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HERPETOLOGICAL SURVEY OF SOUTHCENTRAL IDAHO

by

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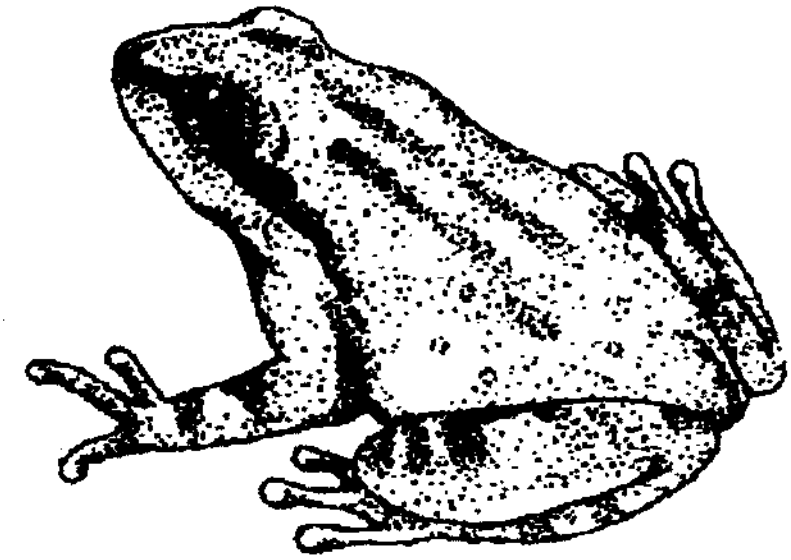

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Herpetological Survey of Southcentral Idaho

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Final Report for a FY 2000 Challenge Cost-Share Agreement between the U.S. Bureau of Land Management, Burley Field Office; Idaho Department of Fish and Game, Magic Valley Region; Idaho State University; and U.S. Fish and Wildlife Service Minidoka Wildlife Refuge

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Executive Summary

The primary objective of this study was to provide information concerning current amphibian and reptile occurrence throughout southcentral Idaho where few historical data are available. This information will be incorporated into the Northern Intermountain Herpetological Database, shared with Idaho Conservation Data Center, and will provide a more thorough understanding of current species distributions in southcentral Idaho. These results provide baseline data for future comparisons and management decisions in this region.

Based on current range maps, 27 species of amphibians and reptiles were identified as potentially occurring within the study area. Three potentially occurring amphibian species, the Western Toad (*Bufo boreas*), Northern Leopard Frog (*Rana pipiens*), and Columbia Spotted Frog (*Rana luteiventris*) are considered to be Sensitive Species (BLM) and State Species of Special Concern (IDFG) for the state of Idaho. The Columbia Spotted Frog is also currently a candidate for Threatened and Endangered status by the U.S. Fish and Wildlife Service. There are also three potentially occurring reptile species, the Longnose Snake (*Rhinocheilus lecontei*), Ringneck Snake (*Diadophis punctatus*), and Ground Snake (*Sonora semiannulata*) which are considered to be Sensitive Species and State Species of Special Concern.

We employed multiple sampling techniques such as visual encounter surveys, aquatic funnel trapping, and road driving surveys to increase the chances of detecting species that occur within the study area. Site surveys were conducted over 33 total days that began on 8 June 2000 and ended on 4 August 2000. We detected the presence of 16 species within the study area including the Northern Leopard Frog, which was locally abundant at the Minidoka National Wildlife Refuge. An unconfirmed incidental observation of a Western Toad on the Big Cottonwood Wildlife Management Area (BCWMA) was contributed by an Idaho Fish and Game employee, and further observations in this area are required to establish species presence. Three other amphibian species were detected including the Tiger Salamander (*Ambystoma tigrinum*), Pacific Treefrog (*Pseudacris regilla*), and Boreal Chorus Frog (*Pseudacris maculata*). The occurrence of Tiger Salamanders in this part of the state suggests a westward expansion of the currently known distribution. Five lizard species were detected including the Longnose Leopard Lizard (*Gambelia wislizenii*), Side-Blotched Lizard (*Uta stansburiana*), Sagebrush Lizard (*Sceloporus graciosus*), Western Fence Lizard (*Sceloporus occidentalis*), and Western Whiptail (*Cnemidophorus tigris*). An additional incidental observation of a Western Skink (*Eumeces skiltonianus*) was contributed by BLM employees from the Chokecherry Canyon area. Five species of snakes were detected within the study area including the Racer (*Coluber constrictor*), Striped Whipsnake (*Masticophis taeniatus*), Gopher Snake (*Pituophis catenifer*), Western Terrestrial Garter Snake (*Thamnophis elegans*), and Western Rattlesnake (*Crotalus viridis*).

Pacific Treefrogs exhibited the greatest relative abundance throughout the study area contributing 42% (56% of amphibians) to the total observations. Surprisingly, the Northern Leopard Frog had the second highest observed abundance representing 24% (33% of amphibians) of the total. Western Fence Lizards had the highest observed lizard abundance contributing 55% (8% of the total observed) to all lizard observations. Gopher Snakes were the most abundant snake species observed representing 38% (4% of total observed) of the snake observations.

Introduction

The primary objective of this study was to document reptile and amphibian species occurrence in south central Idaho, which encompasses Cassia county and also includes Minidoka, Power, and Twin Falls counties, a region of the state where historical observational data and formal surveys are few (McDonald 1996, Makela 1998). The collected information will provide updated records of current distributions of amphibian and reptile species in this part of the state, especially for those species considered to be Sensitive by the Bureau of Land Management (BLM) or considered State Species of Special Concern by the Idaho Department of Fish and Game (IDFG). The data will be shared with the Idaho Conservation Data Center and have also been incorporated into the Northern Intermountain Herpetological Database (NIHD) of the Idaho Museum of Natural History (IMNH), where it will be used to establish a more comprehensive understanding of current statewide species distributions and to provide baseline data for future comparisons and management decisions.

Methods

Study Area

The survey area extends throughout four counties in south central Idaho (Figure 1). The majority of survey sites are primarily located within Cassia County with only a few isolated survey sites located throughout the surrounding counties of Minidoka, Power, and Twin Falls. The majority of survey sites were located on the Sawtooth National Forest (55%) with shorter excursions onto BLM land (12%), U.S. Fish and Wildlife (USFWS) Minidoka Wildlife Refuge land (12%), State land (6%), and private -land (14%). With a study area this large, there is a considerable amount of variation in

habitat composition and characteristics. Elevations in the study area ranged from 1250m at Minidoka National Wildlife Refuge to 2806m at Independence Lake 4 on the Sawtooth National Forest. The lowlands are generally dominated by xeric sage-steppe habitat with an overstory of native species such as Wyoming Big Sagebrush (*Artemisia tridentata wyomingensis*) and Utah Juniper (*Juniperus osteosperma*), but also an understory of non-native species such as Crested Wheatgrass (*Agropyron cristatum*) and Downy Brome (*Bromus tectorum*). The higher elevation forested uplands were generally dominated by species such as Quaking Aspen (*Populus tremuloides*), Douglas-Fir *(Pseudotsuga menziesii*), and Lodgepole Pine (*Pinus contorta*).

Sampling Site Selection

We determined the location of survey areas based on historical observations of Sensitive Species in south central Idaho and from numerous other suggested areas of interest to local BLM and IDFG biologists. Within an identified survey area (i.e., Big Cottonwood Canyon), we chose specific sites based on background knowledge of potentially suitable habitat (i.e., wetlands or south-facing talus slopes) for the species in these areas. We took photographs of most of the sites we surveyed throughout the study for identification and to provide visual examples of the various habitats we encountered (Appendix A). Our goal was to determine which species were present in the study area, not to obtain unbiased data for modeling habitat relationships.

Determination of Site Coordinates

We collected Universal TransMercator (UTM) coordinates at each survey site and for any amphibian or reptile species observation. We used a Trimble GeoExplorer GPS

(Trimble Navigation Limited, Sunnydale, CA) receiver on 8 June 2000 through 12 June 2000, and 19 June 2000 through 23 June 2000. Due to difficulties in detecting satellites with the Trimble unit in many of the deep canyons located throughout the study area, we began using a Garmin GPS II Plus receiver following the surveys on 23 June 2000 which provided a faster and more reliable contact with satellites. We continued using this unit for the duration of the study.

We only recorded location coordinates when the displayed position dilution of precision (PDOP) was at least 7.0 or lower when using the Trimble unit, or when the estimated potential error (EPE) was 10 meters or lower when using the Garmin unit. The Department of Defense turned off Selective Availability (SA) this year which formerly was responsible for the intentional scrambling of satellite signals that created position coordinate errors of l00m or more. Currently GPS receivers are capable of determining locations with position estimate errors of only about 10m without differential correction to account for SA. Consequently, we did not differentially correct any of the recorded GPS points collected in the study.

Site Characteristics and Environmental Measurements

We collected habitat and environmental measurements at all surveyed sites and locations where species observations were made using a standard form for amphibian and reptile surveys (Appendix B, Peterson 1997). Various environmental conditions such as radiation, cloud cover, precipitation, and air temperature were recorded at each survey site. Radiation and cloud cover were visually estimated, while shaded 1m height air temperature measurements were made using a Taylor (Model 9841) digital thermometer.

We also collected data on wetland characteristics when surveying aquatic sites such as length, width, depth, water temperature, water chemistry (pH and conductivity), and National Wetlands Inventory (NWI) classification (Cowardin et al. 1979). Site length and width were visually estimated, while wetland depth was classified as either <1 meter, 1-2 meter, or >2 meter. All water temperature measurements were taken at roughly 1 cm depth and approximately 1 m from the shoreline using the same thermometer used for the air temperatures measurements. We used a TDSTester 3 ATC for all conductivity measurements, and an Oaktown pHTester 2 ATC pocket meter (Forestry Supply, Jackson, MS) for all pH measurements. Various other data were collected at each wetland site surveyed, such as primary substrate, dominant vegetation, and relative percent of shoreline with emergent vegetation. We visually estimated each of these parameters following visual encounter surveys to ensure the entire site is represented in the reported data. A comprehensive listing of all environmental conditions and habitat characteristics that were recorded are reported in Appendix C.

We also estimated a habitat classification for each survey site based on the land cover classification system developed for the Idaho Gap Analysis. Land cover classification is divided into nine major categories: Urban or Developed Land (1000), Agricultural (2000), Non-Forested Lands (3000), Forest Uplands (4000), Water (5000), Riparian and Wetland Areas (6000), Barren Land (7000), Alpine Meadow (8000), and Snow, Ice, Cloud or Cloud Shadows (9000). Within each of these major categories are sub-categories which further specify distinct habitat types, and these codes are explained when reported (Tables 1 and 2).

We calibrated the pH and conductivity meters prior to the beginning of the survey and about every two weeks until the completion of the study. Waders, dipnets, and

aquatic funnel traps were rinsed and sterilized using a diluted bleach solution (roughly 10%) in conjunction with equipment calibration to decrease the chance of transmitting disease or pollutants among wetland survey sites.

Amphibian and Reptile Sampling

Based on range maps in Nussbaum et al. (1983), Stebbins (1985), Baxter and Stone (1985), and records from the Northern Intermountain Herpetological Database, 27 species (7 amphibians and 20 reptiles) were identified as potentially occurring in the study area (Tables 3-5).

We conducted sampling at numerous times throughout the late spring and summer of 2000. Site surveys were conducted on 8 June 2000 through 12 June 2000, 19 June 2000 through 23 June 2000, 28 June 2000 through 2 July 2000, 5 July 2000 through 8 July 2000, 18 July 2000 through 22 July 2000, 25 July 2000 through 28 July 2000, and 1 August 2000 through 4 August 2000. A summary of the days we surveyed and the corresponding sampling techniques that were used on those days can be found in Figure 2.

We did not perform Calling Surveys during the study because the study began too late in the spring and breeding amphibians had already undergone mating.

Voucher photographs were taken of all sensitive species we found within the study area. The photographs can be found in Appendix D.

Visual Encounter Surveys (VES)

This method of survey was the most frequently used technique throughout the study. Using this method, we walked within an identified survey site visually searching

for amphibian and reptile species. Visual encounter surveys were employed in all terrestrial sites with the effort focused on sampling particular areas which appeared to provide suitable habitat for potentially present species. Visual encounter surveys were also made around the perimeter of wetland sites prior to entering the water, and again throughout the main portions of the site itself. Shed snake skins were collected whenever encountered and were later used to identify the species through scalation patterns.

Dipnetting and cover turning are complementary techniques to visual encounter surveys, and were subsequently used throughout the study as well. These additional sampling components were employed to maximize the possibility of detecting species that generally remain hidden within vegetation or underneath cover.

1. Dipnetting -Historically, this method has been proven effective at locating amphibian species hidden in submerged vegetation (Crisafulli 1997). We used a fine-mesh dipnet, and dipped approximately every 5 steps around wetland perimeters. In shallow ponds, we also waded portions of the interior wetlands to access potentially good habitat.

2. Cover turning -This method incorporates the lifting and turning of cover objects, such as rocks and logs, to locate animals hidden beneath them. All cover objects were returned to the original placement after turning. This method was primarily used in terrestrial sites, especially where rocks and downed logs were abundant throughout the landscape.

Road Driving

We drove roads in the mornings and early evenings and identified any reptiles or amphibians that were observed (Shaffer and Juterbock 1994). Roads were also continually surveyed while driving to and from survey sites throughout the study

period. Any species observations made while road driving were recorded using a standard form for amphibian and reptile multiple observations (Appendix E) and the results are reported in Appendix F. The dates that roads were driven and the corresponding results are listed in Appendix G .

Aquatic Funnel Trapping

We used standard minnow traps to perform aquatic funnel trapping. These traps incorporate a central holding chamber with two tapered openings that direct organisms towards the traps interior. This method has proven effective for capturing amphibian larvae, but also for some adults of smaller species (Adams et al. 1997). The number of traps placed in a wetland was determined based on the general size of the wetland, and the relative area of shallow shorelines. We placed traps in a generally even distribution around a site whenever possible, and specifically in locations that contained emergent vegetation or submerged aquatic vegetation with depths deep enough to cover the openings of the traps. We also placed a few traps in open water areas so that these locations were not excluded from sampling. The number of traps placed in a wetland site ranged from four to ten possible based upon the number of traps available and wetland characteristics mentioned above. Traps were placed and left out for two nights to collect animals. Traps were placed in shallow water so that they were not completely submerged. This helped ensure that non-target species would not drown if caught accidentally. The data collected from the Aquatic Funnel Trapping are summarized in Appendix H.

Incidental Observations

We made incidental observations any time a species was located in an area that was not actively being sampled. GPS points were collected at the location of the observation, and some general descriptions of the species and location were made as well. Any observations that were contributed from an outside source (e.g., BLM or IDFG employees) were considered incidental observations.

Data Management

We entered the data into a Microsoft Excel spreadsheet for management and analysis. The data were also incorporated into the NIHD of the IMNH. Maps of species distributions were developed using ArcView 3.2 (ESRI Redlands, California) Geographic Information Systems (GIS). The topographic maps used in the creation of the species distribution maps were acquired from the Idaho All Topo Maps: Idaho software (iGage, Salt Lake City, UT).

Results and Discussion

Site Characteristics and Environmental Measurements

Throughout the study, shaded air temperatures ranged from 17.2°C to 34.9°C with an average temperature of 26.2°C. Wetland water temperatures taken at 1cm depth ranged from 14.1°C to 28.1°C with an average of 23.2°C. Water chemistry exhibited considerable variation over the course of the study with pH values ranging from 5.3 to 10.8, and conductivity values ranging from 10 mg/L to 660 mg/L.

Occurrence

We encountered 16 (5 snake species, 6 1izard species, and 5 amphibian species) of the 27 potentially occurring species within our study area (Tables 3-5). We detected one Sensitive Species (BLM) within the study area. Northern Leopard Frogs (*Rana pipiens*) were found at three separate locations on the Minidoka National Wildlife Refuge, and an additional observation was contributed from Murtaugh Lake. One additional incidental observation of a Western Toad (*Bufo boreas*) was reported along Big Cottonwood Creek by an IDFG employee stationed at the Big Cottonwood Wildlife Management Area (BCWMA), but this observation has not been confirmed through specimen or photograph voucher. For most cases we only sampled survey sites once throughout the study, and it is important to realize the failure to detect a particular species does not indicate that species is absent from a site.

Distribution

Throughout the study area we surveyed 49 sites; 29 terrestrial and 20 aquatic/wetlands. We detected amphibian or reptile species in 10 of the wetland sites (50%) and in 19 of the terrestrial sites (66%). The Minidoka National Wildlife Refuge proved to be a "hotspot" for amphibian observations, while the South Hills area (i.e. Big Cottonwood Canyon, Big Cedar Canyon, Little Cedar Canyon, Robber Gulch, Buckhorn Canyon, and Mountain Road) near the BCWMA represented the area with the most common and diverse reptile observations.

Relative Abundance

Of the 543 amphibian and reptile observations made throughout the study area, Pacific Treefrogs (*Pseudacris regilla*) exhibited the highest relative abundance representing 42% of the total number of observations (56% of all amphibian observations) (Figure 3). Many of these observations were of tadpoles and it is important to realize that not all of these individuals may metamorphose, mature, and subsequently contribute to the population. Interestingly, Northern Leopard Frogs, which are considered a Sensitive Species (BLM) and Species of Special Concern (IDFG), exhibited the second highest relative abundance in the study area representing 24% of the total number of observations (33% of all amphibian observations). Contrary to the Pacific Treefrog, the majority of Northern Leopard Frog observations were metamorphs that have already overcome the initial hardships of metamorphosing from tadpoles. Western Fence Lizards (*Sceloporus occidentalis*) had the highest relative abundance of any lizard species representing 55% of all lizard observations, but only contributed 8% to the total number of observations made throughout the study area (Figure 4). Gopher Snakes (*Pituophis catenifer*) had the highest relative abundance of any snake species detected throughout the study area representing 38% of all snake observations, but only contributed 4% to the total number of observations made throughout the study area (Figure 5).

Habitat Relationships

Of the nine major Idaho Gap Analysis categories for vegetation and cover classification, we identified six (Agricultural, Non-Forested Lands, Forest Uplands, Water, Riparian and Wetland Areas, and Barren Land) of these categories within the sites

we surveyed in our study (Table 4). Species occurrence throughout these recognized vegetation and cover classifications was fairly limited to one or two different habitat types, with the Non-forested Lands (specifically the Xeric Shrubland sub-category) providing the most utilized habitat (Table 5). The majority of species we identified in this study are habitat generalists (Stebbins 1985) and are not expected to be associated specifically with certain habitat types. Western Terrestrial Garter Snakes *(Thamnophis elegans*) and Racers (*Coluber constrictor*) were both considerably widespread with respect to habitat preference. We observed both species in three different vegetation and cover categories.

Species Accounts

Tiger Salamander (*Ambystoma tigrinum*)

The observed distribution of Tiger Salamanders was very limited and centered primarily at Sagehen Spring pond. We found 12 larvae at Sagehen Spring pond. There were contributed observations from this site of 34 larvae, two metamorphs, and a single adult. There was an additional contributed observation of a single adult found at gravel pits near Rock Creek, south of Hansen, ID. This species is not considered Sensitive or of Special Concern, however these observations do suggest a westward extension of this species currently understood state distribution.

Pacific Treefrog *(Pseudacris regilla)*

This species was the most abundant and widespread species detected in the study area. This species was locally very abundant in some sites such as

Independence Lake 3 where 200+ larvae were observed, while in other sites such as the spring below Curtis Reservoir, only a single individual was detected. We observed 219 larvae, four metamorphs, and seven adults. Three additional observations were contributed by BLM and IDFG employees.

Boreal Chorus Frog (*Pseudacris maculata*)

This species' distribution was limited throughout the study area, and was detected in only one site near the Minidoka Wildlife Refuge Headquarters. A single metamorph was observed at this site. One additional observation of this species at Murtaugh Lake was contributed by a BLM employee.

Northern Leopard Frog *(Rana pipiens)*

The observed distribution of this species was limited to three separate wetland sites at the Minidoka Wildlife Refuge. This species holds the status of Sensitive (BLM) and Species of Special Concern (IDFG) for the state of Idaho, however it was the second most abundant species found within the study area. We detected three larvae, 129 metamorphs, and two adults. A single additional observation from Murtaugh Lake was contributed by a BLM employee.

Longnose Leopard Lizard (*Gambelia wislizenii*)

This species' observed distribution was limited to an area of exposed rocky desert north of the Minidoka National Wildlife Refuge Headquarters. The number of individuals observed was low, with only one juvenile and three adults found at this site.

Side-blotched Lizard (*Uta stansburiana*)

The observed distribution of this species was limited with only two observations made throughout the study area. One juvenile was detected in Big Cedar Canyon and an additional juvenile was detected in sagebrush-steppe uplands near Curtis Reservoir .

Sagebrush Lizard (*Sceloporus graciosus*)

This species exhibited an intermediate distribution, which was mostly concentrated around the City of Rocks National Reserve, Emery Creek, and an access road near McClendon Springs. This species was the second most abundant lizard encountered during our surveys with six juvenile and 20 adult observations.

Western Fence Lizard *(Sceloporus occidentalis)*

The observed distribution of this species was widespread with the majority of observations made in habitat dominated by talus slopes and exposed rocks in the South Hills, particularly in Big Cottonwood Canyon, Big Cedar Canyon, and Little Cedar Canyon. This species was the most abundant lizard species encountered throughout the study area with 12 juvenile and 32 adult observations.

Western Skink (*Eumeces skiltonianus*)

This species was not detected in any of the sites that we surveyed. A single observation was contributed by BLM employees from the Chokecherry Canyon area.

Western Whiptail (*Cnemidophorus tigris*)

The observed distribution of this species was limited to one site in Little Cedar Canyon and one observation from an access road near McClendon Springs. This species' observed abundance was considerably low with only three juvenile and one adult observations made throughout the study area.

Racer *(Coluber constrictor)*

The observed distribution of this species was intermediate with the majority of sightings occurring around wetlands or riparian areas such as the pond surveyed in Big Cottonwood Canyon and near the stream in Cave Canyon. We detected four juveniles and three adults throughout the study area.

Striped Whipsnake (*Masticophis taeniatus*)

The observed distribution of this species was intermediate with no particular area of concentrated observations. We observed four juveniles and three adults throughout the study area.

Gopher Snake *(Pituophis catenifer)*

The observed distribution of this species was primarily limited to the South Hills particularly on roads near the BCWMA and surrounding canyons. This species was the most abundant snake species found throughout the study area with 12 juvenile and nine adult observations. A number of these observations were road killed individuals.

Western Terrestrial Garter Snake *(Thamnophis elegans)*

The observed distribution of this species was widespread with individuals detected in most of the regions surveyed throughout the study area. This species was the second most abundant snake species detected with nine juvenile and six adult observations.

Western Rattlesnake (*Crotalus viridis*)

The observed distribution of this species was limited primarily to the roads near BCWMA, and a single observation from Bobcat Canyon on the Minidoka National Wildlife Refuge. We detected two juveniles and three adults throughout the study area.

Acknowledgements

We would like to thank Paul Makela (BLM Burley Field Office) and Mike McDonald (IDFG Magic Valley Region) for the opportunity to perform this study. Funding was provided via Idaho's BLM Challenge Cost Share Program and the IDFG provided a vehicle and housing for the fieldwork. Ted Scherff (Idaho State Parks and Recreation, National Park Service) provided useful information concerning historical observations and suggestions for potential survey sites at the City of Rocks National Reserve. Steve Bouffard (USFWS) provided housing and transportation while surveying the Minidoka National Wildlife Refuge, and also provided valuable information concerning historical observations and suggestions for potential survey sites. We would like to thank Rob Wilson for contributed observations and for the initial tour of the canyons near the BCWMA. Will Hayes spent a few days in the field surveying sites and his help was greatly appreciated. We want to thank Carl Austin for the opportunity to survey on his private ranch, and also for pointing out the areas on the ranch where previous casual observations have been made.

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Table 1. Idaho Gap Analysis categories found within the study area. The row headings represent the major areas in southcentral Idaho that were surveyed during this study. The column headings denote the major land cover classifications from the Idaho Gap Analysis that were present in the study area. The numbers in each cell represent the sub-categories in each of the major land classifications that were observed in each surveyed area (2000= Agricultural, 33XX= Xeric shrublands, 41XX= Broadleaf Forest, 42XX= Needleleaf Forest, 5000= Water, 61XX= Forested Riparian, 62XX= Non-forested Riparian, 63XX= Wetlands, 7300= Exposed Rock, 7301= Lava). Within each of these areas there may have been more than one site surveyed, and the data presented here reflect all of the habitat types encountered within each of these larger areas.

	Agricultural	Non-Forested Lands	Forest Uplands	Water	Riparian and Wetland Areas	Barren Land
Big Cottonwood Canyon	2000	33XX	41XX	5000	61XX, 63XX	
Cave Canyon		33XX	41XX			
Big Cedar Canyon		33XX	41XX			
Little Cedar Canyon		33XX				
Robber Gulch		33XX				
Buckhorn Canyon		33XX				
Goose Creek Reservoir						7301
Emery Creek		33XX	41XX			
Austin Ranch	2000	33XX			63XX	
Curtis Reservoir		33XX				
Sagehen Spring		33XX			63XX	
Cooper Property					62XX	
N. Cottonwood Cr. Reservoir				5000	63XX	
City of Rocks		33XX	41XX		62XX	7300
Minidoka Wildlife Refuge		33XX		5000	62XX, 63XX	
Raft River (BLM Exclosure)		33XX			62XX	
Independence Lakes			42XX	5000		
Sublett Reservoir		33XX		5000	62XX	
McClendon Springs		33XX			61XX	

Table 2. Species occurrence by Idaho Gap Analysis categories. The row headings represent all species that were observed in our surveys, and do not reflect any contributed observations from outside sources. The column headings denote the major land cover classifications from the Idaho Gap Analysis that were present in the study area. The numbers in each cell represent the sub-category code for each of the major land classifications where those species were observed (2000= Agricultural, 33XX= Xeric shrublands, 41XX= Broadleaf Forest, 5000= Water, 61XX= Forested Riparian, 62XX= Non-forested Riparian, 63XX= Wetlands, 7300= Exposed Rock, 7301= Lava).

