Draft

Habitat Evaluation, Wildlife Inventory and Monitoring Plan

Shoshone-Paiute Tribes
Duck Valley Indian Reservation

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BPA Project Number 32008

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Introduction

The Duck Valley Indian Reservation lies within the Owyhee/Bruneau Canyonlands, a 2.7 million acre region in southwestern Idaho which is rich in unique geologic, biological, and cultural resources. A diversity of habitat types provides critical habitat for sage grouse, raptors, pronghorn, loggerhead shrikes, colonial nesting birds and the largest population of bighorn sheep in the United States (Schnitzspahn et al. 2000). Duck Valley Indian Reservation, home to the Shoshone-Paiute Tribes, is 289,820 acres (117,286 ha) in size and spans 450 square miles. Many state and federal "species of concern" occur within Reservation boundaries but, to-date, no formal study has been conducted to document species diversity, habitat relationships or relative abundance, nor have any investigations been made into the diversity, complexity and condition of the Reservation's terrestrial habitat.

The Tribes propose to conduct two years of wildlife inventory and habitat evaluation work to document species diversity, habitat relationships and relative abundance of both wildlife and vegetation resources. Information gleaned from this research will be utilized on the Reservation (for land use planning, wildlife resource management decisions, zoning, etc.) and in regional planning efforts such as the Northwest Power Planning Council's Subbasin Planning Process, sage grouse conservation plans, and regional raptor monitoring efforts.

Information resulting from this research effort will be disseminated, through reports, GIS data layers and other appropriate means to the Idaho Conservation Data Center, Nevada Natural Heritage Program, University of Idaho's Landscape Dynamics Lab, state and federal wildlife management agencies and others responsible for managing wildlife resources in the region.

Objectives

The objectives of this research effort are:

- To gather baseline data on wildlife species presence/absence, relative abundance and habitat associations.

- Determine distribution and relative abundance of species of concern (Tribal/state/federal).

- Evaluate habitat diversity, structure, integrity and condition across all Reservation habitats and grazing districts (3).

- Document findings of these investigations for the Tribal Council's use and by Tribal departments involved in managing natural resources, land use, zoning, etc.

- Disseminate wildlife information to others in the region that are responsible for wildlife resource management, and/or are involved in subbasin planning efforts.

- Establish a baseline and foundation for future wildlife research efforts.

Methods

A list of species potentially occurring on the Reservation was compiled from a number of sources, including: Idaho Conservation Data Center, Nevada Natural Heritage Program, Nevada Division of Wildlife, Idaho Department of Fish and Game, Oregon Division of Fish and Wildlife, Bureau of Land Management and Humboldt-Toiyabe National Forest (Appendix A). This list will be reviewed by ornithologists, mammalogists and herpetologists at the University of Idaho, Idaho State University and Boise State University and their input will be incorporated into the potential species list.

In order to verify species presence/absence, a number of multi-species surveys will be conducted over the next two years. More extensive investigations will be conducted on species of concern such as the Columbia spotted frog (*Rana luteiventris*), sage grouse (*Centrocercus urophasianus*) and insectivorous bats.

The Tribes will use probabilistic sampling to determine survey points across the Reservation. Using the Universal Transverse Mercator (UTM) coordinate system, a permanent grid with spacing of 200 meters will be established for the Duck Valley Indian Reservation. This spacing (consistent with Albeni Falls M&E Plan 2001) is equal to the preferred distance recommended between bird point-count stations (Huff et al. 2000) and yields one sample point per 4 ha. The starting grid point will be determined by selecting a random number from 1 to 200 meters from the northern boundary of the Reservation and from 1 to 200 meters from the western boundary of the Reservation. Each grid point will be sequentially numbered. A systematic sample of 300 points will be taken (1% of potential sample points) using a random start. Half of these points will be monitored in 2003 and the remainder during 2004. For areas of special interest (i.e., riparian, wetland habitats) for which we are interested in doing more extensive monitoring on, we can use an unequal sampling probability approach which will accomplish most of the objectives of stratification without some of the problems associated with that approach (Fancy 2000).

