owl	Cavity nest in building	--	--	--	4	building demolished
A6-B1	Great-horned owl	Building stick nest	--	--	--	3	3
A3-B1	Great-horned owl	Building stick nest	--	--	--	1	~~
A25-B2	Red-tailed hawk	Building stick nest	--	--	--	1	~~
A3-B2	Great-horned owl	Building stick nest	--	--	--	--	2
A3-Y2	Red-tailed hawk	Joshua tree	--	--	--	--	??
A6-B2	American kestrel	Cavity nest in building	--	--	--	--	3
A1-CR1	American kestrel	Cavity nest in crane	--	--	--	--	3
	Known Total		**10**	**4**	**7**	**23**	**11**

*~~= Inactive **-- = Unknown, nest found in subsequent years ***?? = nest active but number of young not determined

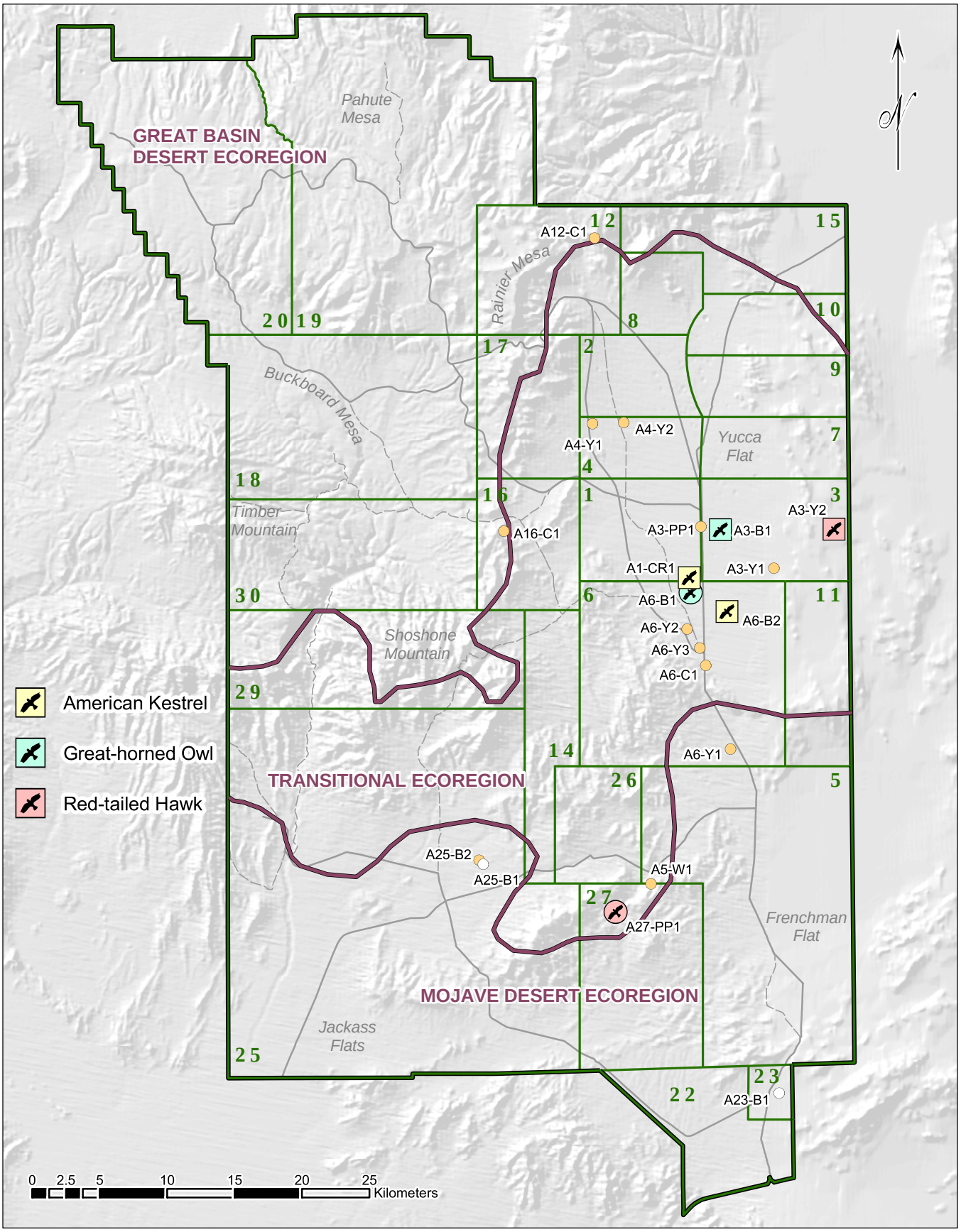

Figure Monitored raptor nests on the NTS during FY 2002

Table 11. Summary of NTS raptor mortality records from 1990-2002

Species	Roadkill	Electrocution	Drowning	Predation	Entrapment	Chick Mortality	Unknown	Totals
American kestrel				1	1	3	2	**7**
Barn owl	1			1	1	3	1	**7**
Golden eagle	1	1					1	**3**
Great-horned owl	3	1				1		**5**
Prairie falcon				1				**1**
Red-tailed hawk	2	1	1				1	**5**
Sharp-shinned hawk							1	**1**
Turkey vulture							1	**1**
Western burrowing owl			1					**1**
Totals	**7**	**3**	**2**	**3**	**2**	**7**	**7**	**31**

the loss of wetland habitat would be required under the CWA. Under these circumstances, wetland hydrology, habitat quality, and wildlife usage data collected at the impacted spring over several previous years can help to develop a viable mitigation plan and demonstrate successful wetland mitigation.

Man-made excavations constructed to contain water occur on the NTS and also attract wildlife. Along with natural water sources, these man-made sources can affect the movement patterns of some species (e.g., wild horses). However, they can also cause accidental wildlife mortalities from entrapment and drowning if not properly constructed or maintained. Quarterly visits to these water sources were conducted in FY 2002 to document wildlife use and mortality.

5.3.1 Wetlands Monitoring