	Agricultural	Non-Forested Lands	Forest Uplands	Water	Riparian and Wetland Areas	Barren Land
Tiger Salamander					63XX	
Pacific Treefrog	2000			5000	63XX	
Boreal Chorus Frog					61XX	
Northern Leopard Frog					61XX, 63XX	
Longnose Leopard Lizard		33XX				
Side-blotched Lizard		33XX				
Sagebrush Lizard		33XX				7300
Western Fence Lizard		33XX	41XX			7301
Western Whiptail		33XX				
Racer		33XX	41XX		62XX, 63XX	
Striped Whipsnake		33XX				7301
Gopher Snake	2000					
Western Terrestrial Garter Snake		33XX		5000	62XX, 63XX	
Western Rattlesnake		33XX				

Table 3. Amphibian species summary table. This table provides concise information about potential and observed amphibian species with their corresponding legal status, and summarizes the study results by distribution, estimated abundance, type of voucher taken, successful survey techniques (ranked), and the observed life stages. The data in this table do not reflect any contributed observations. The ratio in the distribution column denotes the number of wetland sites where this species was observed out of the total surveyed.

Common Name	Scientific Name	Status	Distribution*	Estimated Abundance*	Voucher	Successful Sampling Techniques*	Comments
Confirmed							
Tiger Salamander	*Ambystoma tigrinum*		Limited (1/20)	Uncommon		visual encounters, aquatic funnel traps	larvae, metamorphs, adults
Pacific Treefrog	*Pseudacris regilla*		Limited (5/20)	Abundant		visual encounters, aquatic funnel traps, incidental observations	larvae, metamorphs, adults
Boreal Chorus Frog	*Pseudacris maculata*		Limited (1/20)	Uncommon		visual encounters	metamorphs
Northern Leopard Frog	*Rana pipiens*	S, SC	Limited (3/20)	Uncommon	photograph	visual encounters, incidental observations	larvae, metamorphs, adults
Possible							
Western Toad	*Bufo boreas*	S, SC					
Great Basin Spadefoot Toad	*Spea intermontana*						
Columbia Spotted Frog	*Rana pretiosa*	S, SC					
Classification Information:							
Names Based on Integrated		Based on Rankings	Widespread	Abundant	museum specimen	Techniques Employed:	Life Stages:
Taxonomic Information		from the Idaho	Intermediate	Common	photograph	visual encounter	eggs
System (ITIS) website 2001		Conservation Data	Limited	Uncommon		aquatic funnel traps	larvae
		Center 2001		Rare		road driving	metamorph
			* based on this	* based on this		incidental observation	juvenile
		S (BLM)= Sensitive	survey and	survey and		*ranked by success	adult
		Species	recently	recently			
		SC (IDFG)= Species	contributed	contributed			
		of Special Concern	observations	observations			

Table 4. Lizard species summary table. This table provides concise information about potential and observed lizard species with their corresponding legal status, and summarizes the study results by distribution, estimated abundance, type of voucher taken, successful survey techniques (ranked), and the observed life stages. The data in this table do not reflect any contributed observations. The ratio in the distribution column denotes the number of terrestrial sites where this species was observed out of the total surveyed.

Common Name	Scientific Name	Status	Distribution*	Estimated Abundance*	Voucher	Successful Sampling Techniques*	Comments
Confirmed							
Longnose Leopard Lizard	*Gambelia wislizenii*		Limited (1/29)	Rare		visual encounters	juveniles, adults
Side-blotched Lizard	*Uta stansburiana*		Limited (1/29)	Rare		visual encounters	juveniles
Sagebrush Lizard	*Sceloporus graciosus*		Intermediate (6/29)	Abundant		visual encounters, road driving, incidental observations	juveniles, adults
Western Fence Lizard	*Sceloporus occidentalis*		Widespread (14/29)	Abundant		visual encounters, road driving, incidental observations	juveniles, adults
Western Whiptail	*Cnemidophorus tigris*		Limited (1/29)	Rare		visual encounters, road driving	juveniles, adults
Possible							
Short-Horned Lizard	*Phrynosoma douglassii*						
Desert Horned Lizard	*Phrynosoma platyrhinos*						
Western Skink	*Eumeces skiltonianus*						
Classification Information:							
Names Based on Integrated		Based on Rankings	Widespread	Abundant	museum specimen	Techniques Employed:	Life Stages:
Taxonomic Information		from the Idaho	Intermediate	Common	photograph	visual encounters	juveniles
System (ITIS) website 2001		Conservation Data	Limited	Uncommon		road driving	adults
		Center 2001		Rare		aquatic funnel traps	
			* based on this	* based on this		incidental observation	
		S (BLM)= Sensitive	survey and	survey and			
		Species	recently	recently			
		SC (IDFG)= Species	contributed	contributed			
		of Special Concern	observations	observations			

Table 5. Snake species summary table. This table provides concise information about potential and observed snake species with their corresponding legal status, and summarizes the study results by distribution, estimated abundance, type of voucher taken, successful survey techniques (ranked), and the observed life stages. The data in this table do not reflect any contributed observations. The ratio in the distribution column denotes the number of survey sites where this species was observed out of the total surveyed (all sites were included for those species which may be found terrestrially or at wetlands).

Common Name	Scientific Name	Status	Distribution*	Estimated Abundance*	Voucher	Successful Sampling Techniques*	Comments
Confirmed							
Racer	*Coluber constrictor*		Intermediate (4/49)	Common		visual encounters, road driving, incidental observations	juveniles, adults
Striped Whipsnake	*Masticophis taeniatus*		Intermediate (2/49)	Common		visual encounters, road driving	juveniles, adults
Gopher Snake	*Pituophis catenifer*		Widespread (2/29)	Abundant		visual encounters, road driving, incidental observations	juveniles, adults
Western Terrestrial Garter Snake	*Thamnophis elegans*		Widespread (8/49)	Abundant		visual encounters, road driving, aquatic funnel traps, incidental observations	juveniles, adults
Western Rattlesnake	*Crotalus viridis*		Intermediate (1/29)	Common		visual encounters, road driving	juveniles, adults
Possible							
Rubber Boa	*Charina bottae*						
Longnose Snake	*Rhinocheilus lecontei*	S, SC					
Ringneck Snake	*Diadophis punctatus*	S, SC					
Ground Snake	*Sonora semiannulata*	S, SC					
Night Snake	*Hypsiglena torquata*						
Common Garter Snake	*Thamnophis sirtalis*						
Classification Information:		Based on Rankings	Widespread	Abundant	museum specimen	Techniques Employed:	Life Stages:
Names Based on Integrated		from the Idaho	Intermediate	Common	photograph	visual encounters	juveniles
Taxonomic Information		Conservation Data	Limited	Uncommon		road driving	adults
System (ITIS) website 2001		Center 2001		Rare		funnel traps	
			* based on this	* based on this		incidental observation	
		S (BLM)= Sensitive	survey and	survey and			
		Species	recently	recently			
		SC (IDFG)= Species	contributed	contributed			
		of Special Concern	observations	observations			

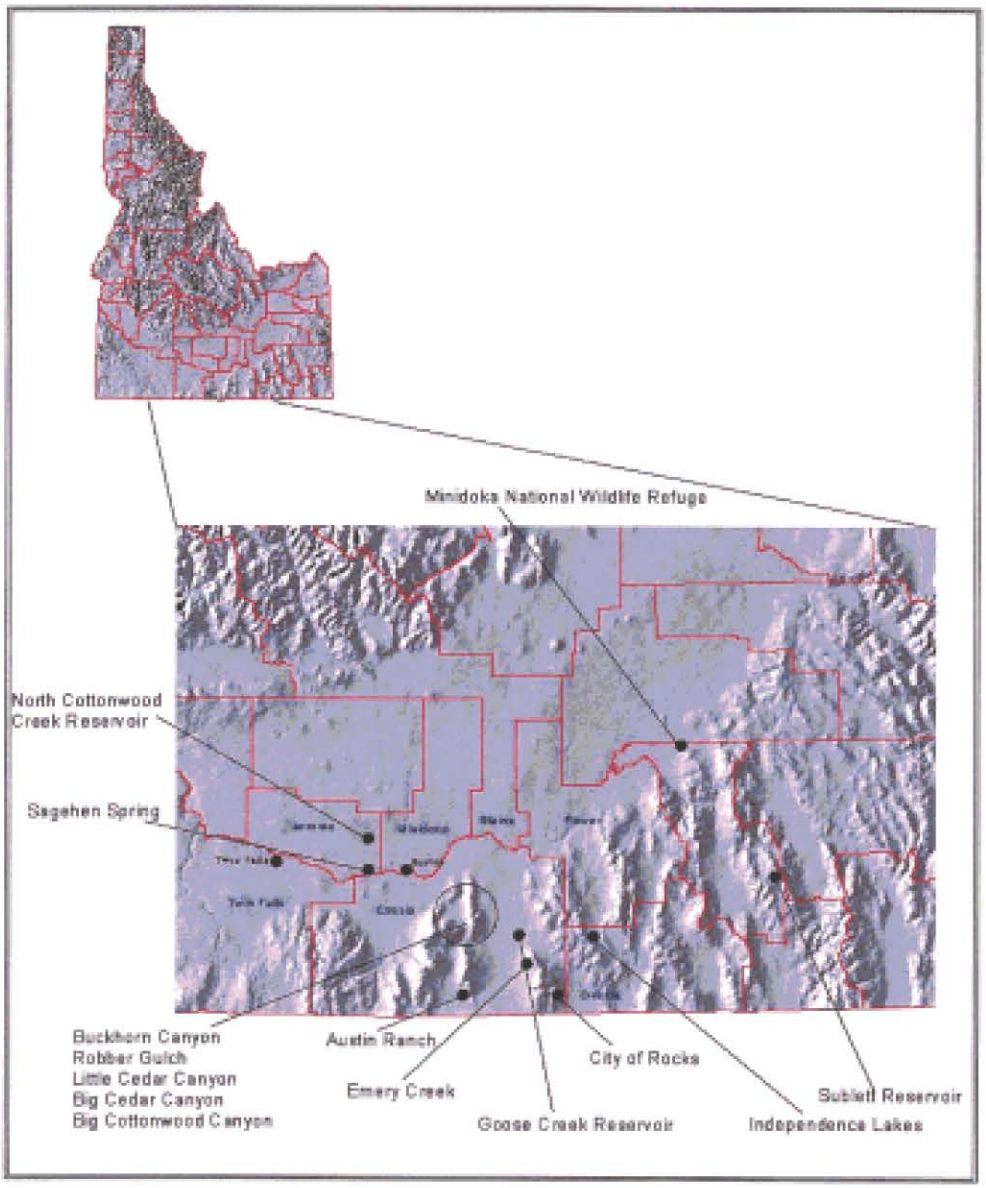


Figure 1. The southcentral region of the state showing the locations of the specific areas where we surveyed for amphibians and reptiles. The red lines delineated county boundaries and the county names are listed in blue. Twin Falls and Burley are shown for geographic reference.

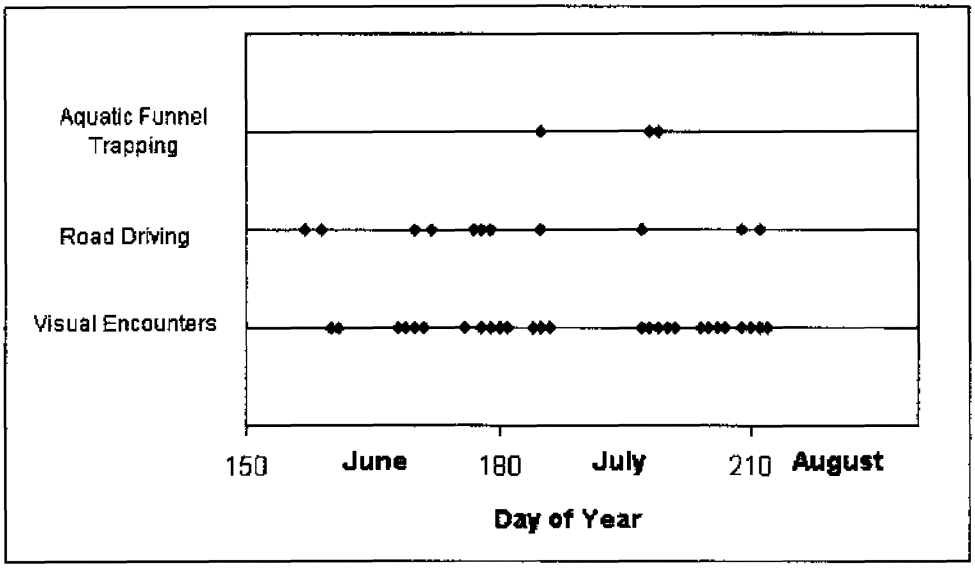
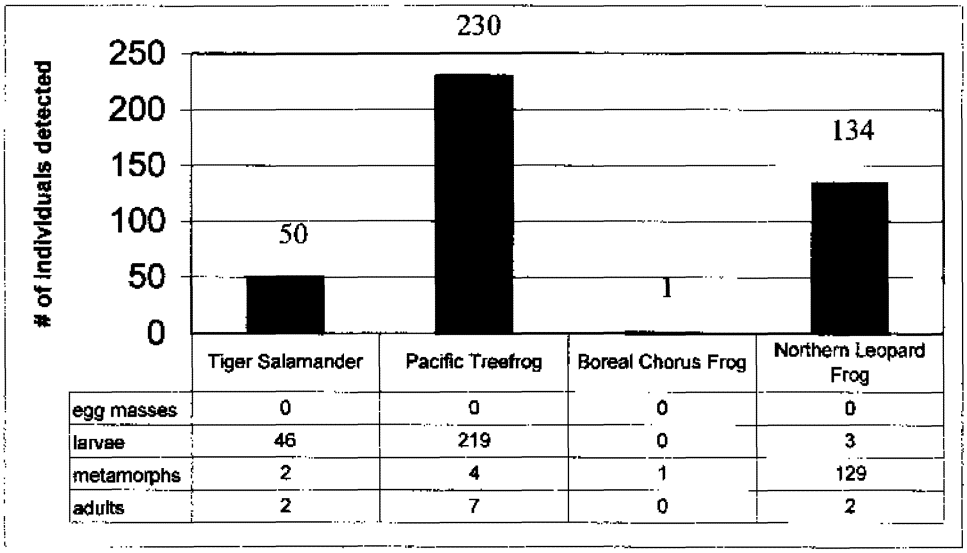


Figure 2. Days of the year when we surveyed and the corresponding sampling techniques used on those days.



	Tiger Salamander	Pacific Treefrog	Boreal Chorus Frog	Northern Leopard Frog
egg masses	0	0	0	0
larvae	46	219	0	3
metamorphs	2	4	1	129
adults	2	7	0	2

Figure 3. The amphibian species and corresponding life stages observed throughout the survey. These numbers do not reflect any contributed observational data that did not report a life stage with the submitted information.

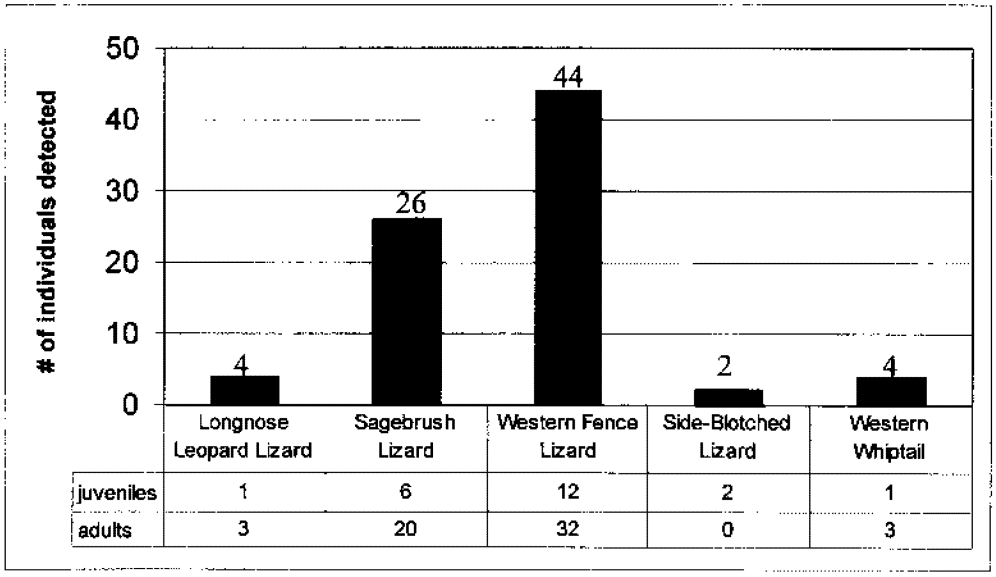


Figure 4. The lizard species and corresponding life stages observed throughout the survey. These numbers do not reflect any contributed observational data that did not report a life stage with the submitted information.

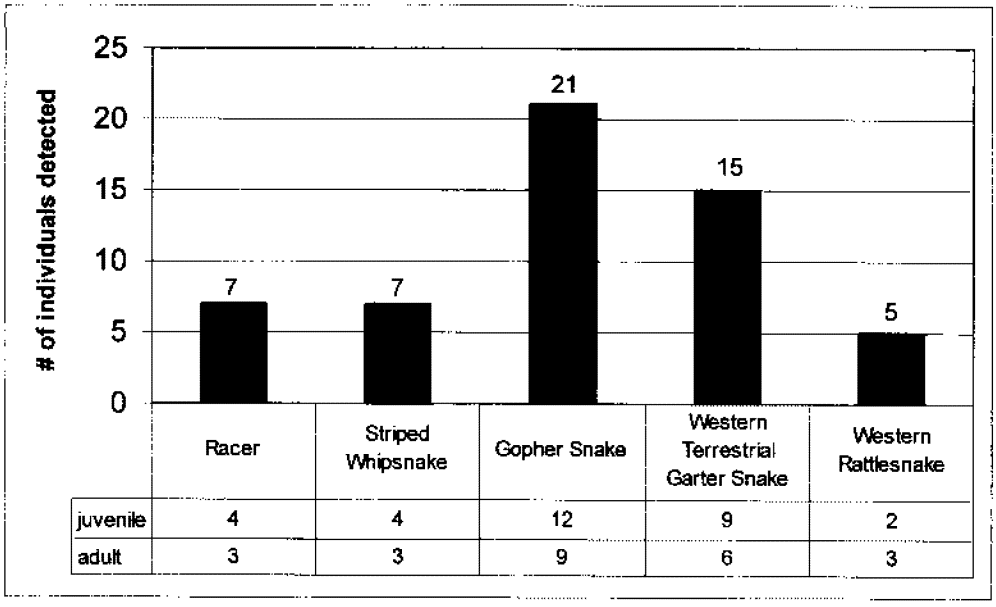


Figure 5. The snake species and corresponding life stages observed throughout the survey. These numbers do not reflect any contributed observational data that did not report a life stage with the submitted information.

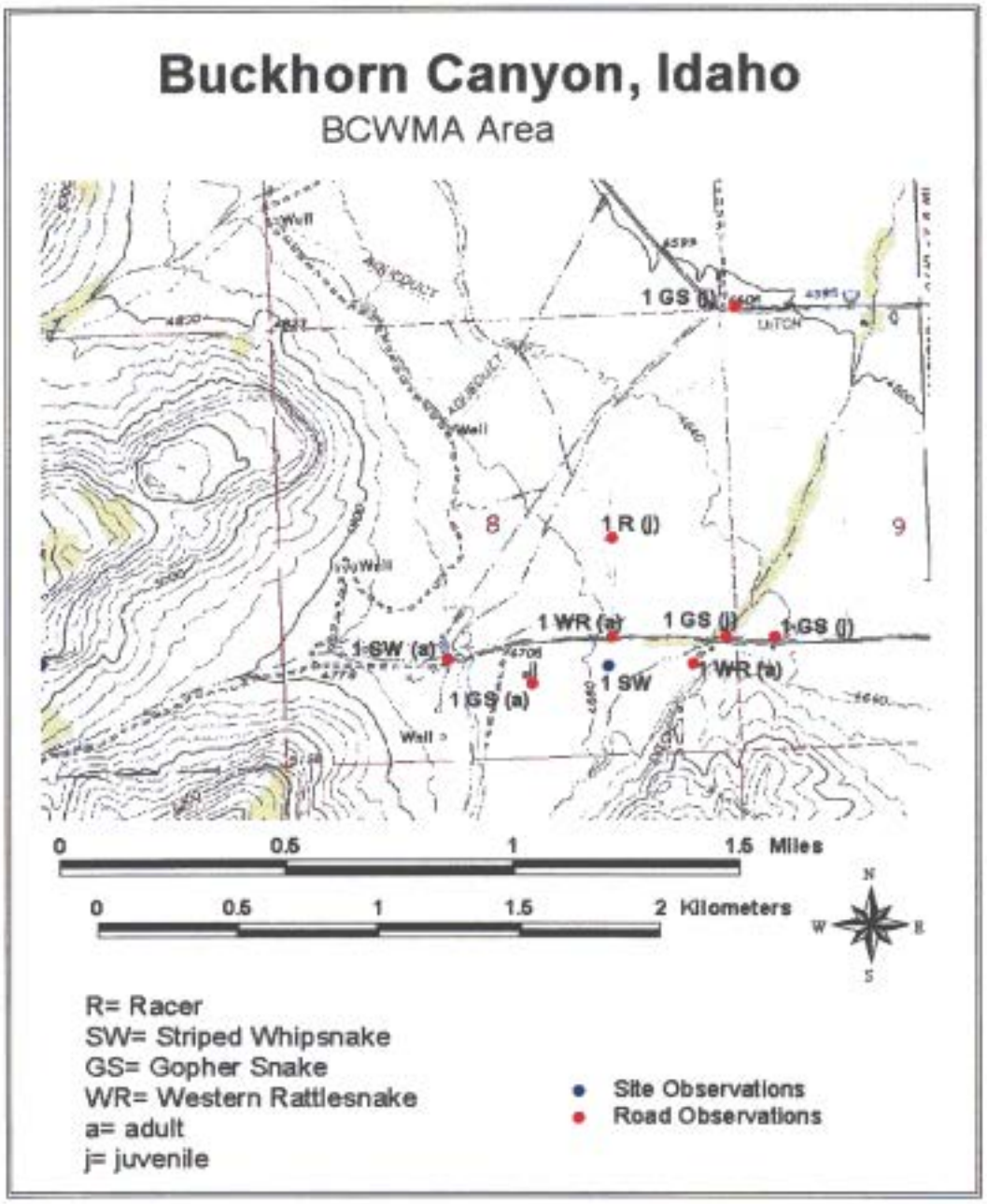


Figure 6. A portion of the Buckhorn Canyon Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

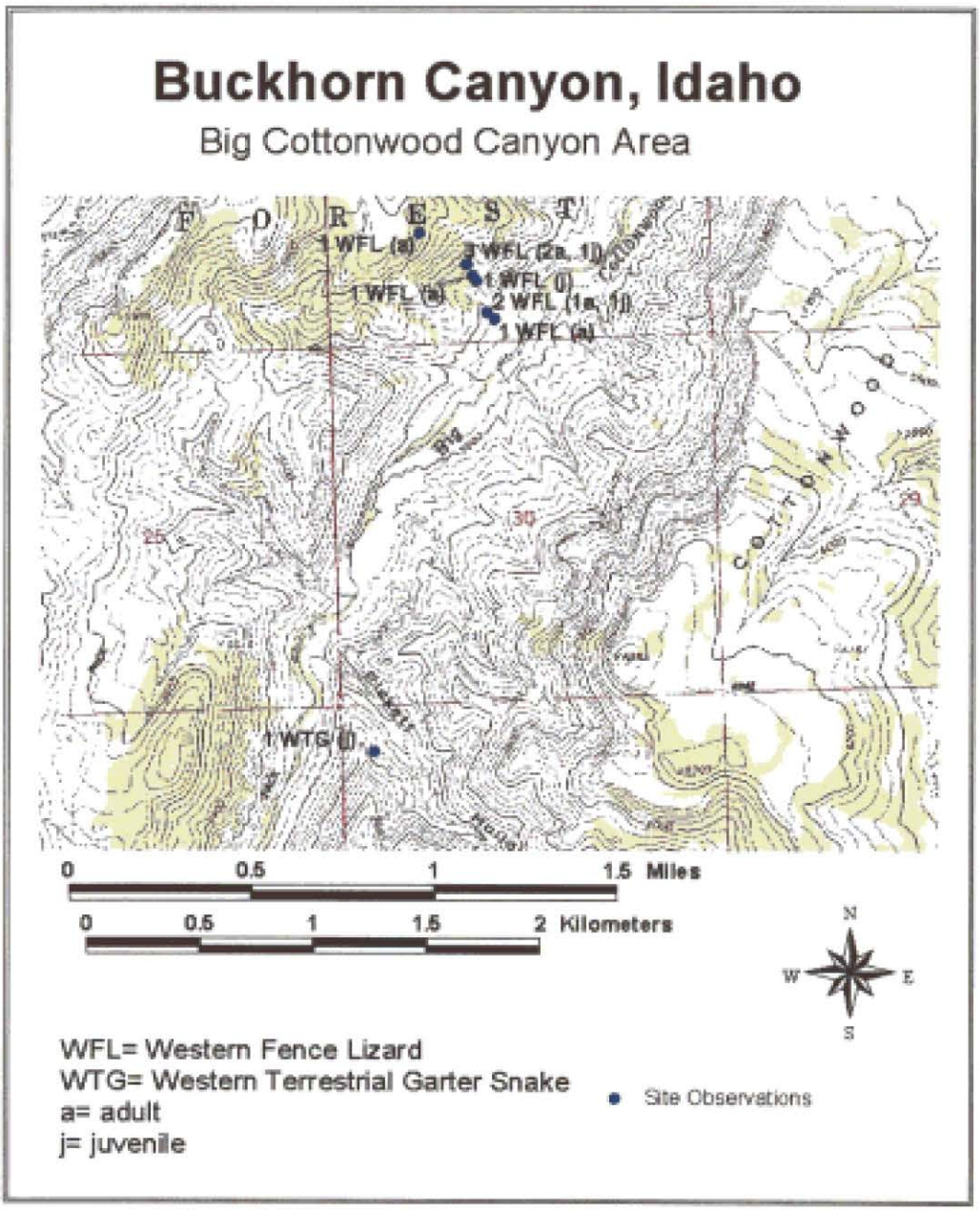


Figure 7. A portion of the Buckhorn Canyon Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