Vegetation sampling protocols have not yet been developed due to time constraints, but the Tribes will work with the Southern Idaho Wildlife Mitigation core team, Albeni Falls Work Group and Columbia Basin Fish and Wildlife

Authority biologists to accomplish this task. Vegetation sampling will be conducted in conjunction with some wildlife surveys in order to accomplish these tasks in the most efficient and cost-effective manner.

Following please find wildlife survey protocols that are being proposed for this project. Not all of the protocols are fully developed. The Tribes will continue to consult with wildlife biologists across the region to make improvements to the protocols and plan. The Tribes have also made provisions in the project budget to utilize the expertise of a University of Idaho wildlife with statistical sampling design expertise.

Sage Grouse Monitoring Protocol

Background and Objectives

Sage grouse (*Centrocercus urophasianus*) are a sagebrush steppe obligate species. Breeding populations across the west have declined 17-47% over the last 70 years (Connelly and Braun 1997). Sage grouse are a species of concern in Nevada (being considered for listing in Idaho) a sensitive species by the BLM and a culturally important species to the Tribes. Concern over a declining population trend has prompted Nevada, Idaho, and the Tribes to develop sage grouse conservation plans and to initiate a number of research projects in the southwestern Idaho/northern Nevada area (Saul et al. 2001).

According to tribal members and to land owners in the immediate area of the Reservation, sage grouse were once very abundant and would congregate in large flocks in late spring and summer. While the Reservation still supports a large number of birds it is unclear whether a portion of the population are year-round residents or whether they are migratory. According to Connelly et.al's (2000) guidelines, the first step in effectively managing a sage grouse population is to identify lek sites and determine if the population is migratory or nonmigratory. During the first two years of the study the Tribes will identify lek sites on the Reservation and conduct lek counts. During the second year of the study the Tribes, in coordination with other sage grouse efforts in the area, may radio tag a number of birds at lek sites to determine their seasonal use of habitats on and off the Reservation, and migratory status.

The objectives of this effort are to:

- Identify sage grouse leks on Duck Valley Reservation.
- Gather baseline data on lek attendance.
- Establish a long-term sage grouse monitoring plan to determine population trend.
- Provide Reservation planning offices with information on lek sites so that this information will be considered when planning activities that impact land use.

Sampling Design

Aerial surveys will be conducted to identify lek sites on the Reservation. This survey method was selected because it is the most efficient way of surveying the entire Reservation and can be accomplished in a short period of time. Many areas of the Reservation are inaccessible during winter and early spring due to poor road conditions or lack of roads.

Due to a number of factors, including number of counts conducted per lek per season, weather, observability, etc., lek counts may not provide an accurate assessment of grouse populations (Beck and Braun 1980). Despite these problems, lek counts provide the best index to breeding population levels in an area due to the long-term nature of the monitoring program (50+ years in Idaho) (Connelly and Braun 1997).

During the first year of the survey, lek counts will be conducted by air. In addition, any lek(s) previously identified on the Reservation that are accessible to Wildlife and Parks staff would be double sampled to estimate observability. The natural estimator of β, the proportion of animals seen from the air, is the ratio of the mean aerial count divided by the mean ground count. The total number of male sage grouse present can then be determined by dividing the total number of birds seen from the air by the natural estimator for β (Lancia et al. 1996). This number would be an estimate of the total number of displaying males on the Reservation. The most critical consideration in this type of sampling is the accuracy of the ground count, because the method assumes that the ground counts are 100% accurate. If the number of males seen from the air exceeds the number counted on the ground, then estimates of total males present will be biased low.

Lek surveys will be conducted twice between March 15th and April 15th. Wildlife biologists will depart from Elko airport at dawn aboard a Bell helicopter. The helicopter will proceed to the southeastern border of the Reservation. Transects will be flown in an east to west pattern 500 feet above ground. Distance between transects will be ½ mile (Commons 2002). Upon locating a lek, the UTM coordinates will be recorded on a GPS unit and a lek survey form will be filled out (Figure 1). Number of males in attendance at lek will be noted as well as pertinent weather/location data. The helicopter will proceed on transect route until entire Reservation has been surveyed or 2 – 2.5 hours after sunrise.