Monitoring of selected NTS wetlands continued this fiscal year to characterize seasonal baselines and trends in physical and biological parameters. Eleven wetlands (Figure 9) were visited at least once during the year to record the presence/absence of land disturbance, water flow rates, and surface area of standing water (Table 12). Wildlife use data collected at these water sources are shown in Table 13. Due to a low rainfall year, declines in wetland surface area, flow rates, and wildlife use were noted at most wetlands on the NTS during FY 2002 compared to FY 2001.

5.3.2 Monitoring of Man-made Water Sources

BN biologists conducted quarterly monitoring of man-made water sources. These sources, located throughout the NTS (Figure 10), include 35 plastic-lined sumps, 9 sewage treatment ponds, 8 unlined well ponds, and 2 radioactive containment ponds. Several ponds or sumps are located next to each other at the same project site. Many NTS animals rely on these man-made structures as sources of free water. Wildlife and migratory birds may drown in steep-sided or plastic-lined sumps as a result of entrapment, or ingest contaminants in drill-fluid sumps or evaporative ponds. Ponds are monitored to assess their use by wildlife and to develop and implement mitigation measures to prevent them from causing significant harm to wildlife.

Man-made water sources were visited during four quarterly sampling periods: November 2002, February, May, and September 2002. Sewage ponds and well reservoirs were visited once annually. At each site, a BN biologist recorded the presence or absence of standing water and the presence of animals or their sign around the water source. The presence of ramps or ladders, which allow animals to escape if they fall in, have also been installed at many plastic-lined sumps, and the presence, absence, and condition of these structures were also noted. All dead animals (or any remains of an animal) in or adjacent to a man-made water source are recorded.