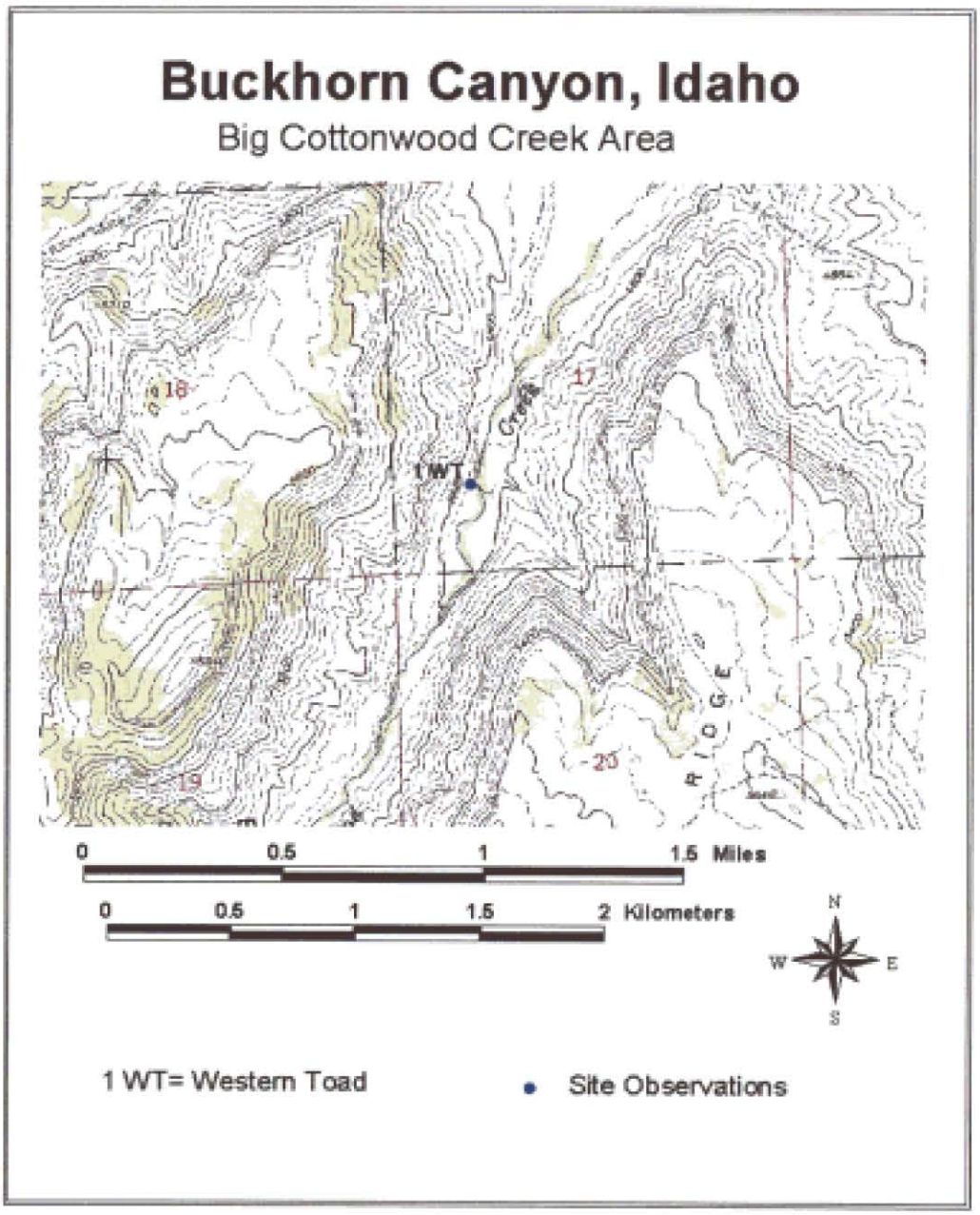


Figure 8. A portion of the Buckhorn Canyon Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

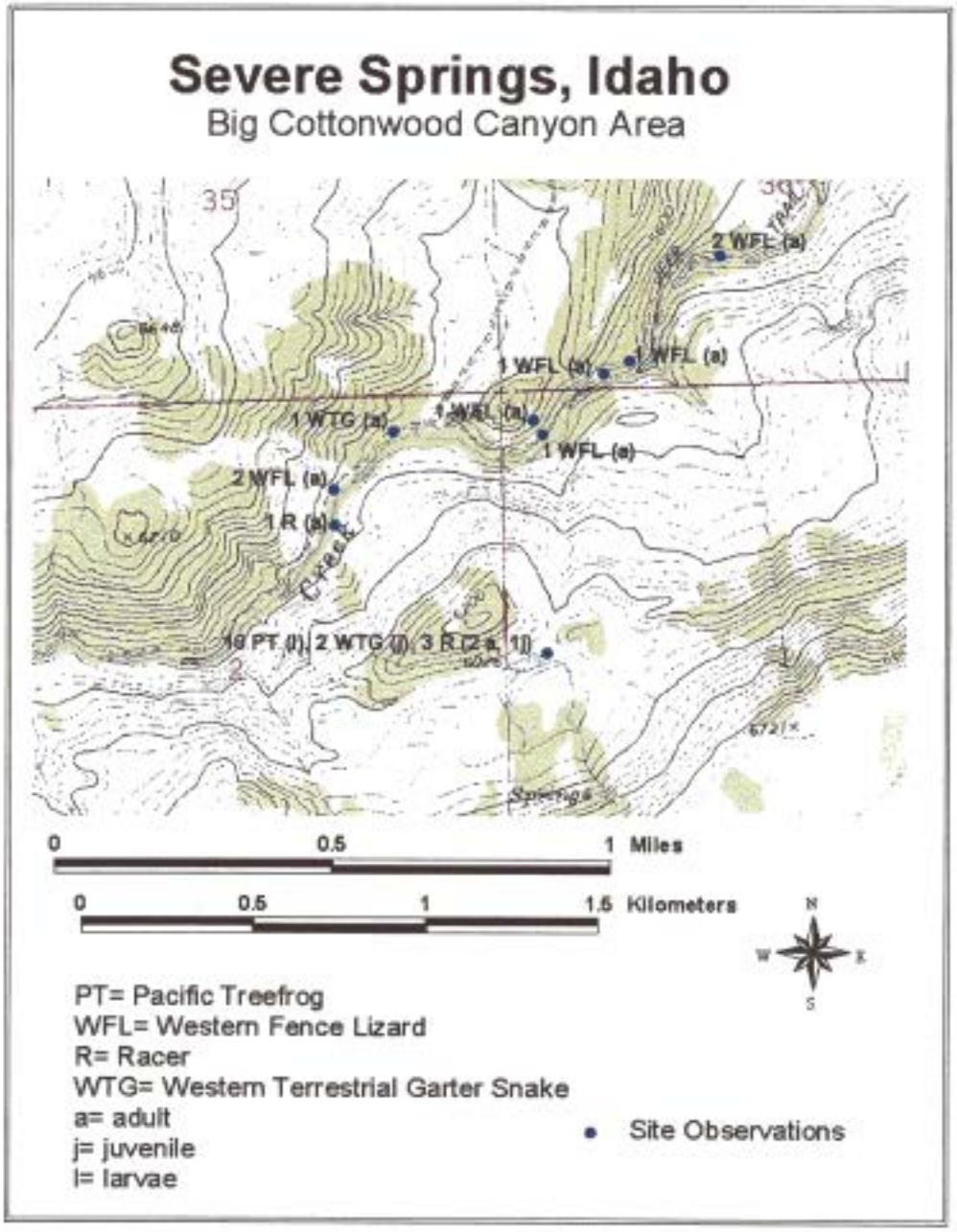


Figure 9. A portion of the Severe Springs Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

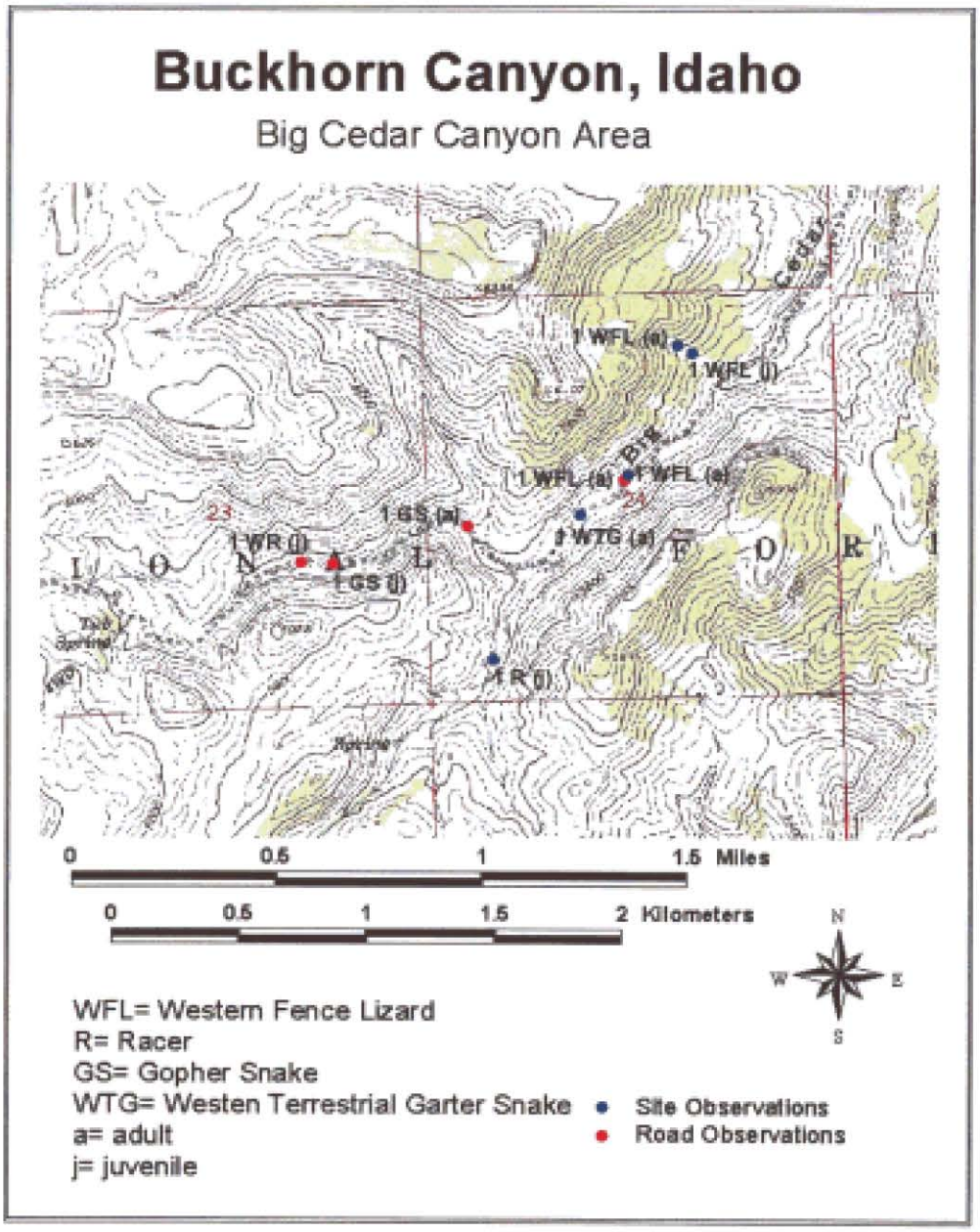


Figure 10. A portion of the Buckhorn Canyon Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

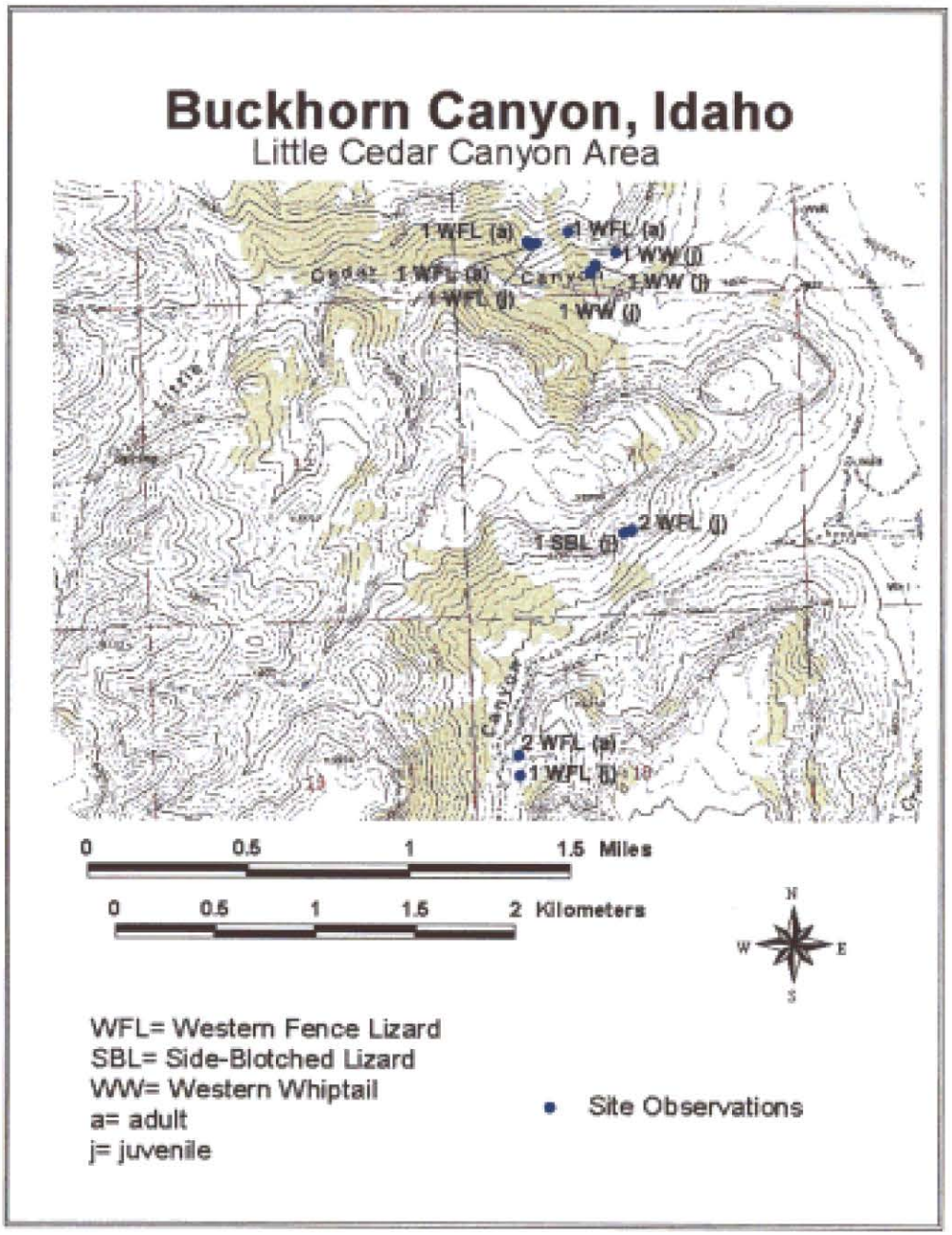


Figure 11. A portion of the Buckhorn Canyon Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

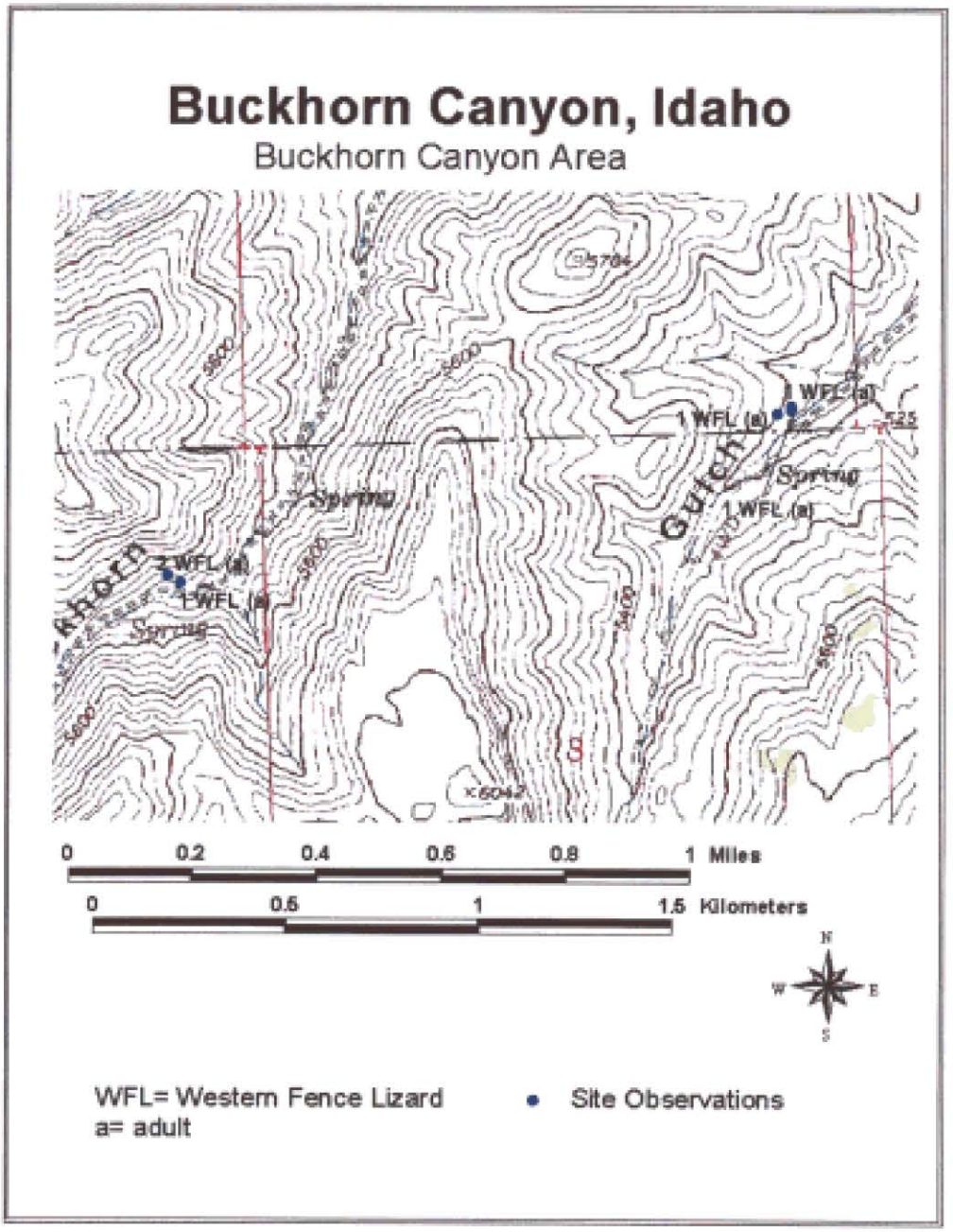


Figure 12. A portion of the Buckhorn Canyon Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

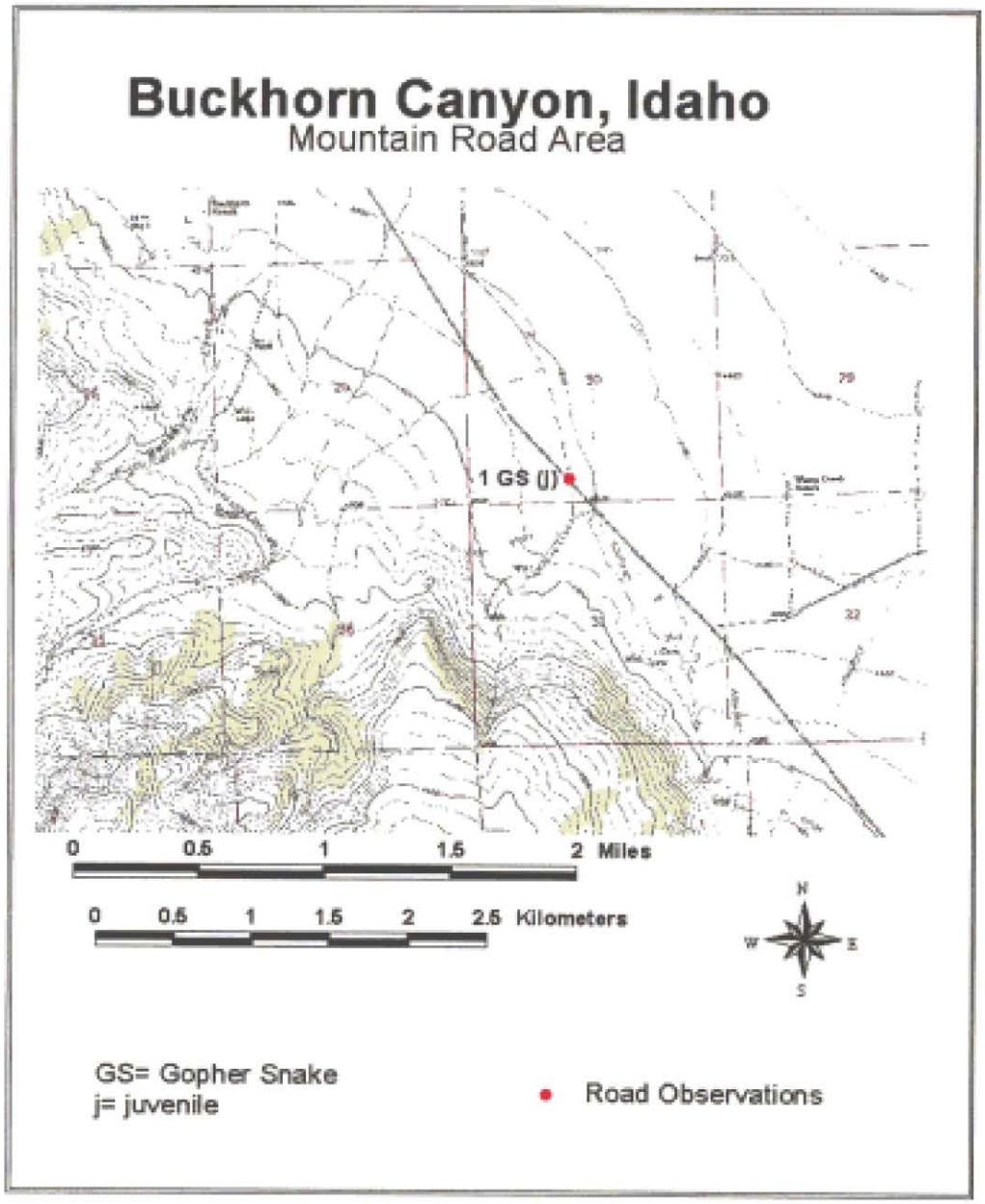


Figure 13. A portion of the Buckhorn Canyon Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