Field Methods

Pre-field season preparations:

- Two months prior to conducting lek surveys the Tribes will obtain bids from helicopter flight contractors. Contracts will be negotiated and purchase order issued.
- GPS unit will be purchased.
- Coordinate with agency biologist (NDOW or IDFG) to establish aerial survey schedule.
- Coordinate with ICDC, NNHP, IDFG, NDOW and others to determine information needs of agencies to facilitate data transfer.

On survey dates the following equipment will be required: GPS unit, lek survey sheets, binoculars, camera, maps of Reservation.

Data Handling, Analysis and Reporting

Lek data will be input into GIS database.

Data will be forwarded to the following entities: Lands, and Natural Resources office at DVIR, IDFG, NDOW, ICDC, NNHP, BLM. IDFG will incorporate Tribes' lek data into their statewide data set.

Personnel Requirements and Training

During the initial year of the surveys, a trained Tribal staff member as well as a biologist from IDFG or NDOW will conduct the lek surveys. In subsequent years, surveys will be conducted with SPT staff biologist and W&P staff member or member of the Sage grouse Working Group.

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Figure 1. Sage Grouse Lek Survey Form (IDFG)

Sage/Sharp-tailed Grouse Lek Route Survey

☐ Sage Grouse ☐ Sharp-tailed Grouse County:

Lek Route Name: Date of Survey:

Observer: Official Sunrise:

Weather: Start Time: End Time:

Summary: Active Leks Comments:

Total Males Counted

				Legal Description[a]				UTM Coordinates[A]		
Time	Lek No.	Lek Name	Males	Twp.	Range	Sect.	¼ ¼ ¼ Sect.	Northing	Easting	Comments
		Total Males Counted								

[a]Record location if lek has moved from previous years, if previously recorded location is inaccurate or if lek is new on the route.

Columbia Spotted Frog Monitoring Protocol

Background and Objectives:

The Columbia spotted frog (*Rana luteiventris*) occurs in four disjunct populations (Great Basin, West Desert, Wasatch, Northern) across northwestern North America. Spotted frog populations in the southern and western portions of the species range, including those in southwestern Idaho and northern Nevada, are declining and/or are facing significant threats including loss of habitat due to conversion of wetland habitats, dewatering of river areas, and impacts from livestock grazing (Gomez 1994).

The Great Basin population is one of three "candidate" populations currently being considered for listing by the U.S. Fish and Wildlife Service (USFWS). The USFWS initiated a long-term monitoring program for the Owyhee subpopulation in 2001 in order to assess long-term subpopulation trend and to identify and recommend changes in land use practices that would facilitate the long-term persistence of the species (Engle 2001).

Spotted frogs are associated with permanent water sources such as marshy edges of ponds or lakes, algae-filled overflow pools of streams, spring complexes, or in wet areas of emergent vegetation. After breeding they often move considerable distances to foraging areas such as seeps, moist meadows, pools, or permanent water (Gomez 1994, Engle 2001).

Because amphibians in general, and spotted frogs in particular, are closely associated with riparian, wet meadow, and wetland areas and due to their physiological (permeable skin) and ecological traits (complex life history), they can serve as indicators of environmental health (Heyer et. al 1994).

The objectives of this inventory and monitoring effort are to:

- Conduct a survey of suitable spotted frog habitat to determine presence/absence of the species and to establish a baseline for future spotted frog monitoring.
- Collect information on the distribution, number present, sex ratio and life history stage of spotted frogs on the Reservation.
- Collect baseline habitat information including: water chemistry, percent vegetative utilization by animals, vegetative stability and degree of streambank alteration.
- Work in conjunction with and share data with regional land management agencies including USFWS, Idaho Department of Fish and Game (IDFG), Nevada Division of Wildlife (NDOW), Bureau of Land Management (BLM) and the Humboldt-Toiyabe National Forest.
- Provide species occurrence data to Idaho Conservation Data Center and Nevada Natural Heritage Program.