During FY 2002, use of unlined sumps and ponds by waterfowl (ducks, shorebirds), passerine birds (ravens, horned larks, house finches), and mammals, such as coyotes and deer, was common, although numbers observed were low. Only one man-made pond (Camp 17 Pond in Area 18) was used this year by wild horses. Birds were observed much less at the plastic-lined sumps compared to the unlined ponds.

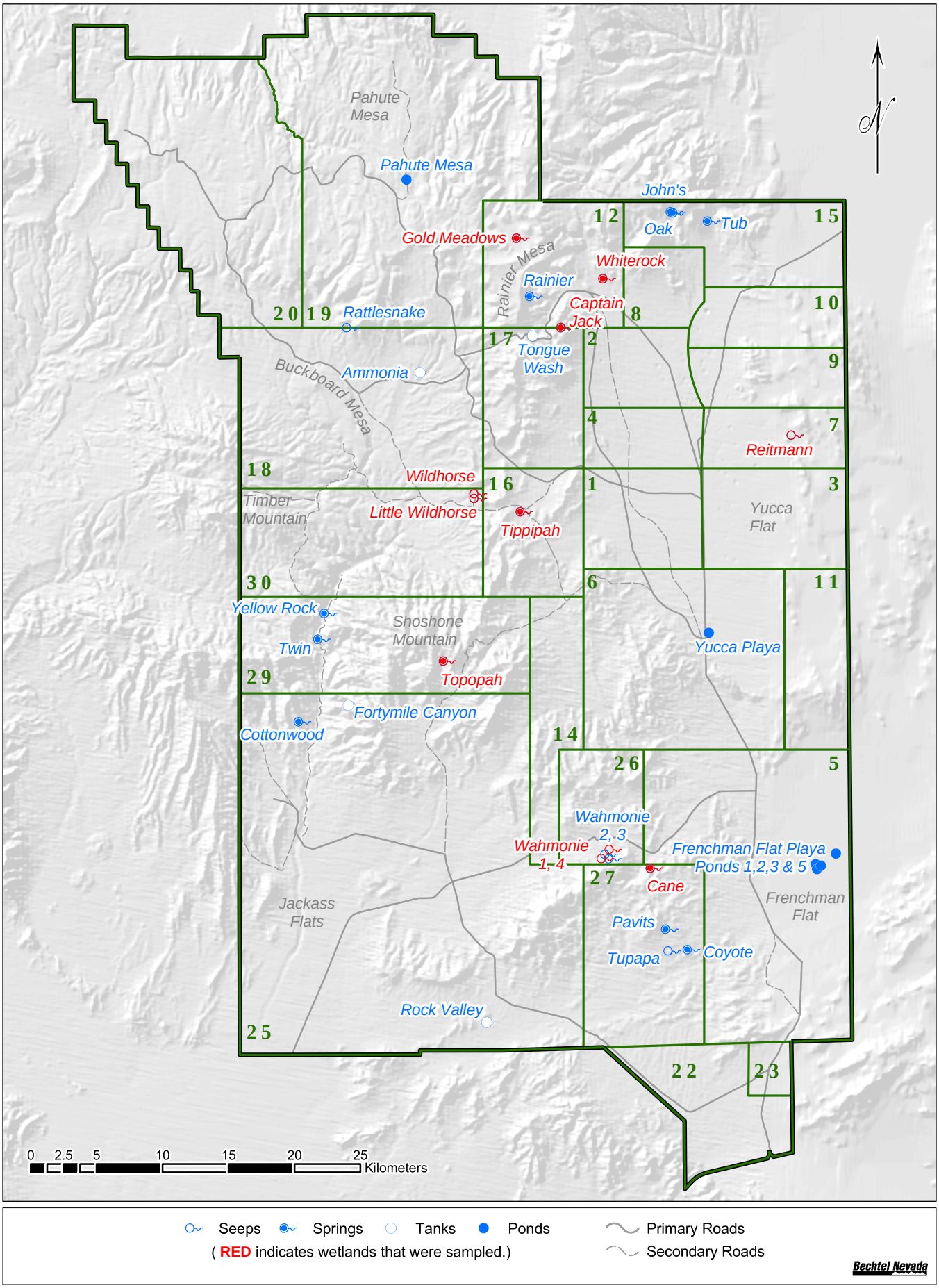

Figure Natural water sources on the NTS sampled during FY 2002

Table 12. Seasonal data from selected natural water sources on the NTS collected during FY 2002