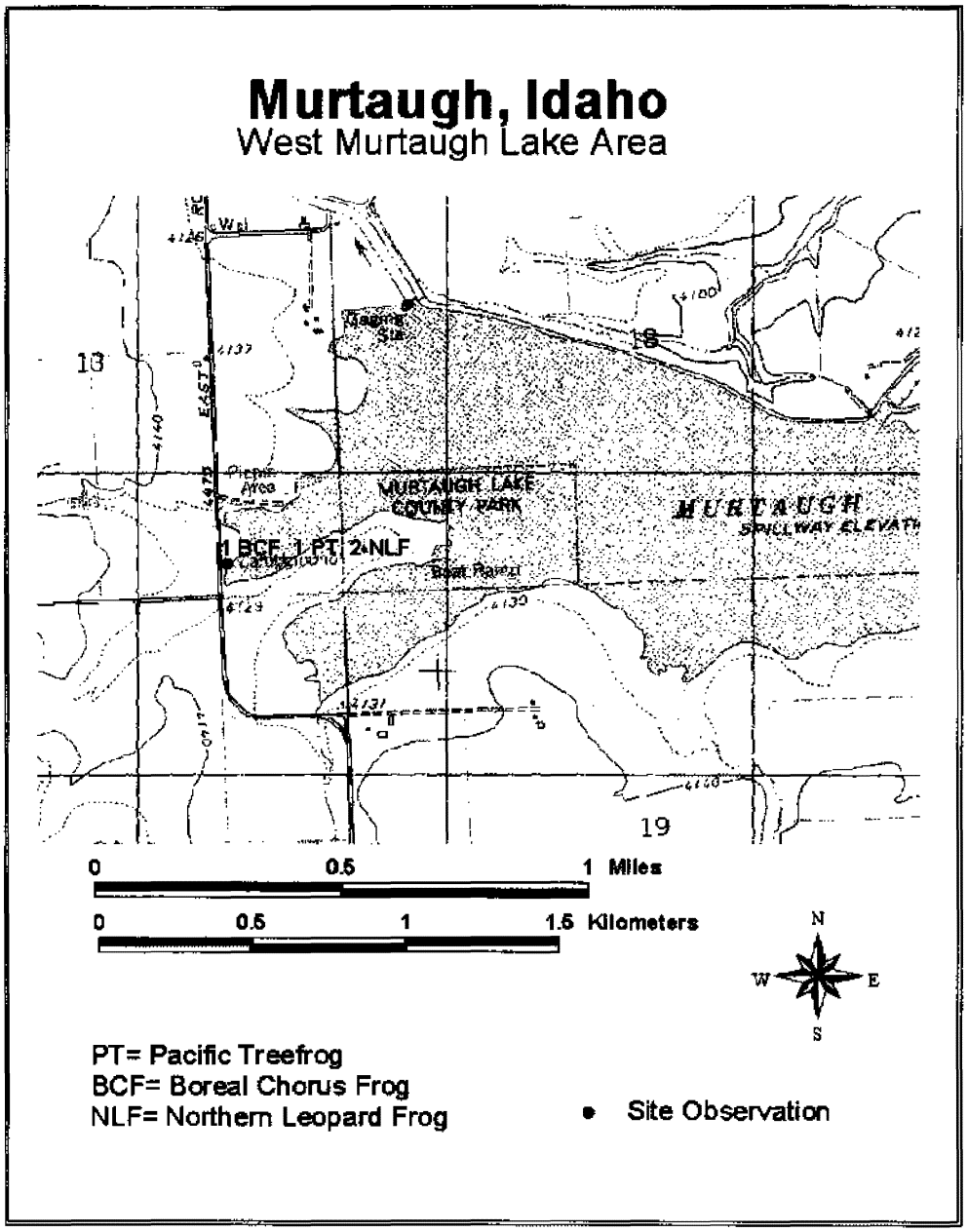


Figure 14. A portion of the Murtaugh Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages. These observations were contributed and do not represent observations from our survey

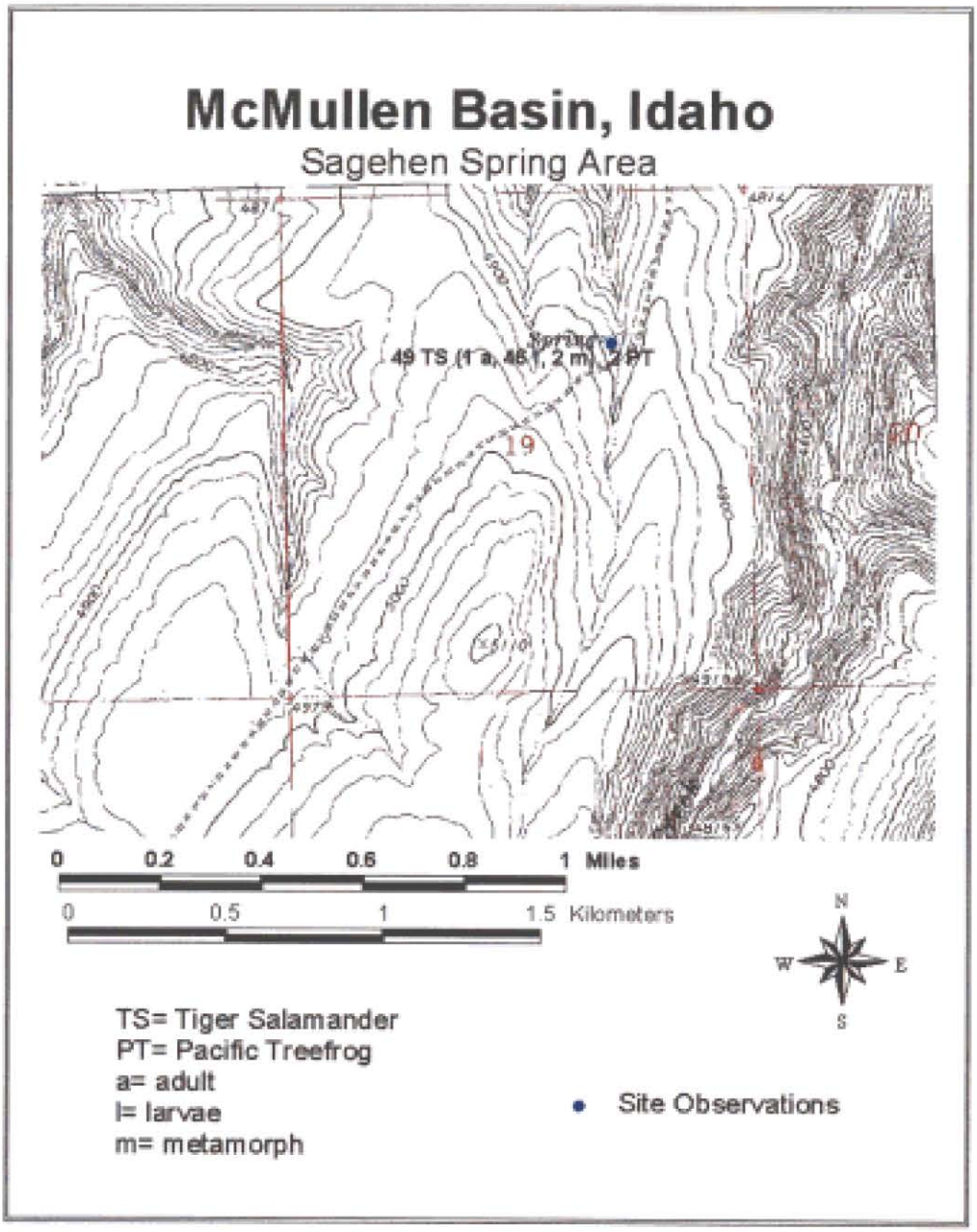


Figure 15. A portion of the McMullen Basin Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

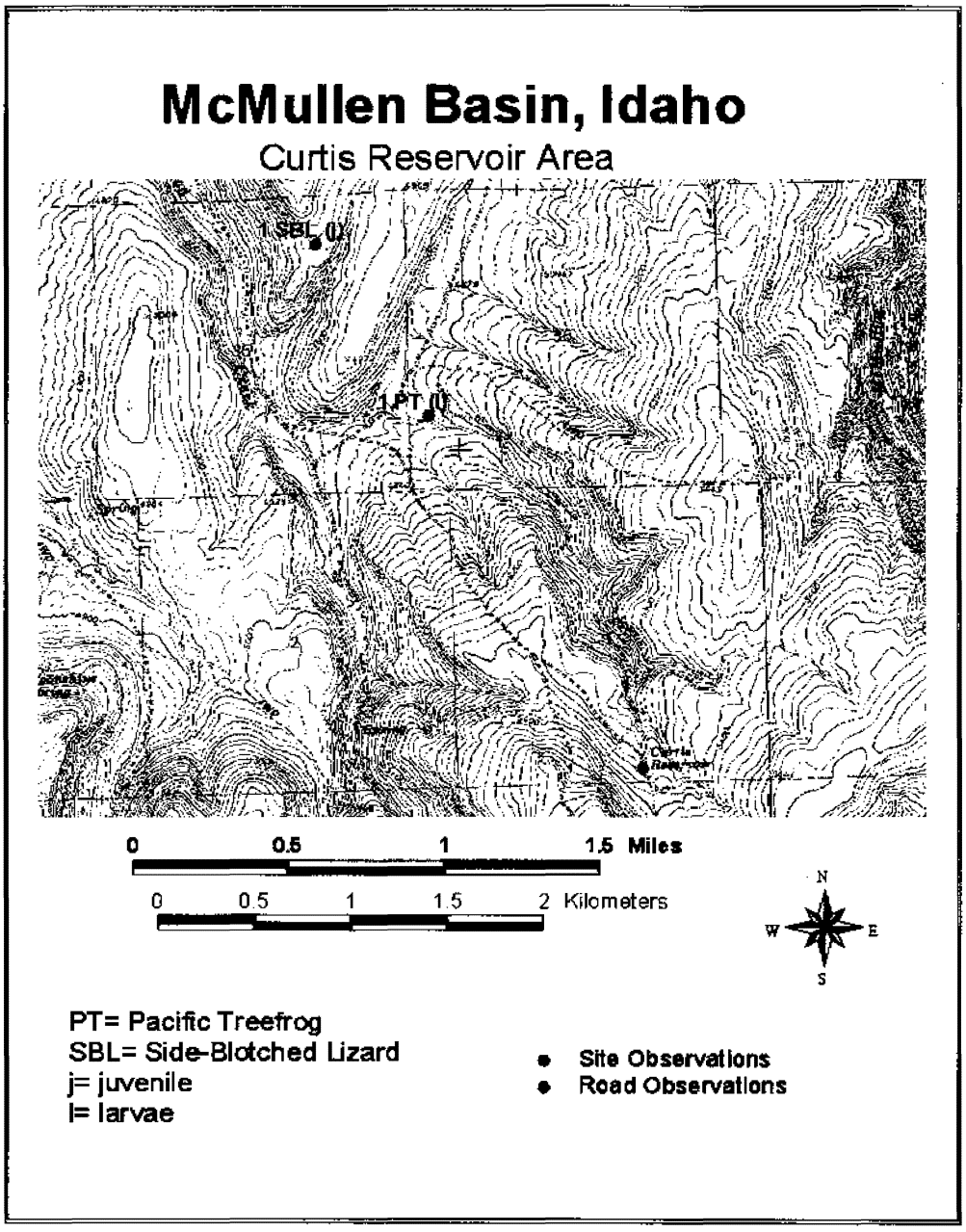


Figure 16. A portion of the McMullen Basin Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages. The site with no corresponding observation label shows the location of Curtis Reservoir, and no species were detected at this site.

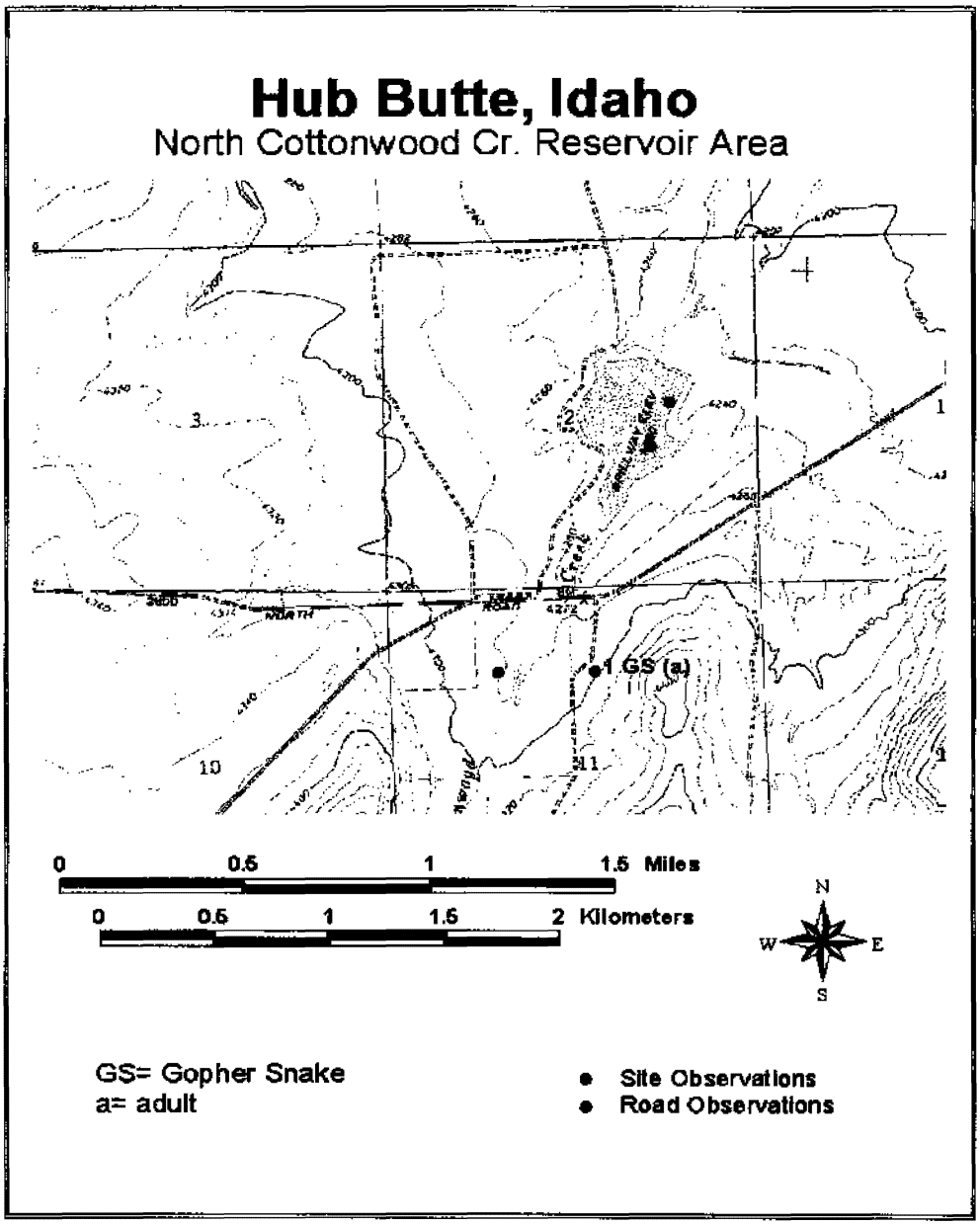


Figure 17. A portion of the Hub Butte Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages. The sites with no corresponding observation labels show the locations of the spring on Cooper's property and North Cottonwood Creek Reservoir. No species were detected at either site.

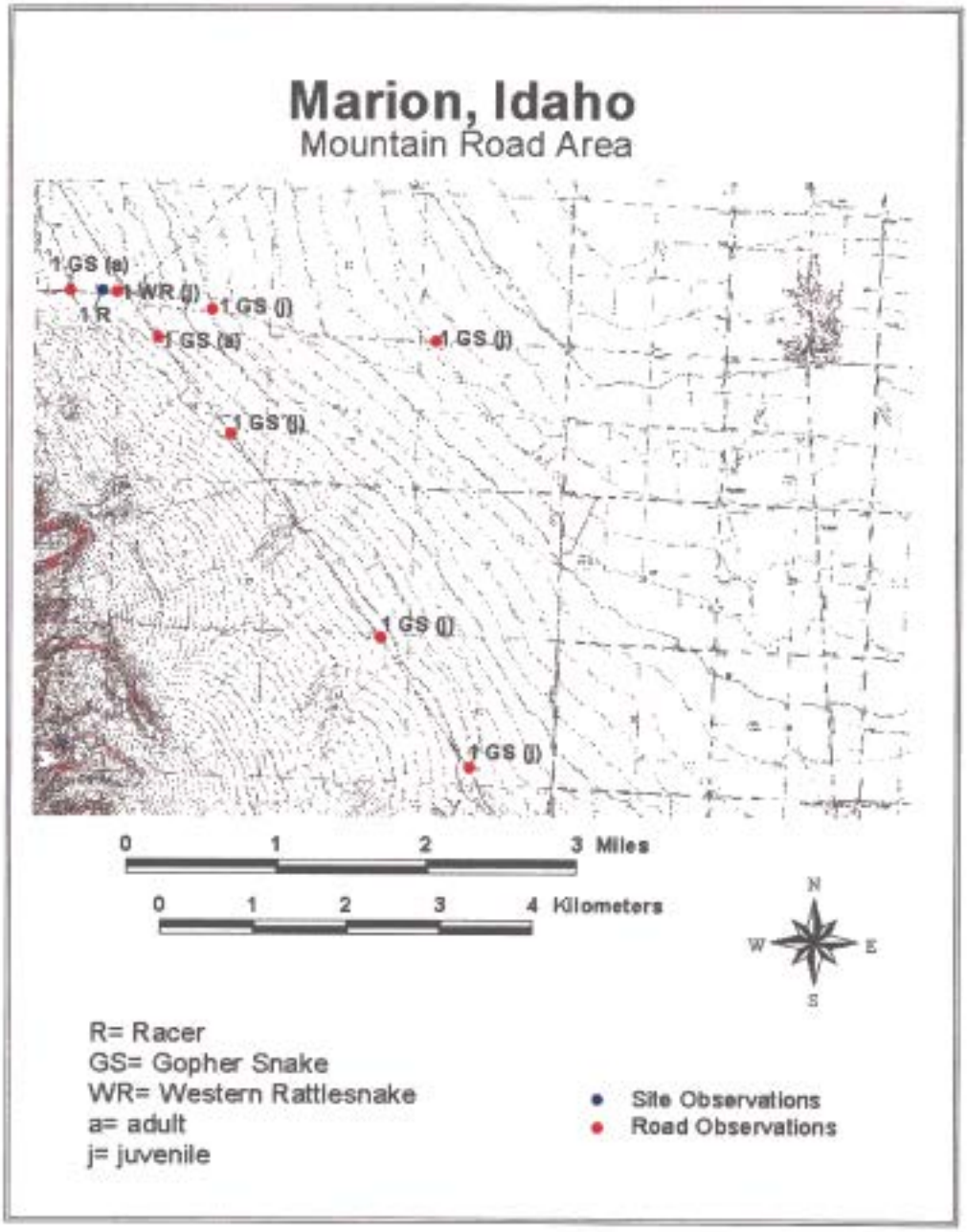


Figure 18. A portion of the Marion Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

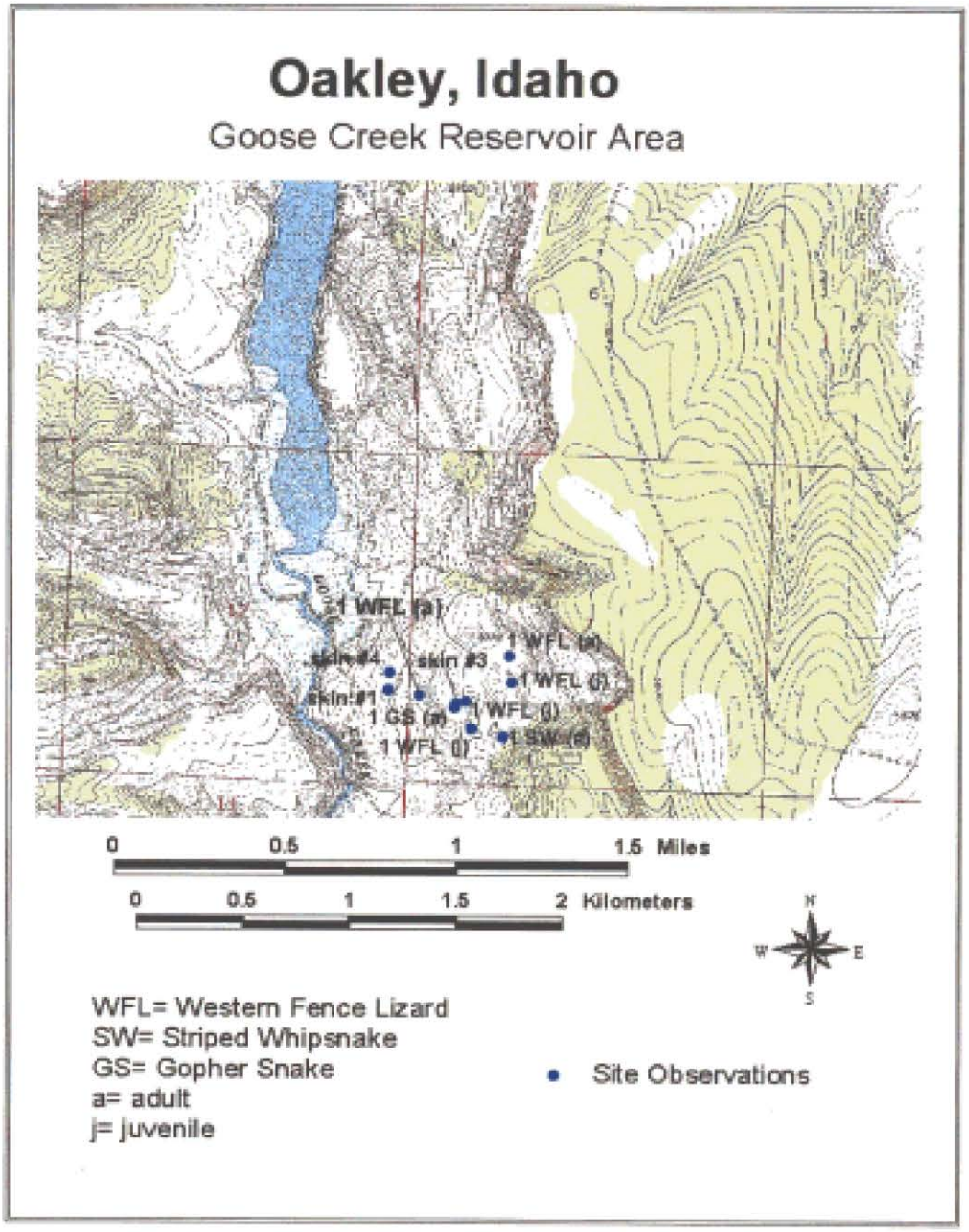


Figure 19. A portion of the Oakley Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages. Snake skins #1 and #4 were both identified as *Thamnophis*, however the species could not be determined. Snake skin #3 could not be accurately identified.

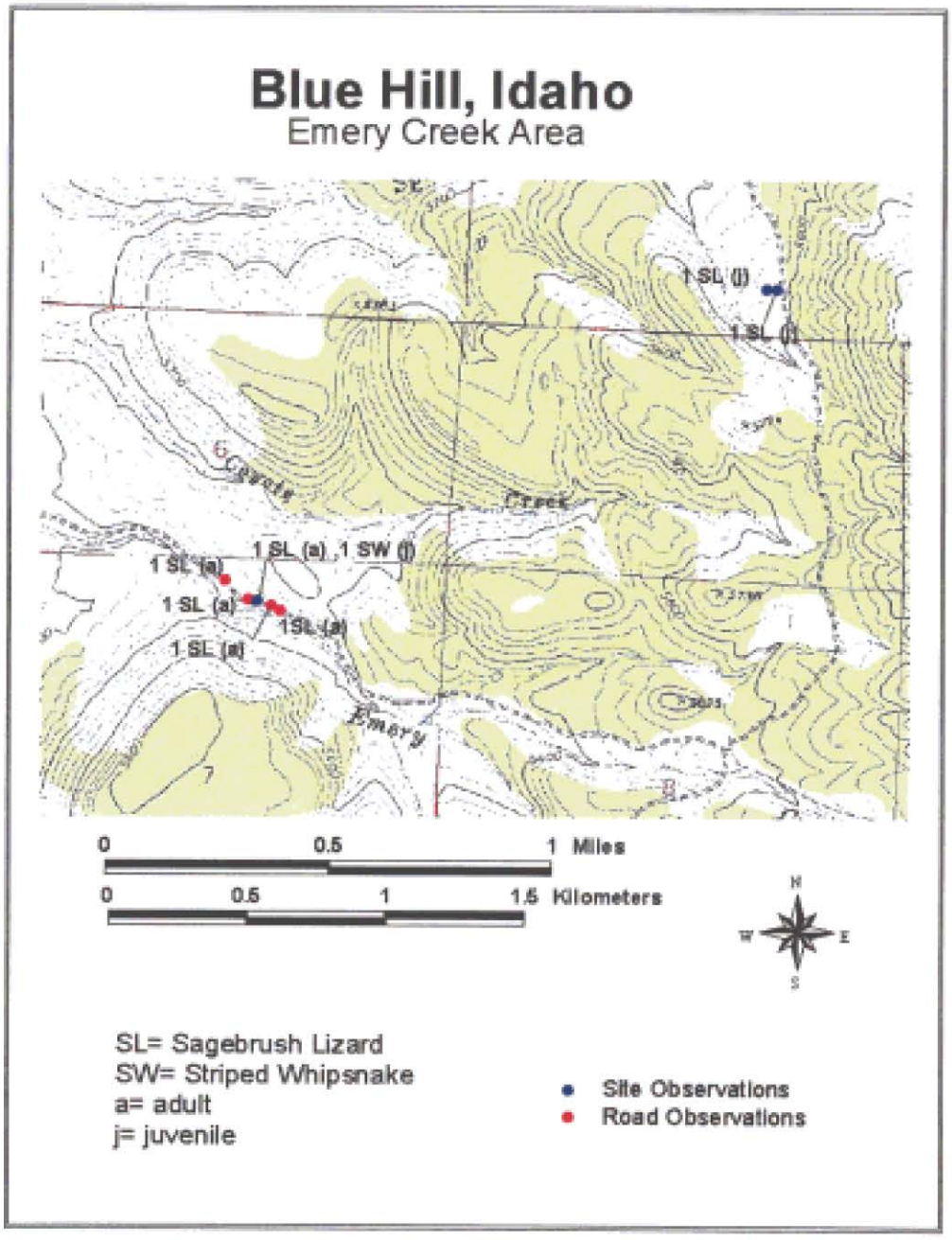


Figure 20. A portion of the Blue Hill Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