Water Source	Date	Surface Area of Water (m^2)[a]	Surface Flow Rate (L/Min)[b]	Disturbance at Spring
Cane Spring	08/07	6	0.3	None
Captain Jack Spring	08/20	23	1	Horse grazing and trampling
Gold Meadows Spring	07/03	0	0	Horse grazing and trampling
Little Wildhorse Seep	09/05	0	0	Horse grazing and trampling
Reitmann Seep	09/04	0.4	0	None
Tippipah Spring	08/01	130	NM[c]	None
Topopah Spring	09/05	1.5	0.015	None
Wahmonie Seep No. 1	08/07	0	0	None
Wahmonie Seep No. 4	08/07	0	0	None
Whiterock Spring	08/27	2	1.7	None
Wildhorse Seep	09/05	0	0	Horse grazing and trampling

[a]m^2 - Square meters
[b]L/min - Liters per minute
[c]NM - Not measurable due to diffused flow

No dead animals were recorded in any plastic-lined sumps during FY 2002. A sediment mound was constructed in Sump No. 3 at ER-20-6 during FY 2001 and has been monitored since that time to assess its effectiveness in preventing animal entrapment or drowning. This sediment ramp appears to be working well as deer sign have been recorded at this site, yet no deer or other wildlife entrapment or mortality has occurred.

Table 13. Seasonal wildlife use at selected natural water sources on the NTS during FY 2002. P = species present, inferred from sign.

Wildlife Observed	Cane Spring	Captain Jack Spring				Gold Meadows Spring	Little Wildhorse Seep	Reitmann Seep	Tippipah Spring	Topopah Spring	Wahmonie Seep No. 1	Wahmonie Seep No. 4	Whiterock Spring	Wildhorse Seep
Mammals	**08/07**	**08/20**	**08/27**	**08/28**	**09/04**	**07/03**	**09/04**	**09/14**	**08/01**	**09/05**	**08/07**	**08/07**	**08/27**	**9/4**
Coyote (*Canus latrans*)	1	P	P	P	P	P	P	P	P	P	P	P	P	P
Cottontail rabbit (*Sylviligus audubonii*)	1													
Feral horse (*Equus caballus*)		P	P	P	6	P	P							P
Mule deer (*Odocoileus hemionus*)	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Birds														
Black-throated sparrow (*Amphispiza bilineata*)	>4											>4		
Chukar (*Alectoris chukar*)		5								>3				
Common raven (*Corvus corax*)										1				
Cooper's hawk (*Accipiter cooperi*)		1												
Gambel's quail (*Calipepla gambelii*)	20								6				4	
Mourning dove (*Zenaida macroura*)								1	1					
Pinion jay (*Gymnorhinus cyanocephalus*)		1	25	7	5									
Roadrunner (*Geococcyx californianus*)							1							
Scrub jay (*Aphelocoma coerulescens*)		1												1
Western kingbird (*Tyrannus verticalus*)									1					

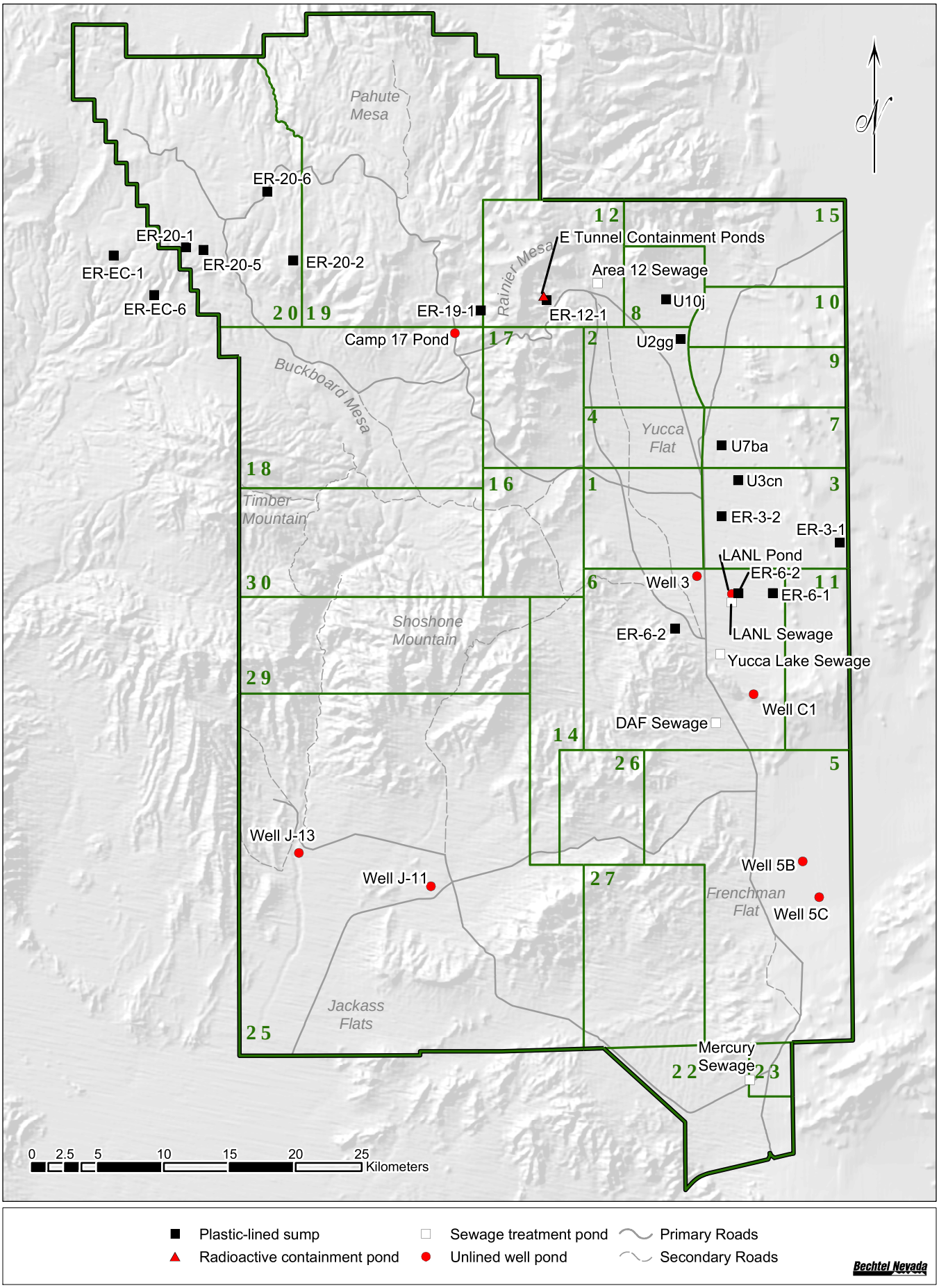

Figure Man-made water sources monitored for wildlife use and mortality on the NTS during FY 2002

THIS PAGE IS INTENTIONALLY LEFT BLANK

6.0 MONITORING OF THE HAZMAT SPILL CENTER

6.1 Task Description

Biological monitoring at the HAZMAT Spill Center on the playa of Frenchman Lake in Area 5 will be performed, if necessary, for certain types of chemical releases as per the center's programmatic Environmental Assessment. In addition, ESHD has requested that BN monitor any test which may impact plants or animals downwind which are off the playa. A document titled *Biological Monitoring Plan for Hazardous Materials Testing at the Liquefied Gaseous Fuels Spill Test Facility on the Nevada Test Site* was prepared in FY 1996 (BN, 1996). It describes how field surveys will be conducted to determine test impacts on plants and animals and to verify that the center's program complies with pertinent state and federal environmental protection legislation. The design of the monitoring plan calls for the establishment of three control transects and three treatment transects at three distances from the chemical release point. The control and treatment transects have similar environmental and vegetational characteristics.