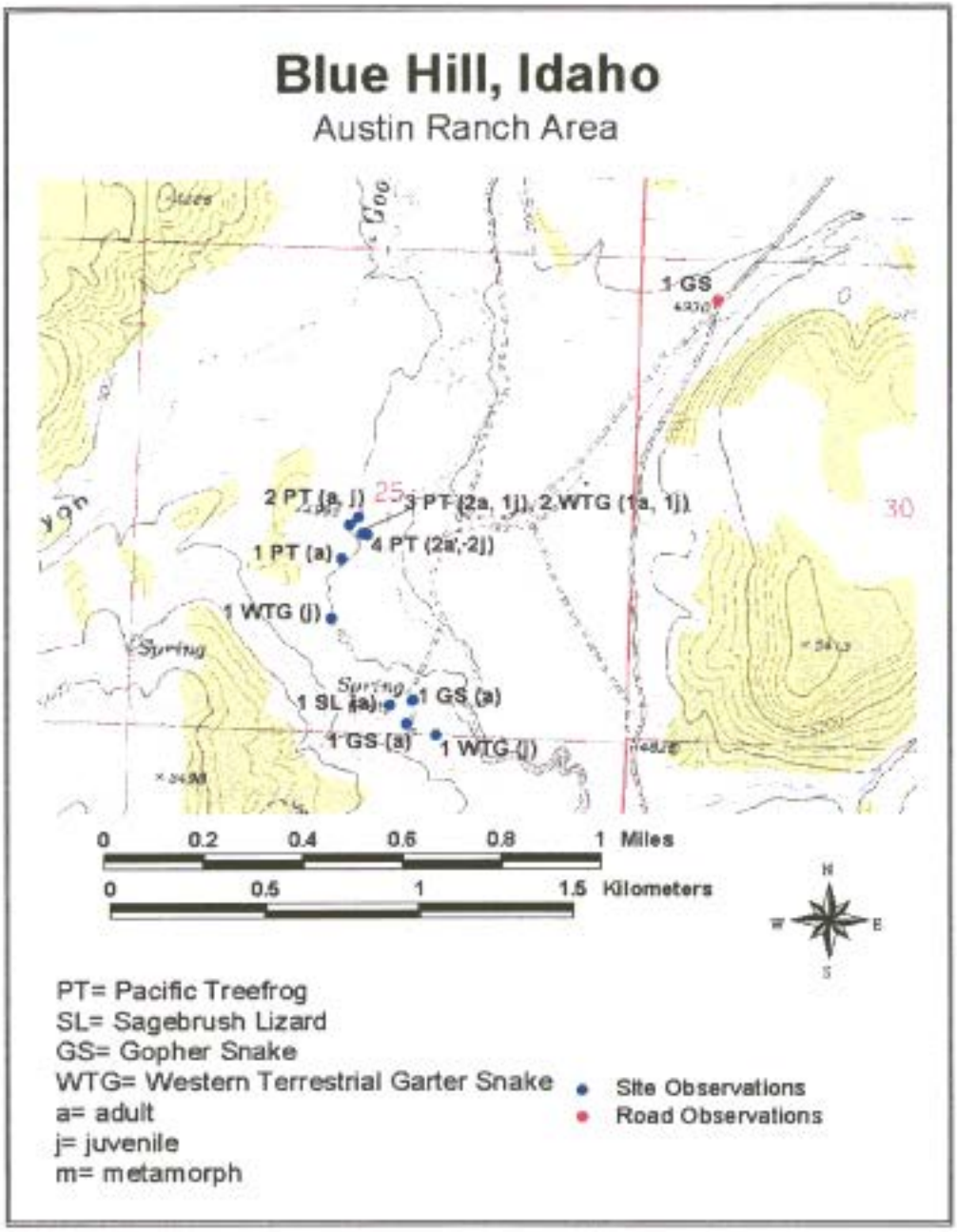


Figure 21. A portion of the Blue Hill Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

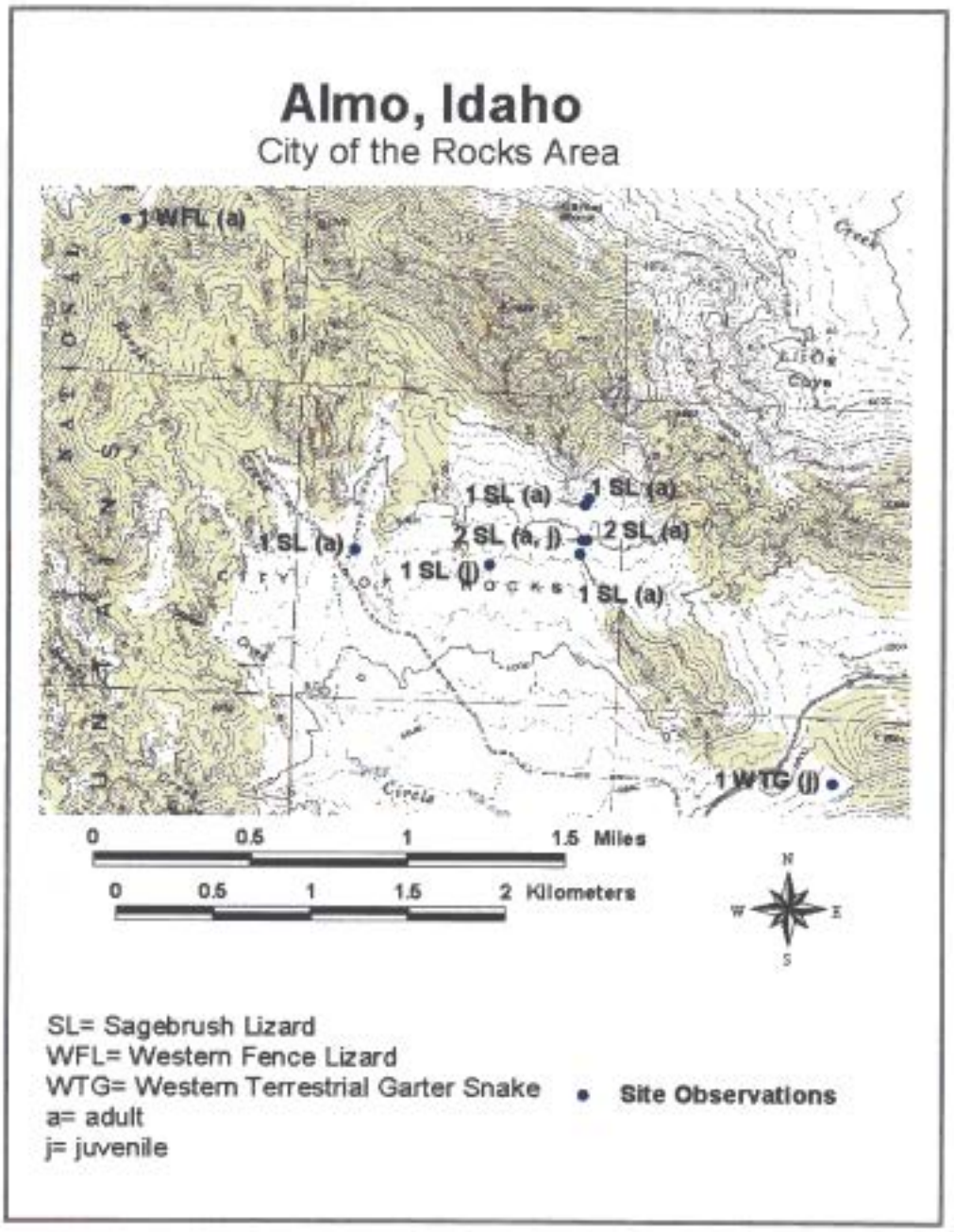


Figure 22. A portion of the Almo Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

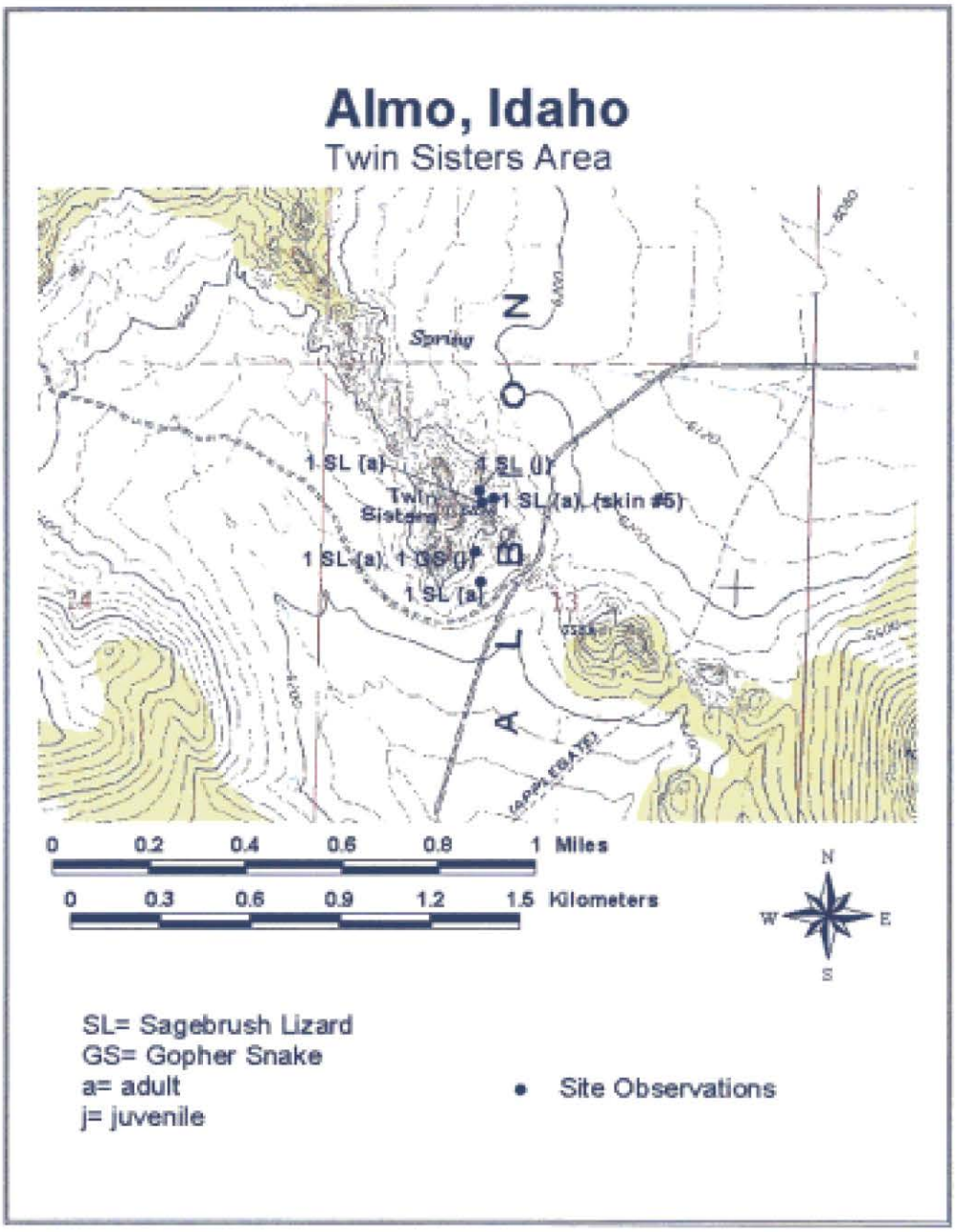


Figure 23. A portion of the Almo Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages. Snake skin #5 could not be accurately identified.

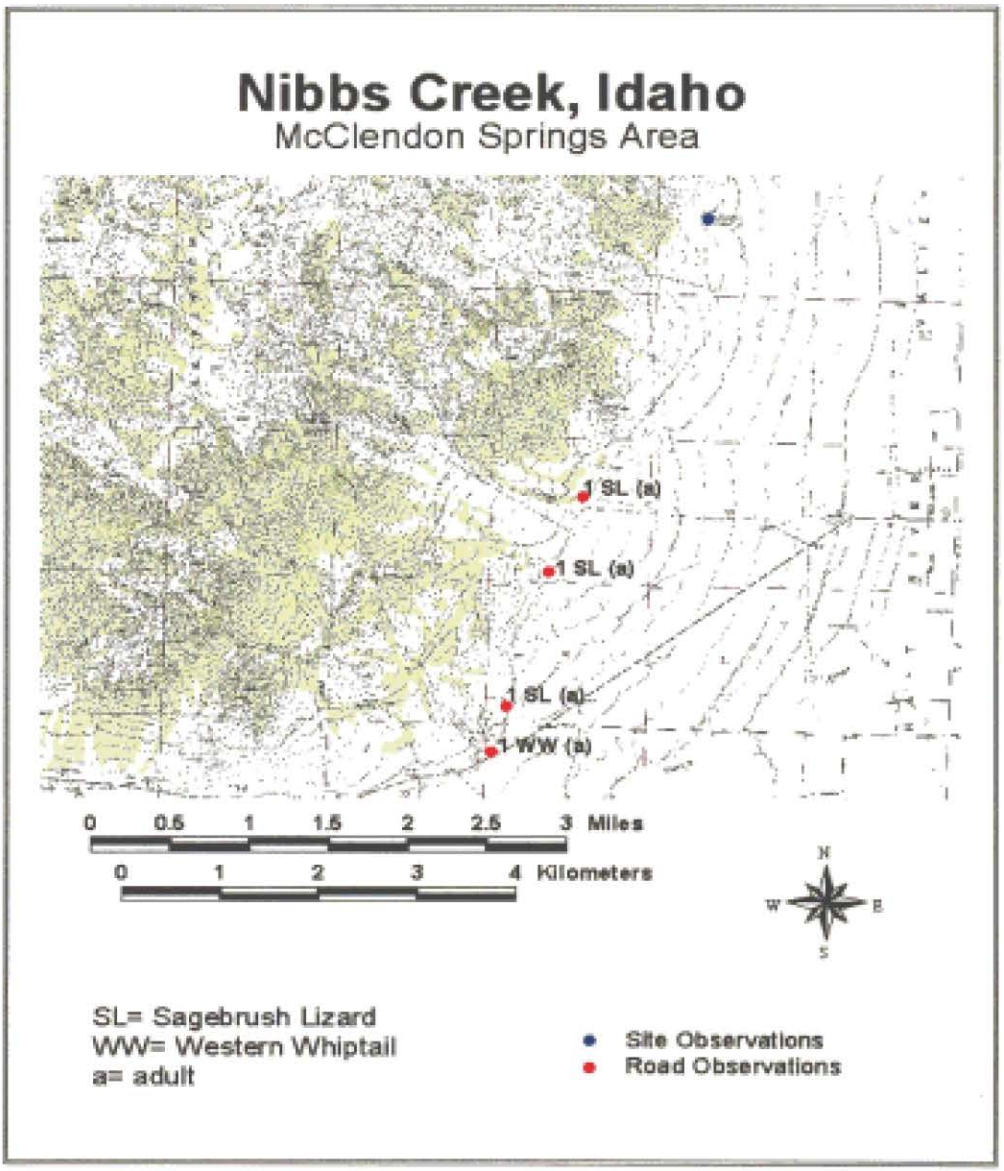


Figure 24. A portion of the Nibbs Creek Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages. The site with no corresponding observation label shows the location of McClendon Springs, and no species were detected at this site.

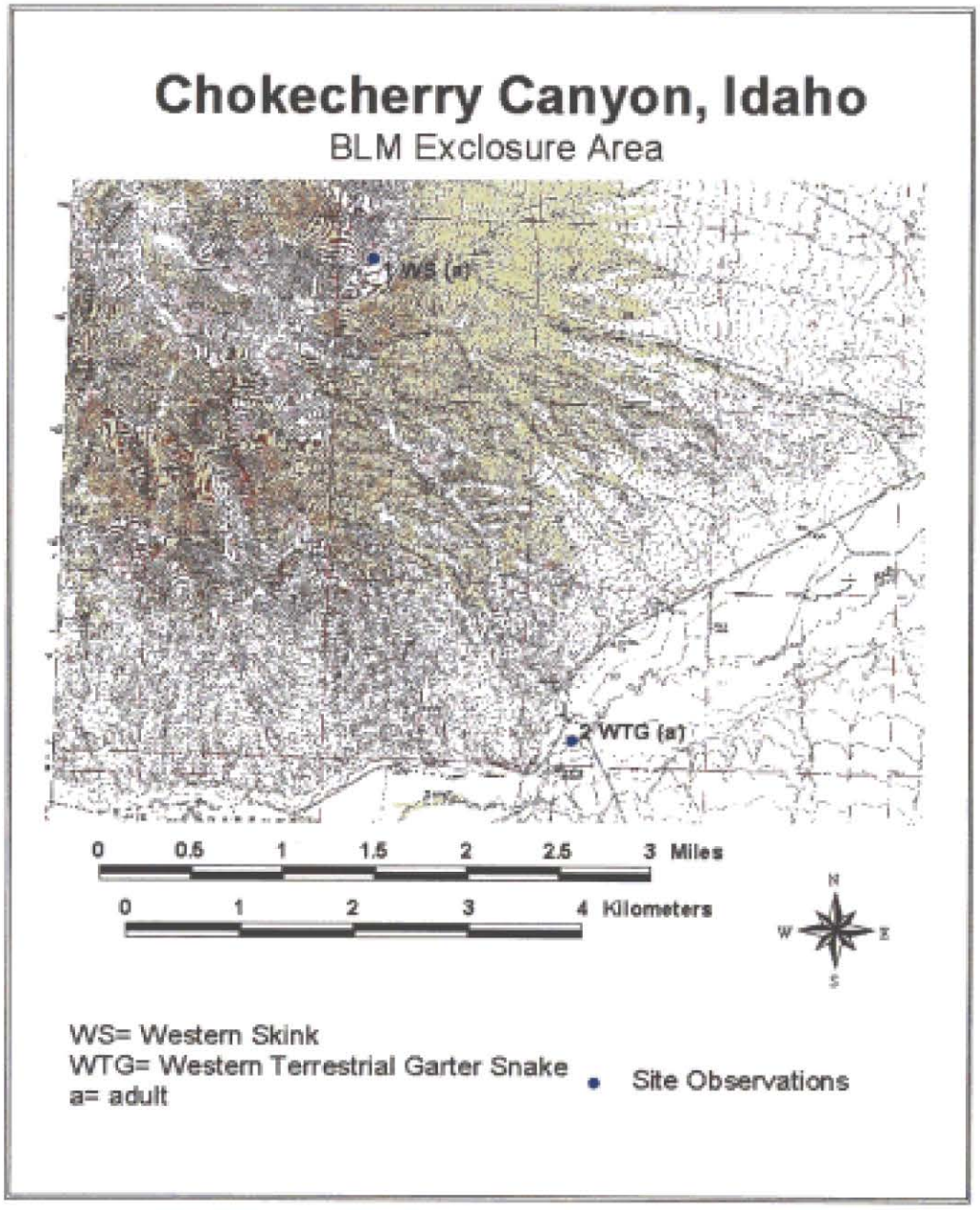


Figure 25. A portion of the Chokecherry Canyon Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

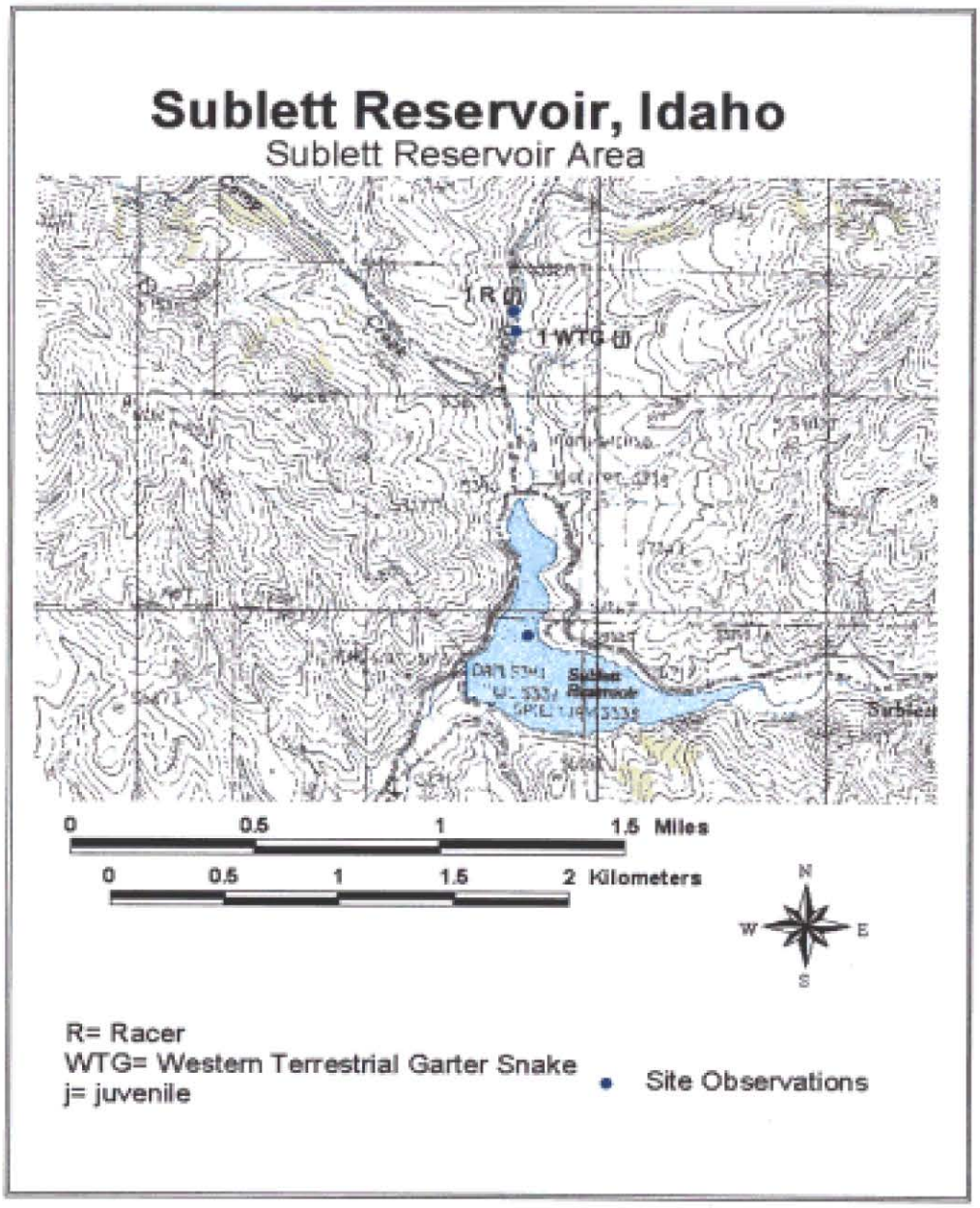


Figure 26. A portion of the Sublett Reservoir Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages. The site with no corresponding observation label shows the location of the northern portion of Sublett Reservoir, and no species were detected at this site.

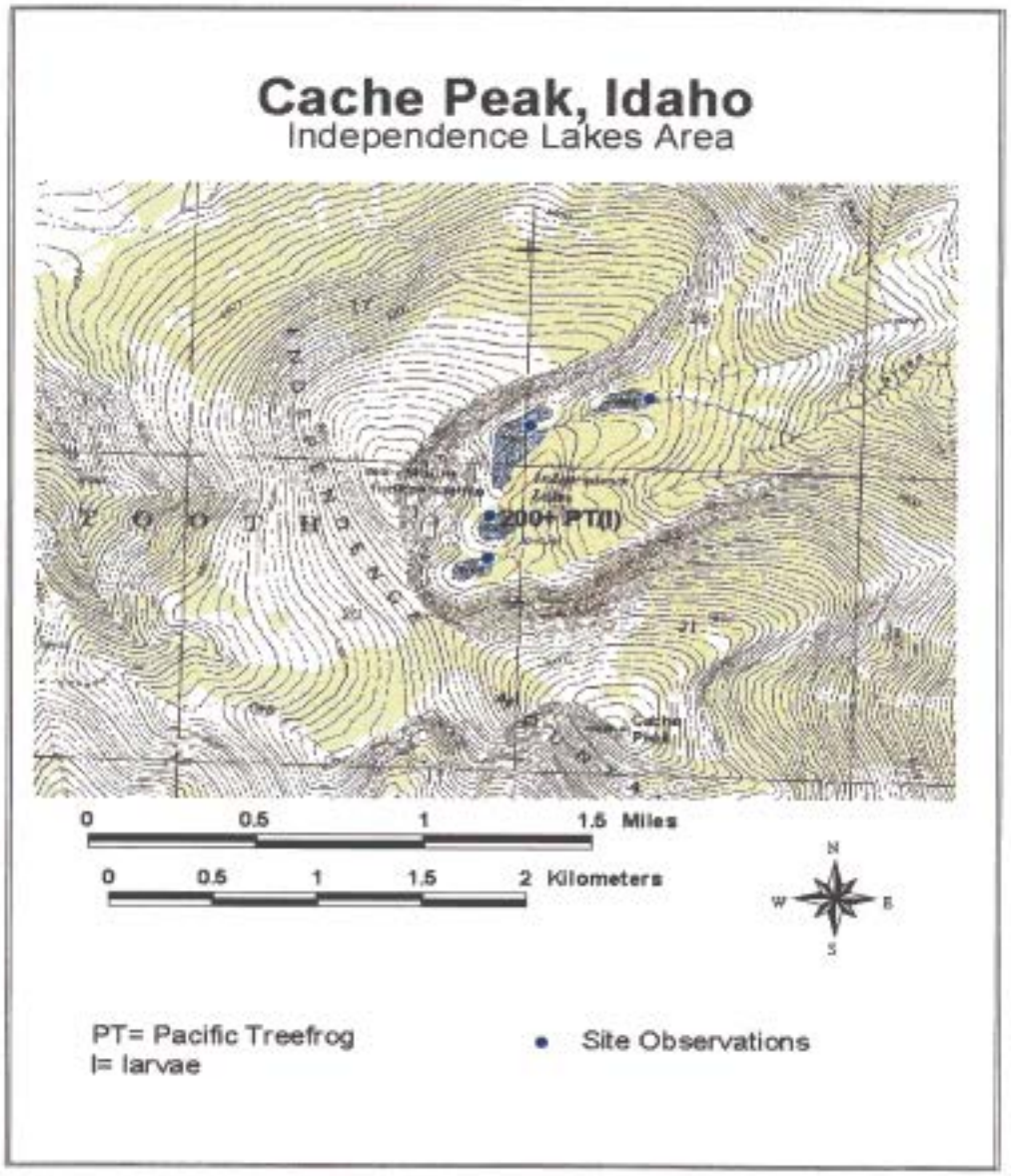


Figure 27. A portion of the Cache Peak Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages. The sites with no corresponding observation labels show the location of the Independence Lakes where no species were detected.

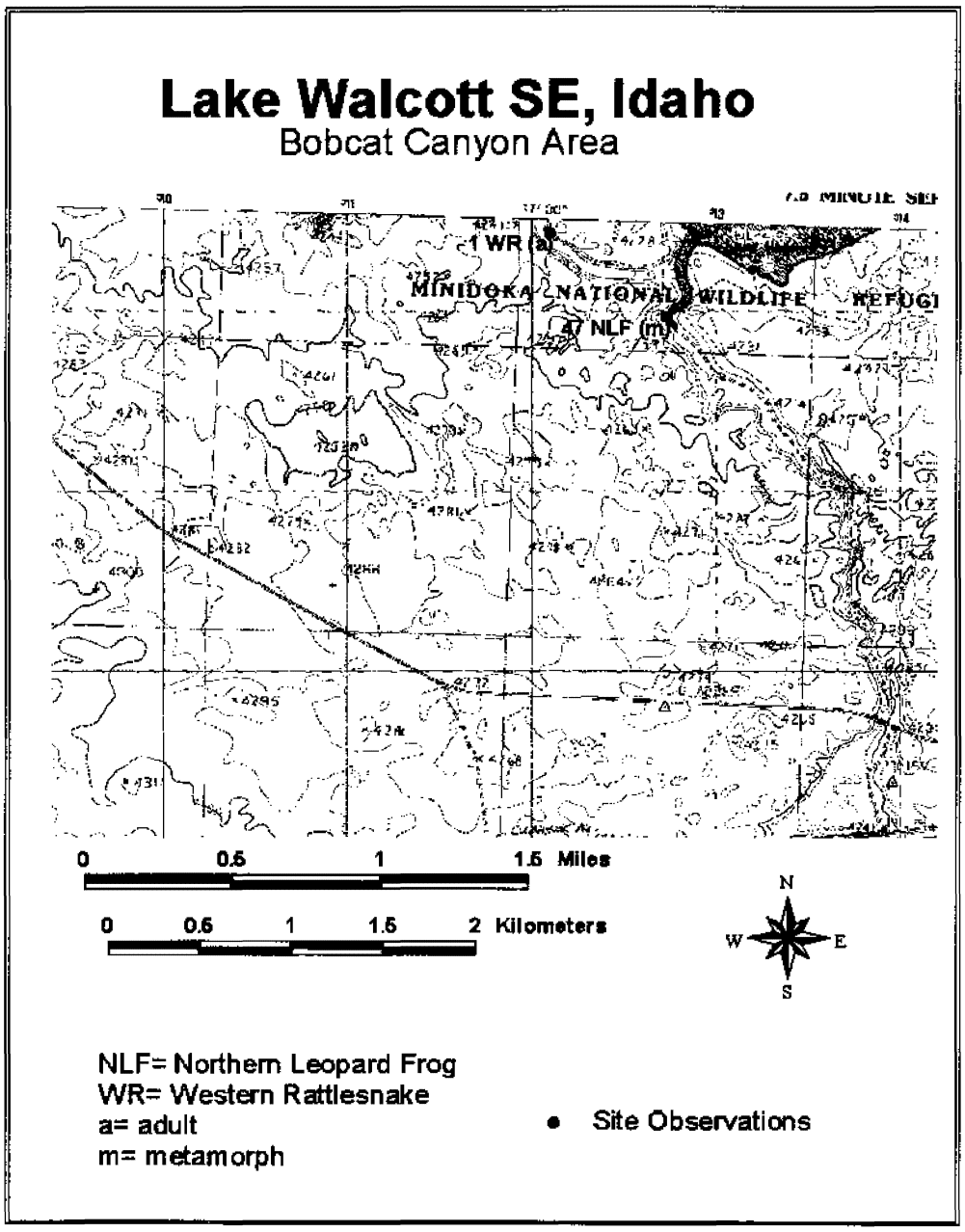


Figure 28. A portion of the Lake Walcott SE Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

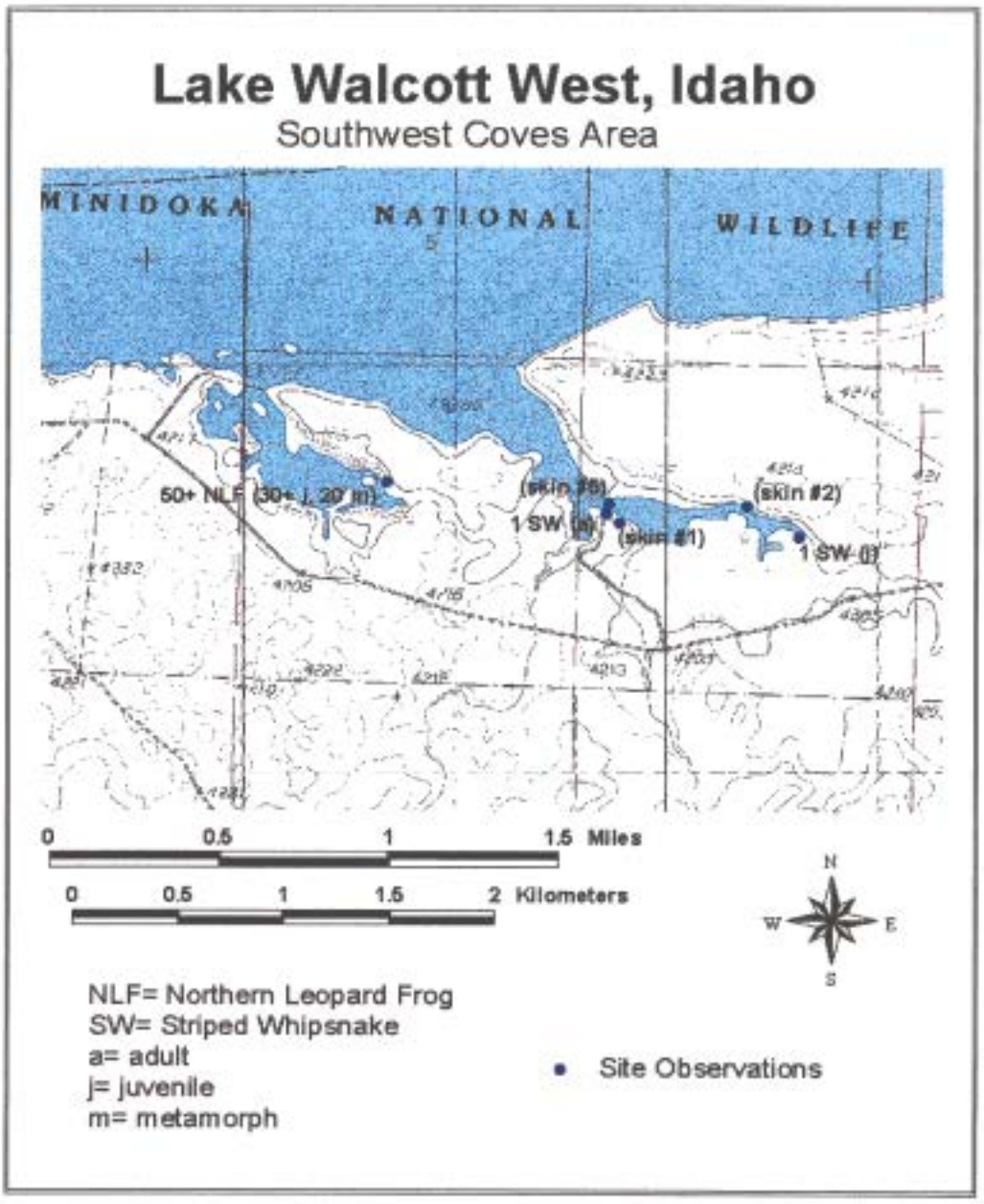


Figure 29. A portion of the Lake Walcott West Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages. Snake skin #5 was identified as *Thamnophis*, but the species could not be determined. Snake skins #1 and #2 could not accurately be identified.

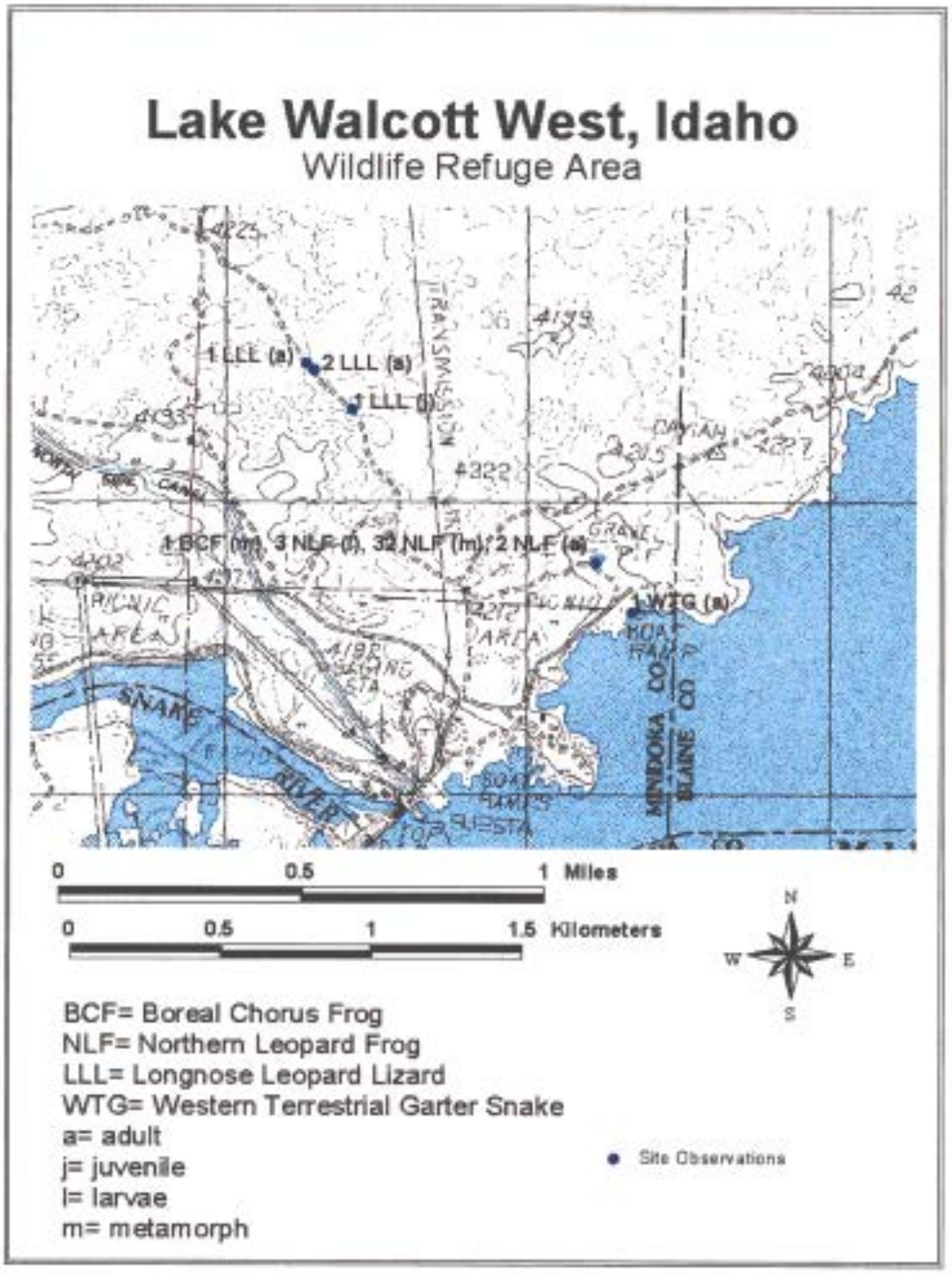


Figure 30. A portion of the Lake Walcott West Quadrangle, Idaho 7.5 minute series (Topographic) that shows the observed species and their distribution for this area. The labeling numbers refer to the number of individuals observed, the letters represent species identification codes, and the letters in parentheses identify the observed life stages.

Appendix A. Survey site photographs taken during the study.

This site is located in Big Cottonwood Canyon, and is generally characterized by rocky hillsides and talus slopes with intermixed juniper and sagebrush. The photograph was taken looking west. A single adult Western Fence Lizard was observed at this site.

This site is located near Bosteter Road east of Big Cottonwood Canyon and is characterized by exposed rocky wash with a riparian area located just east of this view. The photograph was taken looking north. There were no species found at this site.

This site is an emergent wetland that lies in about the middle of this photograph and is located in Big Cottonwood Canyon up and behind one of the ridges to the east. The photograph was taken looking west and characterizes typical upland habitat in Big Cottonwood Canyon. Eighteen Pacific Treefrog larvae, one juvenile and two adult Racers, and two juvenile Western Terrestrial Garter Snakes were detected at this site.

This site is located in Cave Canyon and is primarily characterized by talus slopes with a riparian area and small stream located approximately 20 meters to the south. This photograph was taken looking northwest. Two Western Fence Lizards, one adult and one juvenile, were observed at this site and a dead Racer was found on the access trail nearby.

This site is riparian habitat located in Big Cedar Canyon. This photograph was taken looking northeast. Two Western Fence Lizards, one juvenile and one adult, and one adult Western Terrestrial Garter Snake were observed at this site.

This site is located in Big Cedar Canyon and is characterized by numerous exposed rocky areas. The photograph was taken looking southeast. No species were detected at this site.

This site is located in Big Cedar Canyon and is a juniper and sagebrush dominated hillside with regions of exposed rock. This photograph was taken looking northwest. Three adult Western Fence Lizards were seen at this site.

This site is located in Big Cedar Canyon near the USFS boundary and is characterized by juniper and sagebrush intermixed with talus slopes and exposed rocky cliffs. The photograph was taken looking west. One juvenile Side-Blotched Lizard and two juvenile Western Fence Lizards were observed at this site.

This site is located in Little Cedar Canyon and is characterized by exposed rocky areas intermixed with dense stands of juniper and sagebrush. The photograph was taken looking south. No species were detected at this site.

This site is located in Little Cedar Canyon and is primarily characterized by large rocks and talus slopes. This photograph was taken looking north and this site lies across the valley from the previous site. Four Western Fence Lizards, three adults and one juvenile, were observed in the exposed rocky uplands, while three juvenile Western Whiptails were detected in the sagebrush and juniper dominated lowlands.

This site is located in Robber Gulch and is dominated by sagebrush with numerous areas of exposed rock. The photograph was taken looking northwest. One adult Western Fence Lizard was found at this site.

This is the Curtis Reservoir site. The photograph was taken looking west. This site had dried at the time of the survey and no species were detected.

This site is a spring that is located below Curtis Reservoir to the north. This photograph was taken looking northwest. One Pacific Treefrog larvae was caught in an aquatic funnel trap at this site.

This is the Sagehen Spring site. This isolated wetland was dominated by submergent aquatic vegetation. The photograph was taken looking northeast. Twelve Tiger Salamander larvae were observed at this site. Contributed observations included 34 Tiger Salamander larvae, two metamorphs, one adult, and one Pacific Treefrog.

This site is located at the bottom of the upland hills where Sagehen Springs was located. This photograph was taken looking north. No species were found at this site.

This site is the southern portion of North Cottonwood Creek Reservoir. This photograph was taken looking west. Eight aquatic funnel traps were placed in this portion of the reservoir, but no amphibian or reptile species were detected.

This photograph shows the remaining portion of North Cottonwood Creek Reservoir. This photograph was taken looking north. No species were detected at this site.

This site is located at the southern end of Goose Creek Reservoir and is characterized by vast boulder fields and talus slopes. This photograph was taken looking southeast. Four Western Fence Lizards, two juveniles and two adults, and an adult Striped Whipsnake were observed at this site while an adult Gopher Snake was identified via a shed skin.

This site is Emery Creek. There is a small riparian area about 7 meters wide surrounded by sagebrush dominated uplands. This photograph was taken looking south. No species were detected at this site. Two juvenile Sagebrush Lizards were observed at a site to the northeast of Emery Creek which was not photographed.

This site is located at the Austin Ranch and lies north of the house. This site is characterized by talus slopes and sagebrush dominated lowlands. This photograph was taken looking northwest. No species were found at this site.

This photograph shows part of the Austin Ranch and the single wetland site located to the west of the canal (dark blue wetland). The portion of the connected emergent wetlands that lie to the east of the canal are also visible. This photograph was taken looking east. No species were detected in the western wetland.

This site is located at the Austin Ranch. There is a canal that runs along the west of the agricultural fields and Goose Creek can be seen in the middle of this photograph. All of the wetland areas to the east of the canal were connected and were considered a single site. This photograph was taken looking southeast. Four Pacific Treefrogs, two metamorphs and two adults, were observed at this site

This wetland site is located on the lower southeast corner of the City of Rocks National Reserve and was dominated by aquatic vegetation. This photograph was taken looking southeast. One juvenile Western Terrestrial Garter Snake was caught in an aquatic funnel trap at this site.

This site is located at the Twin Sisters area of the City Of Rocks National Reserve. This photograph was taken looking west. One juvenile and four adult Sagebrush Lizards were observed at this site. We also identified a juvenile Gopher Snake from a shed skin.

This site is located near the Circle Creek Trailhead at the City of Rocks National Reserve. This photograph was taken looking north. Two juvenile and five adult Sagebrush Lizards were observed at this site.

This site is a potion of a large cove near the southeast corner of the Minidoka National Wildlife Refuge. Both sides of this cove were thickly vegetated with bulrush and cattails which made surveying difficult. No species were detected in the wetland, but through shed skins, we identified one juvenile and one adult Striped Whipsnake.

This site covers a major portion of a large cove near the southeast corner of the Minidoka National Wildlife Refuge. This photograph was taken looking southeast. The southeast edge of this cove is where we surveyed shallow emergent wetlands. We detected 50+ Northern Leopard Frog metamorphs at this site and a voucher photograph was taken here.

This site is a backwater cove that lies east of Bobcat Canyon. The photograph was taken looking south. Forty seven Northern Leopard Frog metamorphs were found at this site.

This site is Bobcat Canyon on the Minidoka National Wildlife Reserve. This photograph was taken looking northwest. One adult Western Rattlesnake was found at this site.

This site is located northwest of the Minidoka National Wildlife Refuge Headquarters and is characterized by exposed rocky areas surrounded by sagebrush dominated desert. The photograph was taken looking northwest. One juvenile and three adult Longnose Leopard Lizards were detected at this site .

This site is an isolated wetland located north of the boat ramp near the Minidoka National Wildlife Refuge Headquarters. This photograph was taken looking north. Three Northern Leopard Frog larvae, 32 metamorphs, and two adults were found here, as well as one Boreal Chorus Frog metamoroph.

This site is the first lake and has the lowest elevation of the Independence Lakes. This photograph was taken looking west. No species were found at this site.

This site is the second Independence Lake. This photograph was taken looking southwest. No species were encountered at this site.

This site is the third Independence Lake. The photograph was taken looking west. Approximately two hundred Pacific Treefrog tadpoles were found at this site.

This is the fourth Independence Lake and it has the highest elevation of the four lakes. The photograph was taken looking southwest. No species were detected at this site.

This site is the northern shallow portion of Sublett Reservoir. This photograph was taken looking south. No species were observed at this site, but one juvenile Racer and one juvenile Western Terrestrial Garter Snake were encountered north of this site in riparian habitat.

This site is McClendon Springs Pond. This photograph was taken looking southeast. No species were detected at this site.

Appendix B. Standard amphibian and reptile survey form used for all site surveys.

AMPHIBIAN SURVEY DATA SHEET - modified after S.P. Corn, NBS, Fort Collins, CO (ver. 1 May 1999)

Herpetology Laboratory, Idaho State University and Idaho Museum of Natural History, Box 8007, Pocatello, ID 83209
(208) 236-3922 voice 236-4570 FAX e-mail: petecher@isu.edu

DATE		BEGIN TIME		END TIME		OBSERVERS		
LOCALITY								
STATE		COUNTY		MAP NAME		OWNER		ELEVATION
T	R	S		UTM ZONE/DATUM		NORTHING		EASTING

AMPHIBIAN AND REPTILE SPECIES PRESENT (INDICATE NUMBERS IN CATEGORIES IF POSSIBLE)

SPECIES	ADULT	JUVENILE	METAM.	LARVAE	EGGS	CALLING	TECHNIQUE(S)	VOUCHER

FISH PRESENT	YES ??? NO	FISH SPECIES:		
ENTIRE SITE SEARCHED?	YES NO	IF NO, IDICATE AREA:		meters of shoreline habitat
WEATHER:	RADIATION: CLEAR PARTIAL OVERCAST		WIND: CALM LIGHT MEDIUM HEAVY	
AIR TEMPERATURE (1 M SHADED)	°C OR F	% CLOUD COVER:	PRECIPITATION: SNOW RAIN	
WATER	TEMPERATURE (1CM)	pH:	CONDUCTIVITY	SAMPLE?
	COLOR: CLEAR STAINED		TURBIDITY CLEAR CLOUDY	
SITE DESCRIPTION	PUT SKETCH AND ADDITIONAL COMMENTS ON BACK OF SHEET			
ORIGIN	NATURAL MAN-MADE MAN-MODIFIED		DRAINAGE PERMANENT OCCASIONAL NONE	
SITE TYPE	TEMPORARY or PERMANENT LAKE/POND MARSH/BOG STREAM SPRING/SEEP ACTIVE or INACTIVE BEAVER POND			
NATIONAL WETLAND INVENTORY CLASIFICATION		GAP ANALYSIS COVER TYPE (IF KNOWN)		
STREAM ORDER	1 2 3 4 5 6			
SITE LENGTH m	SITE WIDTH m	MAXIMUM DEPTH	< 1M 1 - 2 M > 2 M	
PRIMARY SUBSTRATE	SILT/MUD SAND/GRAVEL COBBLE BOULDER/BEDROCK OTHER:			
% OF LAKE MARGIN WITH EMERGENT VEGETATION	0 1 - 25 25 - 50 >50			
EMERGENT VEGETATION SPECIES (IN ORDER OF ABUNDANCE)				
NORTH SHORELINE CHARACTERISTICS	SHALLOWS PRESENT	SHALLOWS ABSENT	EMERGENT VEG PRESENT	EMERGENT VEG ABSENT
DISTANCE TO FOREST EDGE m	FOREST TREE SPECIES			

Appendix C. Data collected from all site surveys including incidental observations. The data presented in this appendix are from a larger spreadsheet that should be read across the row and then down the columns for each observation. Following the data is a page of metadata explaining the categories and information listed in the appendix.