BN biologists are tasked to review chemical release test plans to determine if field monitoring along the treatment transects is required for each test as per the monitoring plan criteria. All test-specific field monitoring is funded through the HAZMAT Spill Center. Since 1996, the majority of chemical releases being studied at the center use such small quantities that downwind test-specific monitoring has not been necessary.

6.2 Task Progress Summary

BN reviewed chemical spill test plans for one experiment this year called Roadrunner. Five chemicals were released at such low volumes that there was no need to monitor downwind transects for biological impacts. Baseline monitoring was conducted at established control-treatment transects near the HAZMAT Spill Center in August. This sampling noted the condition of plants and the presence of wildlife sign during the period of vegetative dormancy. No differences in biota were noted along downwind (treatment) versus upwind (control) transects. Baseline monitoring data are collected to document any cumulative impacts over time of test center activities on biota downwind of the facility. These data are made available to neighboring land managers upon request. Noticeable cumulative impacts on biota are not expected.

THIS PAGE IS INTENTIONALLY LEFT BLANK

7.0 LITERATURE CITED

Altenbach, J. S., W. Amy, P. V. Bradley, P. E. Brown, K. Dewberry, D. B. Hall, J. Jeffers, B. Lund, J. E. Newmark, M. J. O'Farrell, M. Rahn, R. E. Sherwin, C. R. Tomlinson, and J. A. Williams, 2002. *Nevada Bat Conservation Plan*. Nevada Bat Working Group, Austin, NV. 188 pp.

Anderson, D. C., 1998. Distribution of Clokey's Eggvetch (*Atragalus oophorus* var. *clokeyanus*) on the Nevada Test Site. DOE/NV/11718--262, Bechtel Nevada, Las Vegas, NV, December 1998.

Anderson, S. H., L. W. Ayers, J. A. Dechant, M. T. Green, W. H. Howe, S. L. Jones, D. S. Klute, D. K. Rosenberg, S. R. Sheffield, and T. S. Zimmerman, 2001. *Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States*. Administrative Report, U.S. Department of Interior, Fish and Wildlfie Service, Denver, CO.

Bechtel Nevada, 1996. *Biological Monitoring Plan for Hazardous Materials Testing at the Liquefied Gaseous Fuels Spill Test Facility on the Nevada Test Site.* Submitted to U.S. Department of Energy, Nevada Operations Office, Letter from J. R. Kannard to R. C. Furlow, Correspondence No. E100-JRK-96-004, January 25, 1996.

———, 2001a. *Adaptive Management Plan for Sensitive Plant Species on the Nevada Test Site.* DOE/NV/11718–507, Bechtel Nevada, Las Vegas, NV, March 2001.

———, 2001b. *Ecological Monitoring and Compliance Program Fiscal Year 2001 Report.* DOE/NV/11718–645, Bechtel Nevada, Las Vegas, NV, December 2001.

Blomquist, K. W., T. A. Lindemann, G. E. Lyon, D. C. Steen, C. A. Wills, S. A. Flick, and W. K. Ostler, 1995. *Current Distribution, Habitat, and Status of Category 2 Candidate Plant Species on and Near the U.S. Department of Energy's Nevada Test Site*. EGG11265-1149, EG&G Energy Measurements, Las Vegas, NV, December 1995.

Blomquist, K. W., C. A. Wills, W. K. Ostler, K. R. Rautenstrauch and T. P. O'Farrell, 1992. *Distribution, Life History, Management, and Current Status of Astraglaus beatleyae on the U.S. Department of Energy's Nevada Test Site*. EGG10617-2187, EG&G Energy Measurements, Santa Barbara Operations, Goleta, CA, November 1992.

BN, see Bechtel Nevada.

DOE/NV, see U.S. Department of Energy Nevda Operations Office.

FWS, see U.S. Fish and Wildlife Service.

Greger, P. D. and E. M. Romney, 1994a. Feral horse monitoring at the Nevada Test Site from 1989-91. In: *Status of the Flora and Fauna on the Nevada Test Site 1989-91*. Compiled by R. B. Hunter, DOE/NV/11432-57, Reynolds Electrical & Engineering Co., Inc., Las Vegas, NV.

Greger, P. D. and E. M. Romney, 1994b. Trends in Wildlife Utilization of Water Source and Adjacent Habitats at the Nevada Test Site 1989-91. In: *Status of the Flora and Fauna on the Nevada Test Site 1989-91*. Compiled by R. B. Hunter, DOE/NV/11432-57, Reynolds Electrical & Engineering Co., Inc., Las Vegas, NV.

Greger, P. D. and E. M. Romney, 1999. High foal mortality limits growth of a desert feral horse population in Nevada. Great Basin Naturalist 59:374-379.

O'Farrell, T. P., and L. A. Emery, 1976. *Ecology of the Nevada Test Site: A Narrative Summary and Annotated Bibliography*. NVO-167. Desert Research Institute, Las Vegas, NV.

Ostler, W.K., D. J. Hansen, D.C. Anderson and D.B. Hall, 2000. Classification of Vegetation on the Nevada Test Site. DOE/NV/11718--477, Bechtel Nevada Ecological Services, Las Vegas, NV.

Steen, D. C., D. B. Hall, P. D. Greger, and C. A. Wills, 1997. *Distribution of the Chuckwalla, Western Burrowing Owl, and Six Bat Species on the Nevada Test Site*. DOE/NV/11718-149, Bechtel Nevada, Las Vegas, NV, May 1, 1997.

U.S. Department of Energy Nevada Operations Office, 1996. *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada, Volume 1, Chapters 1-9*. DOE/EIS 0243, U.S. Department of Energy, Nevada Operations Office, Las Vegas, NV, August 1996.

———, 1998. *Nevada Test Site Resource Management Plan*, DOE/NV–518, U.S. Department of Energy, Nevada Operations Office, Las Vegas, NV, December 1998.

U.S. Fish and Wildlife Service, 1996. *Final Programmatic Biological Opinion for Nevada Test Site Activities*. File No. 1-5-96-F-33, August 22, 1996, U.S. Fish and Wildlife Service, Reno, NV.

DISTRIBUTION

U.S. Department of Energy,
National Nuclear Security Administration
Nevada Operations Office
Las Vegas, Nevada
Michael Childers, SMD
Robert Furlow, ESHD (6)
Carl Gertz, AMEM
Kennith Hoar, ESHD
Terry Wallace, AMTS

Deborah Monette, AMNS
Darwin Morgan, OPA
Jay Norman, O/Mgr
Public Reading Facility
Technical Library

U.S. Department of Energy,
Yucca Mountain Site Characterization Office
Las Vegas, Nevada
Scott Wade

Bechtel Nevada
Environmental Monitoring
Mercury, Nevada
Don Van Etten (8)

Defense Threat Reduction Agency
Mercury, Nevada
Lawrence Ashbaugh

Desert Research Institute
Las Vegas, Nevada
David Shafer (3)

Lawrence Livermore National Laboratory
Las Vegas, Nevada
Willie Cooper

Los Alamos National Laboratory
Las Vegas, Nevada
Chuck Costa

Sandia National Laboratories
Las Vegas, Nevada
Paul Raglin

DOE Office of Scientific and Technical Information
Oak Ridge, Tennessee (1 - electronic)

Nellis Air Force Base
Las Vegas, Nevada
Susan Barrow (2)

Desert National Wildlife Range
Las Vegas, Nevada
Richard Birger (3)