Date	Time	Locality	Observers	UTM	Elevation	Northing	Easting
20-May-99	14:00	Murtaugh Lake	P. Makela		4125ft	4704695	732290
20-May-99	14:15	Murtaugh Lake	P. Makela		4125ft	4704695	732290
20-May-99	14:30	Murtaugh Lake	P. Makela		4125ft	4704695	732290
24-May-00	11:00	Jim Sage Mountains (Chokecherry Canyon exclosure)	P. Makela, W. Hayes	12	6060ft	4664470	295950
10-Jun-00	16:00	Buckhorn Canyon near USFS fenceline	J. Shive	11	1547	4690424	739773
10-Jun-00	16:10	Buckhorn Canyon near USFS fenceline	J. Shive	11	1540	4690434	739772
11-Jun-00	15:20	Big Cottonwood Canyon	J. Shive	11	1632	4680866	742315
11-Jun-00	15:50	Big Cottonwood Canyon near Cave Canyon junction	J. Shive	11	1665	4680486	741461
11-Jun-00	16:11	Big Cottonwood Canyon near Cave Canyon junction	J. Shive	11	1665	4680382	741464
11-Jun-00	16:40	Big Cottonwood Canyon near Cave Canyon junction	J. Shive	11	1662	4680658	741632
11-Jun-00	17:14	Big Cottonwood Canyon	J. Shive	11	1586	4681175	742575
11-Jun-00	17:42	Big Cottonwood Canyon	J. Shive	11	1590	4681177	742573
11-Jun-00	18:40	Big Cottonwood Canyon	J. Shive	11	1580	4682215	743630
19-Jun-00	10:00	Big Cottonwood Canyon	J. Shive	11	1485	4684159	744154
19-Jun-00	10:09	Big Cottonwood Canyon	J. Shive	11	1501	4684187	744120
19-Jun-00	10:35	Big Cottonwood Canyon	J. Shive	11	1530	4684188	744120
19-Jun-00	10:50	Big Cottonwood Canyon	J. Shive	11	1533	4684325	744075
19-Jun-00	11:00	Big Cottonwood Canyon	J. Shive	11	1533	4684348	744056
19-Jun-00	11:19	Big Cottonwood Canyon	J. Shive	11	1546	4684403	744032
19-Jun-00	11:41	Big Cottonwood Canyon	J. Shive	11	1546	4684404	744030
19-Jun-00	12:10	Big Cottonwood Canyon	J. Shive	11	1646	4684540	743825
20-Jun-00	11:05	Buckhorn Canyon	J. Shive	11	1651	4689985	738159
20-Jun-00	11:57	Buckhorn Canyon	J. Shive	11	1645	4689966	738194
20-Jun-00	16:39	Robber Gulch	J. Shive	11	1559	4690414	739735
21-Jun-00	10:00	Little Cedar Canyon	J. Shive	11	1543	4689138	743642
21-Jun-00	10:26	Little Cedar Canyon	J. Shive	11	1543	4689130	743612
21-Jun-00	10:40	Little Cedar Canyon	J. Shive	11	1538	4689144	743597
21-Jun-00	11:05	Little Cedar Canyon	J. Shive	11	1523	4689192	743803
21-Jun-00	11:45	Little Cedar Canyon	J. Shive	11	1479	4689093	744037
21-Jun-00	12:05	Little Cedar Canyon	J. Shive	11	1472	4689027	743935
21-Jun-00	12:19	Little Cedar Canyon	J. Shive	11	1469	4688989	743915

Date	Species Present	Wind	Radiation	% Clouds	T_A	Precip.	GAP Analysis	Length
20-May-99	1 PSRE	calm	partial	60	75F	no	-	-
20-May-99	1 PSMA	calm	partial	60	75F	no	-	-
20-May-99	2 RAPI	calm	partial	60	75F	no	-	-
24-May-00	1 EUSK adult	-	partial	-	70F+	no	-	-
10-Jun-00	1 SCOC adult male	calm	partial	70	20.6	no	33XX	-
10-Jun-00	1 SCOC adult male	calm	partial	70	20.6	no	33XX	-
11-Jun-00	1 SCOC adult male	light	overcast	70	21.1	no	33XX / 61XX	-
11-Jun-00	2 SCOC adult males	light	overcast	70	21.2	no	33XX / 61XX	-
11-Jun-00	1 COCO adult	calm	partial	60	21.9	no	33XX / 61XX	-
11-Jun-00	1 THEL adult	light	overcast	75	20.8	no	33XX / 61XX	-
11-Jun-00	1 SCOC adult	calm	partial	70	20.6	no	33XX / 61XX	-
11-Jun-00	1 SCOC adult	calm	partial	60	20.1	no	33XX / 61XX	-
11-Jun-00	1 THEL juvenile	calm	overcast	100	19.1	no	33XX / 61XX	-
19-Jun-00	1 SCOC adult	light	clear	5	16.6	no	33XX	-
19-Jun-00	1 SCOC adult male	light	clear	5	18.1	no	33XX	-
19-Jun-00	1 SCOC juvenile female	medium	clear	2	18.2	no	33XX	-
19-Jun-00	1 SCOC juvenile	medium	clear	5	19.2	no	33XX	-
19-Jun-00	1 SCOC adult	medium	clear	5	19.8	no	33XX	-
19-Jun-00	1 SCOC juvenile	light	clear	5	20.6	no	33XX	-
19-Jun-00	2 SCOC adults	light	clear	5	20.1	no	33XX	-
19-Jun-00	1 SCOC adult	medium	clear	10	21.6	no	33XX	-
20-Jun-00	2 SCOC adults (1female, 1 male)	light	clear	0	18.5	no	33XX	-
20-Jun-00	1 SCOC adult male	medium	clear	0	17.2	no	33XX	-
20-Jun-00	1 SCOC adult male	calm	clear	0	24.4	no	33XX	-
21-Jun-00	1 SCOC juvenile	calm	clear	15	23.2	no	33XX	-
21-Jun-00	1 SCOC adult	calm	clear	20	24.2	no	33XX	-
21-Jun-00	1 SCOC adult female	light	clear	20	23.6	no	33XX	-
21-Jun-00	1 SCOC adult	calm	clear	25	24.1	no	33XX	-
21-Jun-00	1 CNTI juvenile	calm	clear	35	24.9	no	33XX	-
21-Jun-00	1 CNTI juvenile	calm	clear	35	28.6	no	33XX	-
21-Jun-00	1 CNTI juvenile	light	clear	35	28.5	no	33XX	-
22-Jun-00	2 SCOC juveniles	calm	clear	5	25.1	no	33XX	-

Date	Width	Depth	Site Type	NWI	Substrate	Origin	Drainage	pH	Cond.	T_W	Color	Turbidity	Dom Em Veg
20-May-99	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-99	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-99	-	-	-	-	-	-	-	-	-	-	-	-	-
24-May-00	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-

Date	% Shore w/ Em Veg	N. Shore Characteristics	Fish	Forest Distance
20-May-99	-	-	-	-
20-May-99	-	-	-	-
20-May-99	-	-	-	-
24-May-00	-	-	-	-
10-Jun-00	-	-	-	-
10-Jun-00	-	-	-	-
11-Jun-00	-	-	-	-
11-Jun-00	-	-	-	-
11-Jun-00	-	-	-	-
11-Jun-00	-	-	-	-
11-Jun-00	-	-	-	-
11-Jun-00	-	-	-	-
11-Jun-00	-	-	-	-
19-Jun-00	-	-	-	-
19-Jun-00	-	-	-	-
19-Jun-00	-	-	-	-
19-Jun-00	-	-	-	-
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21-Jun-00	-	-	-	-
21-Jun-00	-	-	-	-
21-Jun-00	-	-	-	-
21-Jun-00	-	-	-	-
21-Jun-00	-	-	-	-
21-Jun-00	-	-	-	-
21-Jun-00	-	-	-	-
22-Jun-00	-	-	-	-

Date	Time	Locality	Observers	UTM	Elevation	Northing	Easting
22-Jun-00	9:45	Big Cedar Canyon	J. Shive	11	1557	4687675	744083
22-Jun-00	11:37	Big Cedar Canyon	J. Shive	11	1531	4686449	743572
22-Jun-00	12:00	Big Cedar Canyon	J. Shive	11	1539	4686551	743566
22-Jun-00	17:50	Big Cedar Canyon	J. Shive	11	1628	4685413	742781
22-Jun-00	18:14	Big Cedar Canyon	J. Shive	11	1620	4685382	742836
22-Jun-00	18:50	Big Cedar Canyon	J. Shive	11	1596	4684732	742404
23-Jun-00	10:05	Big Cedar Canyon	J. Shive	11	1597	4684894	742589
27-Jun-00	10:25	Cave Canyon	J. Shive	11	1715	4683244	741115
27-Jun-00	10:40	Cave Canyon	J. Shive	11	1750	4683264	741073
27-Jun-00	12:38	Cave Canyon	J. Shive	11	1625	4684151	742065
27-Jun-00	17:37	Big Cottonwood Canyon	J. Shive	11	1655	4680650	742065
27-Jun-00	17:59	Big Cottonwood Canyon	J. Shive	11	1676	4680692	742038
27-Jun-00	18:50	Big Cottonwood Canyon	J. Shive	11	1651	4680828	742238
28-Jun-00	15:30	South End of Goose Creek Reservoir	J. Shive, P. Makela, W. Hayes	12	1460	4668342	257670
28-Jun-00	15:45	South End of Goose Creek Reservoir	J. Shive, P. Makela, W. Hayes	12	1508	4668254	257983
28-Jun-00	16:05	South End of Goose Creek Reservoir	J. Shive, P. Makela, W. Hayes	12	1518	4668275	257986
29-Jun-00	12:00	Pond up Big Cottonwood Canyon	J. Shive	11	1822	4680004	742079
30-Jun-00	10:45	South End of Goose Creek Reservoir	J. Shive	12	1510	4668148	258061
30-Jun-00	11:15	South End of Goose Creek Reservoir	J. Shive	12	1542	4668115	258206
30-Jun-00	12:10	South End of Goose Creek Reservoir	J. Shive	12	1523	4668505	258240
1-Jul-00	13:30	Austin Ranch	J. Shive, M. Austin	12	1453	4663682	256862
1-Jul-00	14:25	Austin Ranch (Canal)	J. Shive, M. Austin	12	1444	4663213	256890
2-Jul-00	10:00	South End of Goose Creek Reservoir	J. Shive	12	1479	4668425	257675
2-Jul-00	10:50	South End of Goose Creek Reservoir	J. Shive	12	1514	4668285	258039
2-Jul-00	11:51	South End of Goose Creek Reservoir	J. Shive	12	1529	4668374	258252
2-Jul-00	12:40	South End of Goose Creek Reservoir	J. Shive	12	1481	4668315	257819
5-Jul-00	12:30	Austin Ranch (Canal)	J. Shive	12	1452	4663820	256715
5-Jul-00	14:27	Austin Ranch (Canal)	J. Shive	12	1446	4663095	256966
5-Jul-00	14:45	Austin Ranch	J. Shive	12	1467	4663135	256869
5-Jul-00	15:10	Austin Ranch (Canal)	J. Shive	12	1446	4663485	256626
5-Jul-00	16:05	Austin Ranch (wetland west of canal)	J. Shive	12	1451	4663796	256685
6-Jul-00	13:40	Spring near Curtis Reservoir	J. Shive	11	1461	4689976	712679
6-Jul-00	14:25	Sagehen Spring Pond	J. Shive	11	1474	4693963	715123
20-Jun-00	17:30	Sagehen Spring Pond	P. Makela, J. Tharp	11	-	-	-
22-Jun-00	9:00	Sagehen Spring Pond	P. Makela, W. Hayes, J. Tharp	11	-	-	-
7-Jul-00	10:00	Emery Creek	J. Shive, W. Hayes	12	1689	4661513	260335

Date	Species Present	Wind	Radiation	% Clouds	T_A	Precip.	GAP Analysis	Length
22-Jun-00	1 UTST juvenile	light	clear	0	26.2	no	33XX	-
22-Jun-00	1 SCOC juvenile	light	clear	5	28.4	no	33XX	-
22-Jun-00	2 SCOC adult males	calm	clear	5	28.6	no	33XX	-
22-Jun-00	1 SCOC adult male	calm	clear	45	30.5	no	33XX	-
22-Jun-00	1 SCOC juvenile	calm	clear	45	30.1	no	33XX	-
22-Jun-00	1 THEL adult	light	clear	20	27.2	no	41XX / 33XX	-
23-Jun-00	1 SCOC adult female (incidental observation)	calm	partial	60	24.3	no	41XX / 33XX	-
27-Jun-00	1 SCOC juvenile	light	clear	40	26.1	no	41XX / 33XX	-
27-Jun-00	1 SCOC adult	light	clear	40	26.4	no	41XX / 33XX	-
27-Jun-00	1 COCO juvenile dead (incidental observation)	calm	clear	50	27.9	no	41XX	-
27-Jun-00	1 SCOC adult male	light	clear	0	26.6	no	41XX / 33XX	-
27-Jun-00	1 SCOC adult male	light	clear	0	25.4	no	33XX	-
27-Jun-00	1 SCOC adult male (incidental observation)	calm	clear	5	25.9	no	41XX	-
28-Jun-00	skin #1(*Thamnophis* ?)	light	clear	25	25.5	no	73XX	-
28-Jun-00	skin #2 (1 PICA adult)	light	clear	30	25.1	no	73XX	-
28-Jun-00	skin #3	light	clear	30	25.2	no	73XX	-
29-Jun-00	2 THEL juvenile, 18 PSRE larvae, 3 COCO (2 adults and 1 juvenile)	light	clear	0	25.2	no	63XX / 5000	40
30-Jun-00	1 SCOC juvenile male	light	clear	10	31.1	no	73XX	-
30-Jun-00	1 MATA adult	light	clear	20	31.3	no	73XX	-
30-Jun-00	1 SCOC adult	calm	clear	55	32.4	no	73XX	-
1-Jul-00	1 PSRE adult (incidental observation)	light	clear	20	31.8	no	2000 / 63XX	
1-Jul-00	1 PICA adult (incidental observation)	light	clear	25	32.6	no	2000	-
2-Jul-00	skin #4 (*Thamnophis* ?)	light	partial	10	21.6	no	73XX	-
2-Jul-00	1 SCOC juvenile male	medium	clear	10	21.9	no	73XX	-
2-Jul-00	1 SCOC juvenile	medium	clear	20	23.4	no	73XX	-
2-Jul-00	1 SCOC adult male	medium	clear	20	27.7	no	73XX	-
5-Jul-00	1 PSRE metamorph, 1 PSRE adult	medium	clear	10	26.1	no	2000 / 63XX	
5-Jul-00	1 THEL juvenile	medium	clear	15	28.3	no	2000 / 33XX	-
5-Jul-00	1 PICA adult (incidental observation)	light	clear	20	28.5	no	2000	-
5-Jul-00	1 THEL juvenile	light	clear	15	28.4	no	2000 / 63XX	-
5-Jul-00		light	clear	30	31.1	no	2000 / 63XX	25
6-Jul-00	1 PSRE larvae	calm	clear	40	23.7	no	33XX	20
6-Jul-00	12 AMTI larvae	light	clear	40	21.6	no	33XX / 63XX	15
20-Jun-00	1 AMTI adult, 4+ AMTI larvae, 2 PSRE	medium	clear	-	70F	no	33xx	-
22-Jun-00	30 AMTI larvae, 2 AMTI metamorphs	-	clear	-	75F	no	33xx	-
7-Jul-00	1 SCGR juvenile female	calm	clear	5	23.3	no	33XX	-

Date	Width	Depth	Site Type	NWI	Substrate	Origin	Drainage	pH	Cond.	T_W	Color	Turbidity	Dom Em Veg
22-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jun-00	30	<1m	perm. pond	PE	mud	natural	none	5.3	520	21.4	clear	clear	rush, grasses
30-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-00	1	<1m	stream	PE	mud	man-made	permanent	7.5	480	22.1	clear	clear	rush, grasses
1-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Jul-00	1	<1m	stream	PE	mud	man-made	permanent	7	420	21.8	clear	clear	rush, grasses
5-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Jul-00	20	<1m	temp. pond	PE	mud	natural	none	5.4	450	27.8	clear	clear	rush, grasses
6-Jul-00	15	<1m	spring seep	PE	mud	man-mod	permanent	6.8	240	26.4	clear	clear	rush, grasses
6-Jul-00	15	1-2m	spring seep	PAB	mud	man-made	none	8.1	320	27.5	clear	cloudy	-
20-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-

Date	% Shore w/ Em Veg	N. Shore Characteristics	Fish	Forest Distance
22-Jun-00	-	-	-	-
22-Jun-00	-	-	-	-
22-Jun-00	-	-	-	-
22-Jun-00	-	-	-	-
22-Jun-00	-	-	-	-
22-Jun-00	-	-	-	-
23-Jun-00	-	-	-	-
27-Jun-00	-	-	-	-
27-Jun-00	-	-	-	-
27-Jun-00	-	-	-	-
27-Jun-00	-	-	-	-
27-Jun-00	-	-	-	-
27-Jun-00	-	-	-	-
28-Jun-00	-	-	-	-
28-Jun-00	-	-	-	-
28-Jun-00	-	-	-	-
29-Jun-00	>50	shallows pres./ em veg pres.	no	10
30-Jun-00	-	-	-	-
30-Jun-00	-	-	-	-
30-Jun-00	-	-	-	-
1-Jul-00	>50	shallows pres./ em veg pres.	yes	50
1-Jul-00	-	-	-	-
2-Jul-00	-	-	-	-
2-Jul-00	-	-	-	-
2-Jul-00	-	-	-	-
2-Jul-00	-	-	-	-
5-Jul-00	>50	shallows pres./ em veg pres.	yes	50
5-Jul-00	-	-	-	-
5-Jul-00	-	-	-	-
5-Jul-00	-	-	-	-
5-Jul-00	>50	shallows pres./ em veg pres.	no	50
6-Jul-00	>50	shallows pres./ em veg pres.	no	-
6-Jul-00	1-25	shallows pres./ em veg absent	no	-
20-Jun-00	-	-	-	-
22-Jun-00	-	-	-	-
7-Jul-00	-	-	-	-

Date	Time	Locality	Observers	UTM	Elevation	Northing	Easting
7-Jul-00	10:35	Emery Creek	J. Shive, W. Hayes	12	1678	4661512	260297
7-Jul-00	12:12	Emery Creek	J. Shive, W. Hayes	12	1539	4660374	258472
7-Jul-00	13:30	Austin Ranch (wetlands east of canal)	J. Shive, W. Hayes	12	1442	4663762	256745
7-Jul-00	14:04	Austin Ranch (Canal)	J. Shive, W. Hayes	12	1443	4663767	256729
7-Jul-00	15:00	Austin Ranch (wetlands east of canal)					
7-Jul-00	16:00	Austin Ranch	J. Shive, W. Hayes	12	1478	4663196	256817
18-Jul-00	15:15	Cooper Property	J. Shive	11	1280	4697174	711215
18-Jul-00	16:15	North Cottonwood Creek Reservoir	J.Shive	11	1290	4698227	711878
19-Jul-00	11:50	North Cottonwood Creek Reservoir	J. Shive, R. Wilson	11	1310	4698435	711958
20-Jul-00	9:50	City of Rocks	J. Shive	12	1733	4661746	278965
20-Jul-00	11:32	City of Rocks (Twin Sisters)	J. Shive	12	1930	4658030	275030
20-Jul-00	11:58	City of Rocks (Twin Sisters)	J. Shive	12	1950	4658059	274985
20-Jul-00	12:17	City of Rocks (Twin Sisters)	J. Shive	12	1950	4658018	274991
21-Jul-00	9:35	City of Rocks (Twin Sisters)	J. Shive	12	1965	4657849	274971
21-Jul-00	10:03	City of Rocks (Twin Sisters)	J. Shive	12	1934	4657745	274988
21-Jul-00	10:45	City of Rocks (Circle Creek Trail)	J. Shive	12	1893	4663015	277685
21-Jul-00	11:10	City of Rocks (Circle Creek Trail)	J. Shive	12	1916	4663196	277696
21-Jul-00	12:00	City of Rocks (Circle Creek Trail)	J. Shive	12	1918	4663231	277712
21-Jul-00	12:10	City of Rocks (Circle Creek Trail)	J. Shive	12	1896	4663017	277704
21-Jul-00	12:33	City of Rocks (Circle Creek Trail)	J. Shive	12	1877	4662882	277209
22-Jul-00	9:00	City of Rocks	J. Shive	12	1857	4662959	276523
22-Jul-00	10:29	City of Rocks	J. Shive	12	2128	4664691	275340
22-Jul-00	13:03	City of Rocks	J. Shive	12	1894	4662943	277668
25-Jul-00	16:15	Minidoka Wildlife Refuge	J. Shive	12	1281	4725221	300781
25-Jul-00	16:15	Minidoka Wildlife Refuge	J. Shive	12	1275	4725301	301380
25-Jul-00	16:15	Minidoka Wildlife Refuge	J. Shive	12	1270	4725151	301625
25-Jul-00	16:15	Minidoka Wildlife Refuge	J. Shive	12	1285	4725265	300713
25-Jul-00	16:15	Minidoka Wildlife Refuge	J. Shive	12	1269	4725317	300726
26-Jul-00	14:02	Minidoka Wildlife Refuge	J. Shive, W. Hayes	12	1266	4725423	299677
27-Jul-00	11:40	Minidoka Wildlife Refuge (Bobcat Canyon)	J. Shive	12	1269	4721417	312102
27-Jul-00	13:09	Minidoka Wildlife Refuge (Bobcat Canyon Area)	J. Shive	12	1270	4720957	312735
28-Jul-00	10:57	Minidoka Wildlife Refuge	J. Shive, A. Taylor	12	1277	4728458	296271
28-Jul-00	11:25	Minidoka Wildlife Refuge	J. Shive, A. Taylor	12	1271	4728439	296297
28-Jul-00	11:40	Minidoka Wildlife Refuge	J. Shive, A. Taylor	12	1280	4728304	296420
28-Jul-00	12:27	Minidoka Wildlife Refuge	J. Shive, A. Taylor	12	1251	4727785	297230
28-Jul-00	1:26	Minidoka Wildlife Refuge	J. Shive, A. Taylor	12	1250	4727617	297351

Date	Species Present	Wind	Radiation	% Clouds	T_A	Precip.	GAP Analysis	Length
7-Jul-00	1 SCGR juvenile	calm	clear	0	21.8	no	33XX	-
7-Jul-00	1 MATA juvenile, 1 SCGR adult	calm	clear	5	26.9	no	41XX / 33XX	-
7-Jul-00	2 PSRE metamorphs, 2 PSRE adult males	light	clear	20	27.2	no	2000 / 33XX	90
7-Jul-00	2 PSRE adults, 1PSRE metamorph, 1 THEL adult, 1 THEL juvenile	light	clear	30	26.1	no	2000 / 33XX	100
7-Jul-00		light	clear	25	26.1	no	2000	40
7-Jul-00	1 SCGR adult (incidental observation)	light	clear	30	26	no	2000 / 33XX	-
18-Jul-00		light	partial	70	28.6	no	62XX	40
18-Jul-00		light	partial	60	28.9	no	5000 / 63XX	80
19-Jul-00		light	clear	30	27.5	no	5000 / 63XX	85
20-Jul-00	1 THEL juvenile	calm	clear	10	25.3	no	41XX / 62XX	35
20-Jul-00	1 SCGR adult, skin #5	calm	clear	15	28.4	no	73XX	-
20-Jul-00	1 SCGR juvenile	calm	clear	15	30.4	no	73XX	-
20-Jul-00	1 SCGR adult	calm	clear	15	31.7	no	73XX	-
21-Jul-00	1 SCGR adult, 1 PICA juvenile	calm	clear	10	29.9	no	73XX	-
21-Jul-00	1 SCGR adult	light	clear	10	29.6	no	73XX	-
21-Jul-00	1 SCGR adult, 1 SCGR juvenile	light	clear	5	29	no	73XX	-
21-Jul-00	1 SCGR adult	light	clear	5	29.5	no	73XX	-
21-Jul-00	1 SCGR adult	light	clear	20	30.3	no	73XX	-
21-Jul-00	2 SCGR adult	calm	clear	20	30.4	no	73XX	-
21-Jul-00	1 SCGR juvenile	calm	clear	15	30.4	no	73XX	-
22-Jul-00	1 SCGR adult	calm	clear	0	27.9	no	73XX	-
22-Jul-00	1 SCOC adult	light	clear	0	29.4	no	73XX	-
22-Jul-00	1 SCGR adult	light	clear	0	34.9	no	73XX	-
25-Jul-00	skin #1	calm	partial	75	29.6	no	5000 / 63XX	-
25-Jul-00	skin #2	calm	partial	75	29.6	no	5000 / 63XX	-
25-Jul-00	skin #3 (1 MATA juvenile)	calm	partial	75	29.6	no	5000 / 63XX	-
25-Jul-00	skin #4 (1 MATA adult)	calm	partial	75	29.6	no	5000 / 63XX	-
25-Jul-00	skin #5 (*Thamnophis* ?)	calm	partial	75	29.6	no	5000 / 63XX	-
26-Jul-00	50+ RAPI metamorphs	calm	partial	80	30.1	no	5000 / 63XX	110
27-Jul-00	1 CRVI adult	medium	overcast	20	28.8	no	33XX	-
27-Jul-00	47 RAPI metamorphs	medium	overcast	100	31.7	no	5000 / 63XX	60
28-Jul-00	1 GAWI adult male	calm	clear	15	27.7	no	33XX	-
28-Jul-00	2 GAWI adults	calm	clear	10	29.1	no	33XX	-
28-Jul-00	1 GAWI juvenile	calm	clear	15	29.4	no	33XX	-
28-Jul-00	1 PSMA metamorph, 2 RAPI adults, 3 RAPI larvae, 32 RAPI metamorphs	calm	clear	15	30.5	no	61XX	25
28-Jul-00	1 THEL adult (incidental observation)	calm	clear	15	30.8	no	5000	-

Date	Width	Depth	Site Type	NWI	Substrate	Origin	Drainage	pH	Cond.	T_W	Color	Turbidity	Dom Em Veg
7-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Jul-00	40	<1m	temp. pond	PE	mud	natural	none	6.3	440	28.1	clear	clear	grasses, rush
7-Jul-00	1	<1m	stream(canal)	PE	mud	man-made	permanent	6.3	380	27.6	clear	clear	grasses
7-Jul-00	10	<1m	temp. pond	PE	mud	natural	none	6.2	480	27.5	clear	clear	grasses, rush
7-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Jul-00	10	1-2m	spring/pond	PE	mud	man-mod	permanent	8.4	660	25.8	clear	clear	rush, grasses
18-Jul-00	80	>2m	perm. lake	LLME	mud	man-mod	occasional	10.8	440	28	clear	clear	rush, grasses
19-Jul-00	80	>2m	perm. lake	LLME	mud	man-mod	occasional	10.6	320	24.9	clear	clear	rush, grasses
20-Jul-00	13	<1m	perm. pond	PAB	sand/gravel	man-mod	permanent	6.8	430	21.3	clear	clear	rush
20-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Jul-00	50	>2m	perm. lake	LLME	mud	man-mod	permanent	8	240	22.4	clear	clear	bullrush,cattails
27-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jul-00	20	>2m	perm. lake	LLME	mud	natural	permanent	8.2	270	25.2	clear	clear	bullrush,cattails
28-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Jul-00	20	1-2m	perm. pond	PE	mud	natural	none	6.9	580	14.1	clear	clear	cattails
28-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-

Date	% Shore w/ Em Veg	N. Shore Characteristics	Fish	Forest Distance
7-Jul-00	-	-	-	-
7-Jul-00	-	-	-	-
7-Jul-00	>50	shallows pres./ em veg pres.	no	50
7-Jul-00	>50	-	no	50
7-Jul-00	>50	shallows pres./ em veg pres.	no	50
7-Jul-00	-	-	-	-
18-Jul-00	>50	shallows pres./ em veg pres.	yes	-
18-Jul-00	>50	shallows pres./ em veg pres.	yes	-
19-Jul-00	>50	shallows pres./ em veg pres.	yes	-
20-Jul-00	25-50	shallows pres./ em veg pres.	no	-
20-Jul-00	-	-	-	-
20-Jul-00	-	-	-	-
20-Jul-00	-	-	-	-
21-Jul-00	-	-	-	-
21-Jul-00	-	-	-	-
21-Jul-00	-	-	-	-
21-Jul-00	-	-	-	-
21-Jul-00	-	-	-	-
21-Jul-00	-	-	-	-
21-Jul-00	-	-	-	-
22-Jul-00	-	-	-	-
22-Jul-00	-	-	-	-
22-Jul-00	-	-	-	-
25-Jul-00	-	-	-	-
25-Jul-00	-	-	-	-
25-Jul-00	-	-	-	-
25-Jul-00	-	-	-	-
25-Jul-00	-	-	-	-
26-Jul-00	>50	shallows pres./em veg pres.	yes	-
27-Jul-00	-	-	-	-
27-Jul-00	>50	shallows pres./em veg pres.	yes	-
28-Jul-00	-	-	-	-
28-Jul-00	-	-	-	-
28-Jul-00	-	-	-	-
28-Jul-00	>50	shallows pres./em veg pres.	no	-
28-Jul-00	-	-	-	-

Date	Time	Locality	Observers	UTM	Elevation	Northing	Easting
1-Aug-00	12:58	Raft River BLM Exclosure	J. Shive	12	1488	4660186	297690
2-Aug-00	12:31	Independence Lakes 1	J. Shive	12	2687	4675326	280442
2-Aug-00	13:34	Independence Lakes 2	J. Shive	12	2750	4675180	279865
2-Aug-00	14:30	Independence Lakes 3	J. Shive	12	2763	4674710	279675
2-Aug-00	15:31	Independence Lakes 4	J. Shive	12	2806	4674485	279664
3-Aug-00	11:25	Sublett Reservoir	J. Shive	12	1607	4687878	331703
3-Aug-00	13:36	North of Sublett Reservoir	J. Shive	12	1650	4689380	331634
3-Aug-00	13:45	North of Sublett Reservoir	J. Shive	12	1648	4689289	331643
4-Aug-00	9:00	McClendon Springs	J. Shive, W. Hayes	12	1472	4689674	301752
Jun-00	-	Contributed Observations	M. McDonald	11	-	4700687	721907
Jul-00	-	Contributed Observations	M. McDonald	11	-	4700709	721817
25-Aug-00	19:21	Contributed Observations	R. Wilson	11	-	4686081	745360
11-Sep-00	-	Contributed Observations	R. Wilson	11	-	4687789	253422
11-Sep-00	-	Contributed Observations	R. Wilson	11	-	4687676	746135

Date	Species Present	Wind	Radiation	% Clouds	T_A	Precip.	GAP Analysis	Length
1-Aug-00	2 THEL adults	calm	partial	40	31.9	no	33XX / 62XX	-
2-Aug-00		light	partial	75	22.1	no	4000 / 73XX / 5000	50
2-Aug-00		light	partial	85	22.7	no	4000 / 73XX / 5000	60
2-Aug-00	200+ PSRE larvae	light	partial	80	22.7	yes	4000 / 73XX / 5000	50
2-Aug-00		light	partial	60	22.8	no	4000 / 73XX / 5000	50
3-Aug-00		light	partial	70	29.8	no	5000 / 33XX	50
3-Aug-00	1 COCO juvenile	calm	partial	85	30.6	no	62XX	-
3-Aug-00	1 THEL juvenile	calm	partial	85	30.7	no	62XX	-
4-Aug-00		calm	partial	65	23.1	no	61XX / 33XX	20
1-Jun-00	1 AMTI adult dead	-	-	-	-	-	-	-
1-Jul-00	1 PSRE	-	-	-	-	-	-	-
25-Aug-00	1 BUBO	-	-	-	-	-	-	-
11-Sep-00	1 COCO	-	-	-	-	-	-	-
11-Sep-00	1 MATA	-	-	-	-	-	-	-

Date	Width	Depth	Site Type	NWI	Substrate	Origin	Drainage	pH	Cond.	T_W	Color	Turbidity	Dom Em Veg
1-Aug-00	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Aug-00	35	>2m	perm. lake	LLMAB	mud/cobble	natural	permanent	8.5	10	19.3	clear	clear	grasses
2-Aug-00	35	>2m	perm. lake	LLMAB	mud/bedrock	natural	permanent	9.2	20	21.1	clear	clear	rush, grasses
2-Aug-00	40	>2m	perm. lake	LLMAB	mud/bedrock	natural	permanent	9	20	20.1	clear	clear	grasses
2-Aug-00	50	>2m	perm. lake	LLMAB	mud/bedrock	natural	permanent	8.5	20	20	clear	clear	grasses
3-Aug-00	50	>2m	perm. lake	LLMAB	mud	man-mod	permanent	9.7	380	24.2	clear	clear	-
3-Aug-00	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Aug-00	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Aug-00	15	>2m	perm. pond	PAB	mud	man-mod	none	9	430	17.3	clear	clear	grasses
1-Jun-00	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-00	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Aug-00	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Sep-00	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Sep-00	-	-	-	-	-	-	-	-	-	-	-	-	-

Date	% Shore w/ Em Veg	N. Shore Characteristics	Fish	Forest Distance
1-Aug-00	-	-	-	-
2-Aug-00	>50	shallows pres./em veg pres.	yes	1
2-Aug-00	1-25	shallows pres./em veg absent	yes	12
2-Aug-00	1-25	shallows pres./em veg absent	no	3
2-Aug-00	1-25	shallows pres./em veg absent	no	3
3-Aug-00	0	shallows pres./em veg absent	yes	-
3-Aug-00	-	-	-	-
3-Aug-00	-	-	-	-
4-Aug-00	1-25	shallows pres./em veg absent	yes	1
1-Jun-00	-	-	-	-
1-Jul-00	-	-	-	-
25-Aug-00	-	-	-	-
11-Sep-00	-	-	-	
11-Sep-00	-	-	-	-

Date	date of observation
Time	time observations were made
Site	Survey sites.
Locality	survey site
Observers	name(s) of observer(s)
UTM	Universal TransMercator; NAD 27
Elevation	in meters
Northing	UTM north-south coordinate
Easting	UTM east-west coordinate
Species Present	AMTI = Ambystoma tigrinum, BUBO = Bufo boreas, PSRE = Pseudacris regilla, PSMA = Pseudacris maculata, RAPI = Rana pipiens, GAWI = Gambelia wislizenii, UTST = Uta stansburiana, SCGR = Sceloporus graciosus, SCOC = Sceloporus occidentalis, EUSK = Eumeces skiltonianus, CNTI = Cnemidophorus tigris, COCO = Coluber constrictor, MATA = Masticophis taeniatus, PICA = Piuophis catenifer, THEL = Thamnophis elegans, CRVI = Crotalus viridis
Wind	calm, light, medium, heavy
Radiation	clear or partial
% Clouds	percent cloud cover
Ta	shaded air temperature at 1 meter
Precip.	precipitation yes or no
GAP Analysis	Idaho GAP analysis categories which characterize the habitat
Length (m)	estimated longest dimension
Width (m)	estimated maximum width
Depth	< 1, ~1 m, > 1 m
Site Type	beaver pond; a = active; i = inactive; perm. = permanent; temp = temporary
NWI	National Wetland Inventory Classification for wetlands: LLMAB = lacustrine, limnetic, aquatic bed; LLT = lacustrine, littoral; PAB = palustrine, aquatic bed; PE = palustrine, emergent
Substrate	mud, gravel
Origin	man-made, man-mod = man modified, natural
Drainage	none, occasional, permanent
pH	measured pH
Cond.	conductivy in mg/l
Tw	water temperature at 1 cm depth
Color	clear or stained
Turbidity	clear or cloudy
Dom Em Veg	Dom Em Veg = dominant emergent vegetation: grasses, rush, sedge, (-) = not applicable (none)
% Shore w/Em Veg	percent of shoreline with emergent vegetation: 0, 1-25, 25-50, > 50 %
Northern Shore Characteristics	shallows: absent or present; emergent vegetation: absent or present
Fish	yes (present) or no (not seen)
Forest Distance	estimated distance in meters from shoreline to nearest stand of trees

Appendix D. Voucher photograph taken of a Northern Leopard Frog metamorph at the Minidoka National Wildlife Refuge

Appendix E. Amphibian and reptile multiple observation form used for road driving observations.

Name _____

Affiliation _____

Address _____

Phone Number _____

See the instructions for filling out the Amphibian and Reptile Individual Observation Form for details on what information to provide.

SPECIES	DESCRIPTION	DATE & TIME	LOCALITY	HABITAT	REMARKS

Appendix F. Amphibian and reptile multiple observation data collected from road driving surveys and any other observations from roads that were made while driving to survey sites.

Species	Description	Date	Time	UTM	Northing	Easting	Elelvation	Habitat	Remarks
PICA	1 m, adult	1-Jun-00	14:00	11	4687610	745864	1422	agriculture	Observation by M. McDonald
CRVI	91.4 cm, adult	2-Jun-00	-	11	4687784	746147	1400	ag/ sagebrush steppe interface	Observation by M. McDonald
PICA	61 cm, juvenile	8-Jun-00	15:20	11	4688992	746586	1398	ag/ sagebrush steppe interface	
PICA	53.3 cm, juvenile	8-Jun-00	15:30	11	4692232	743727	1374	sagebrush/ crested wheat dominated	dead on road
CRVI	15.2 cm, juvenile	10-Jun-00	19:10	11	4684541	741316	1677	lowland between sage/ crested wheat hillsides	very aggressive, had a black button on tail
COCO	30.5 cm, juvenile	13-Jun-00	15:00	11	4688148	746151	1411	ag/ sagebrush, crested wheat interface	Observation by R. Wilson; dead on road
PICA	25.4 cm, juvenile	20-Jun-00	17:00	11	4696656	741346	1318	ag/ ag interface	Observation by R. Wilson; dead on road
CRVI	61 cm, adult	14-Jun-00	11:00	11	4687687	746436	1400	agriculture, near round corral at BCWMA	Observation by R. Wilson; killed by worker
PICA	61 cm, juvenile	14-Jun-00	-	11	4687782	746726	1399	ag/ crested wheat dominated interface	
PICA	30.5 cm, juvenile	18-Jun-00	-	11	4687240	256995	1349	sagebrush, cheatgrass, crested wheat dominated	very aggressive
SCOC	adult male	22-Jun-00	19:20	11	4684874	742572	1593	sage stepp next to a riparian area	sitting on a boulder near roadside
PICA	45.7 cm, juvenile	23-Jun-00	10:38	11	4684537	741439	1667	sagebrush, cheatgrass/ riparian interface	very docile and slow
MATA	91.4 cm, adult	27-Jun-00	19:20	11	4687701	745567	1426	riparian/ sagebrush, cheatgrass, crested wheat interface	dead on road
PICA	76.2 cm, adult	28-Jun-00	11:20	11	4684689	741961	1637	interface between sage steppe uplands	dead on road
PICA	22.9 cm, juvenile	28-Jun-00	18:10	11	4687783	746553	1389	ag/ ag interface near BCWMA	dead on road
CRVI	30.5 cm, juvenile	28-Jun-00	19:15	12	4687776	253566	1377	ag/ sagebrush, crested wheat interface	dead on road, missing head and rattle
THEL	45.7 cm, juvenile	29-Jun-00	9:20	11	4675937	740650	2143	Aspen forest/ sage steppe upland interface	dead on road
PICA	30.5 cm, juvenile	29-Jun-00	20:24	12	4686221	254806	1368	sagebrush, cheatgrass, crested wheat interface	very aggressive, hissing and rattling tail
PICA	45.7 cm, juvenile	30-Jun-00	8:37	12	4683999	256414	1389	sagebrush, cheatgrass, crested wheat interface	dead on road
PICA	91.4 cm, reddish, adult	5-Jul-00	18:40	12	4687791	253064	1391	ag/ sagebrush, crested wheat, cheatgrass interface	very docile
PICA	61 cm, dark colored, juvenile	5-Jul-00	21:30	12	4687576	254593	1371	ag/ sagebrush, crested wheat, cheatgrass interface	very mellow, skin feels cold
UTST	juvenile female	6-Jul-00	11:50	11	4690889	712096	1481	upland sage steppe interface	tail was missing, reddish tint
PICA	76.2 cm, adult	7-Jul-00	9:22	12	4664535	257877	1484	juniper, sage steppe uplands interface	reddish in color
SCGR	adult	7-Jul-00	11:53	12	4660338	258558	1537	burnt juniper woodland/ riparian interface	
SCGR	adult	7-Jul-00	12:05	12	4660357	258523	1545	burnt juniper woodland/ riparian interface	

Species	Description	Date	Time	UTM	Northing	Easting	Elelvation	Habitat	Remarks
SCGR	adult	7-Jul-00	12:25	12	4660380	258440	1527	burnt juniper woodland/ riparian interface	
SCGR	adult	7-Jul-00	12:30	12	4660448	258358	1532	burnt juniper woodland/ riparian interface	
PICA	adult	2-Jul-00	8:45	12	4687271	254009	1375	sagebrush, cheatgrass, crested wheat interface	quickly took refuge in a burrow
PICA	61 cm, juvenile	19-Jul-00	8:45	12	4682573	257358	1386	sagebrush, cheatgrass, crested wheat interface	dead on road, thin bodied
PICA	1.06 m, adult	19-Jul-00	14:15	11	4697175	711637	1331	sage steppe/ riparian interface	dead on road
SCGR	adult female	21-Jul-00	10:38	12	4662936	277822	1905	pinyon pine, mahogany, sagebrush/ granite interface	brown background color
SCGR	adult	4-Aug-00	10:16	12	4686577	300475	1511	sagebrush, crested wheat interface	
SCGR	adult	4-Aug-00	10:33	12	4685738	300143	1530	sagebrush, crested wheat interface	distinct dark brown coloring
SCGR	adult	4-Aug-00	10:47	12	4684243	299712	1467	sagebrush, crested wheat interface	distinct dark brown coloring
CNTI	adult	4-Aug-00	10:58	12	4683730	299558	1440	sagebrush, crested wheat interface	very fast, active

Appendix G. The dates, times spent surveying, genral route descriptions, and the corresponding results from road driving surveys.

Date	Time	Route	Results
8-Jun-00	17:00-19:30	Up Big Cedar Canyon, across to Dry Creek down, and back to the BCWMA on Mountain Rd.	No Observations
10-Jun-00	21:30-23:00	Mountain Rd. to Goose Creek Rd., turned around at the Austin Ranch entrance and back on same route	1 Western Rattlesnake juvenile
21-Jun-00	20:30-22:30	Up Big Cedar Canyon, across to Buckhorn Canyon, down and back to the BCWMA on Mountain Rd.	No Observations
23-Jun-00	8:30-11:00	Up and down Buckhorn Canyon and Big Cedar Canyon via Mountain Rd. to and from the BCWMA	1 Gopher Snake juvenile
28-Jun-00	9:00-12:30	Up and down Little Cedar Canyon, Robber Gulch, and Buckhorn Canyon via Mountain Rd.	1 Gopher Snake adult
29-Jun-00	20:00-22:00	Mountain Rd. to Goose Creek Rd., turned around at the Idaho/Utah border and back on same route	1 Gopher Snake juvenile
30-Jun-00	19:00-20:30	Up and down Buckhorn Canyon via Mountain Rd. to and from the BCWMA	No Observations
6-Jul-00	20:00-21:30	Mountain Rd. to Birch Creek Rd., turned around at the junction to the City of Rocks National Reserve and back on same route	No Observations
18-Jul-00	19:00-21:00	Mountain Rd. to Birch Creek Rd., through the City of Rocks National Reserve, and back on same route	No Observations
1-Aug-00	19:15-20:45	Up Big Cedar Canyon, across to Buckhorn Canyon, down and back to the BCWMA on Mountain Rd.	No Observations
3-Aug-00	18:30-19:30	Up Big Cedar Canyon, turned around at the junction with Buckhorn Canyon, and back on same route	No Observations

Appendix H. The dates, locations (UTM), number of aquatic funnel traps, trap nights, and the corresponding results from aquatic funnel trapping surveys.

Date	Locality	Northing	Easting	# of Traps	# of Nights	Results
6-Jul-00	Spring below Curtis Reservoir	4689976	712879	4	2	1 Pacific Treefrog tadpole
19-Jul-00	Ponded Stream (Cooper Property)	4697174	711215	5	2	No Observations
19-Jul-00	North Cottonwood Creek Resevoir	4698435	711958	8	2	No Observations
20-Jul-00	Pond on SE Corner of City of Rocks	4661746	278965	4	2	1 Western Terrestrial Garter Snake juvenile

Appendix I. The locations, dates, start and end points, and the estimated widths of all survey sites sampled in this study.

Locality	Date	Time	Start Location	Farthest Location Away	Approximate Width of Area Surveyed
Big Cottonwood Canyon	11-Jun-00	12:00-19:00	Trailhead	4680486, 741461	surveyed along trail (5 m) scouting potential survey sites
Big Cottonwood Canyon	19-Jun-00	9:45-12:40	4684143, 743813	surveyed to rocky face at top on the west side	surveyed about 70 meters wide
Buckhorn Canyon	20-Jun-00	10:10-10:35	4689909, 736750	about 60 meters up talus slope on northwest side	surveyed about 40 meters wide
Buckhorn Canyon	20-Jun-00	10:40-12:00	4689966, 738194	followed ridge up talus slope for 50 meters	surveyed about 40 meters wide
Buckhorn Canyon	20-Jun-00	15:00-15:45	4690183, 738450	followed ridge up past exposed rocks	surveyed about 50 meters wide
Robber Gulch	20-Jun-00	16:30-17:50	4690387, 739768	surveyed to top of hill on northern side	surveyed about 100 meters wide
Little Cedar Canyon	21-Jun-00	9:30-12:30	4688907, 743892	surveyed to top of hill on northern side	surveyed about 250 meters wide
Little Cedar Canyon	21-Jun-00	15:30-18:00	4688779, 743844	surveyed hillside on southern side up 60 meters	surveyed about 100 meters wide
Big Cedar Canyon	22-Jun-00	9:00-10:15	4687360, 744170	surveyed to top of exposed rocks on northern side	surveyed about 150 meters wide
Big Cedar Canyon	22-Jun-00	10:20-10:50	4687288, 744081	surveyed up to fenceline on southern side	surveyed about 50 meters wide
Big Cedar Canyon	22-Jun-00	10:55-12:10	4687027, 743610	surveyed uphill on northern side about 100 meters	surveyed about 100 meters wide
Big Cedar Canyon	22-Jun-00	16:30-19:30	4684574, 742280	followed stream to the north for 200 meters	surveyed about 25 meters wide
Cave Canyon Trail	27-Jun-00	10:00-10:45	4683244, 741115	4683307, 741076	suveyed about 70 meters wide
Cave Canyon Trail	27-Jun-00	11:00-11:20	4683033, 740900	4683074, 740848	surveyed about 30 meters wide
Big Cottonwood Canyon	27-Jun-00	16:45-17:30	4681188, 742652	surveyed up hillside for about 30 meters	surveyed about 90 meters wide
Big Cottonwood Canyon	27-Jun-00	17:35-18:30	4680650, 742065	surveyed up eastern talus slope for about 60 meters	surveyed about 200 meters wide
Bosteter Road (exposed rocky area and riparian)	28-Jun-00	9:45-10:30	4676192, 740299	4676009, 740173	surveyed about 25 meters wide
Big Cottonwood Canyon	28-Jun-00	12:00-13:20	4680004, 742079	surveyed entire wetland	surveyed entire wetland

Locality	Date	Time	Start Location	Farthest Location Away	Approximate Width of Area Surveyed
South End of Goose Creek Reservoir	30-Jun-00	9:30-12:30	4668371, 257508	4668427, 258497	surveyed about 150 meters wide
Austin Ranch	1-Jul-00	12:15-12:45	4663805, 256630	4663853, 256515	surveyed about 30 meters wide
South End of Goose Creek Reservoir	2-Jul-00	9:30-12:45	4668371, 257508	4668427, 258497	surveyed about 200 meters wide
Austin Ranch	5-Jul-00	10:05-12:15	4663805, 256630	4663853, 256515	surveyed about 50 meters wide
Austin Ranch (Canal)	5-Jul-00	12:20-15:20	4663820, 256713	4663057, 257091	surveyed 3 meters from shoreline on both sides
Austin Ranch (wetland west of canal)	5-Jul-00	15:20-16:15	4663796, 256685	surveyed entire wetland	surveyed entire wetland
Curtis Reservoir	6-Jul-00	12:35-11:15	4688082, 713792	surveyed where water had been before dryng up	surveyed where water had been before dryng up
Spring Below Curtis Reservoir	6-Jul-00	13:40-14:15	4689976, 712679	surveyed entire wetland	surveyed entire wetland
Sagehen Springs	6-Jul-00	14:25-15:05	4693963, 715123	surveyed entire wetland	surveyed entire wetland
Spring Near Fencline Below Sagehen Springs	6-Jul-00	16:00-16:20	4689563, 715104	surveyed entire wetland	surveyed entire wetland
Emery Creek	7-Jul-00	9:55-10:40	4661525, 260352	surveyed entire rock outcrop	surveyed about 20 meters wide
Emery Creek (riparian)	7-Jul-00	11:00-11:50	4660567, 258191	4660324, 258598	surveyed 3 meters from shoreline on both sides
Austin Ranch (wetlands east of canal)	7-Jul-00	13:20-14:55	4663762, 256745	4663474, 256692	surveyed all associated wetlands east of canal
Austin Ranch (wetlands east of canal)	7-Jul-00	15:00-15:35	4663474, 256692	surveyed entire wetland area	surveyed entire wetland area
Cooper Property (Spring)	18-Jul-00	15:19-16:10	4697174, 711215	surveyed entire ponded portion of the stream	surveyed entire ponded portion of the stream
North Cottonwood Creek Reservoir	18-Jul-00	16:15-17:26	4698227, 711878	surveyed around the perimeter of the reservoir	surveyed around the perimeter of the reservoir
North Cottonwood Creek Reservoir	19-Jul-00	11:50-14:22	4698435, 711958	surveyed around the perimeter of the reservoir	surveyed around the perimeter of the reservoir
Pond Near Lower SE of City of Rocks	20-Jul-00	9:50-11:07	4661746, 278965	surveyed entire wetland	surveyed entire wetland
Twin Sisters (City of Rocks)	20-Jul-00	11:30-1:00	4658030, 275030	surveyed around rocky peaks	surveyed about 50 meters wide
Twin Sisters (City of Rocks)	21-Jul-00	9:15-10:25	4658030, 275031	surveyed around rocky peaks	surveyed about 70 meters wide
Circle Creek Overlook (City of Rocks)	21-Jul-00	10:35-12:35	4662942, 277653	4663465, 277805	surveyed about 30 meters wide
Circle Creek Trail (Loop)	22-Jul-00	8:20-13:15	4662942, 277653	surveyed the north fork up to Indian Groves	surveyed east to Bread Loaves and finished near Stripe Rock

Locality	Date	Time	Start Location	Farthest Location Away	Approximate Width of Area Surveyed
Minidoka National Wildlife Refuge	25-Jul-00	16:15-19:41	4725298, 300716	surveyed perimeter of cove and shoreline	surveyed perimeter of cove and shoreline
Minidoka National Wildlife Refuge	26-Jul-00	10:30-16:12	4725423, 299677	surveyed perimeter of cove and shoreline	surveyed perimeter of cove and shoreline
Minidoka National Wildlife Refuge (Bobcat Canyon)	27-Jul-00	9:30-13:00	4721304, 302737	4721451, 312079	surveyed primarily the exposed rock cliffs on the northern side
Minidoka National Wildlife Refuge	27-Jul-00	13:09-14:47	4720957, 312735	surveyed perimeter of cove and shoreline	surveyed perimeter of cove and shoreline
Minidoka National Wildlife Refuge (desert)	28-Jul-00	9:20-11:50	4727914, 296565	surveyed rocky desert for about 100 meters length	surveyed about 70 meters wide
Minidoka National Wildlife Refuge (wetland)	28-Jul-00	12:27-13:10	4727785, 297230	surveyed entire wadable porion of the wetland	surveyed entire wadable porion of the wetland
Raft River (BLM exclosure)	1-Aug-00	12:20-15:22	4659716, 297380	4660306, 297793	surveyed about 10 meters from shoreline on both sides
Independence Lakes (1)	2-Aug-00	12:31-13:28	4675326, 280442	surveyed perimeter and shallows of lake	surveyed perimeter and shallows of lake
Independence Lakes (2)	2-Aug-00	13:34-14:22	4675180, 279855	surveyed perimeter and shallows of lake	surveyed perimeter and shallows of lake
Independence Lakes (3)	2-Aug-00	14:30-15:23	4674710, 279675	surveyed perimeter and shallows of lake	surveyed perimeter and shallows of lake
Independence Lakes (4)	2-Aug-00	15:31-16:20	4674485, 279664	surveyed perimeter and shallows of lake	surveyed perimeter and shallows of lake
Sublett Reservoir	3-Aug-00	11:25-13:24	4687878, 331703	surveyed northern shallow portion of the reservoir	surveyed northern shallow portion of the reservoir
Sublett Reservoir	3-Aug-00	13:30-14:10	4689440, 331656	4689249, 331614	surveyed 8 meters from shoreline on both sides and associated wet meadows
McClendon Springs	4-Aug-00	9:00-10:20	4689674, 301752	surveyed perimeter of wetland	surveyed perimeter of wetland