Sampling Design

Spotted frog monitoring will consist of visual encounter (VES), water chemistry and land/vegetation use surveys according to protocols defined in the USFWS long-term monitoring program for the Owyhee subpopulation (described below) (Engle 2001). This sampling design was selected because it is relatively simple to conduct, provides an estimate of relative abundance, provides a crude assessment of habitat condition, and can be compared with, and added to, data that USFWS and others are collecting.

Visual encounter surveys involves the systematic search of an area or habitat for a prescribed period of time. The method is based on the following assumptions:

- Every individual has the same chance of being observed during the survey
- An individual is recorded only once during the survey
- There are no observer-related effects (Crump and Scott 1994)

Water chemistry and land/vegetation use surveys will be conducted to provide a general understanding of the condition of the habitat. This data will be evaluated to identify areas in need of protection/enhancement and/or further investigations. Data will also be shared with appropriate land management agencies and USFWS.

Sample sites will be selected in the following manner:

Using the Universal Transverse Mercator (UTM) coordinate system, a permanent grid with spacing of 200 meters will be established for the Duck Valley Indian Reservation. The starting grid point will be determined by selecting a random number from 1 to 200 meters from the northern boundary of the Reservation and from 1 to 200 meters from the western boundary of the Reservation. Each grid point will be sequentially numbered. The grid will be placed over national wetland inventory maps of the Reservation in a GIS and the areas of interest, identified as wetland, riparian, wet meadow, spring and riverine will be randomly sampled using an unequal selection probability approach (Fancy 2000). This will allow sampling to occur in potential spotted frog habitat, while avoiding some of the complications related to a stratified random sample approach. The number of sites to be sampled in 2003 is estimated to be 15-20 (subject to revision).

Field Methods

Pre-field season preparations will include:

- Coordination with USFWS to arrange training sessions for staff

- Ordering equipment including: dip nets, hip waders, multi-parameter water quality meter, GPS unit, spring balance. Arrange for use of Trimble GPS unit from other Tribal department (2 are needed for survey)
- Development of database
- Generate maps of survey sites, prepare data sheets

Spotted frog surveys will be conducted from mid-May through mid-July. Surveys will not be conducted on days of high winds or on rainy days because research indicates that amphibian activity, distribution and dispersion patterns are strongly influenced by wind currents and precipitation (Crump 1994). Each survey site will be visited once during the May-July sampling frame. Strict adherence to the disease protocols (Figure 2) will be required of all survey personnel. One wildlife biologist and one field technician will arrive at survey site and be prepared to start surveying by 10:00 a.m. MST. GPS coordinates, elevation and start time will be recorded and the starting location marked with flagging tape. Visual encounter surveys will be conducted using a quadrat design. Survey plots measuring 20 (w) x 25 m (l) in size which straddles the stream will be established. One person will be located on each side of the stream. The area will be systematically sampled by walking parallel paths across the plot with spacing of 2 m between paths. Twenty minutes will be allocated for each survey plot, and 12 plots will be surveyed each day. Each frog encountered will be captured by dip net and the following information recorded on data sheets (Figure 3):

Time of capture
Individual's gender
Snout-to-Vent Length (mm)
Weight
GPS coordinates (Datum NAD27, Zone 11)
Abnormalities, unique habitat, etc. (in comments section)

Frogs displaying physical deformities will be placed in a temporary holding container until the end of the sampling period (20 minutes maximum). A photograph will be taken of the frog and the habitat from which it was captured. The data collected from the individual, along with the photographs, will be forwarded to USFWS or appropriate entity involved in researching incidences of amphibian deformities.

Specific details on measurements, etc. are according to Engle 2001a:

Determining Gender –

Adults (M or F): gender of adult frogs is determined by examining their thumbs for presence/absence of enlarged, dark nuptial pads which are characteristic of adult males. Females lack these pads and typically attain snout-to-vent lengths (SVL) of greater than 65 mm whereas males are typically 50-60 mm

If sex is not distinguishable it is recorded as:

Metamorph (MT) – if the SVL is 40 mm or less or young of year
Subadult (SA) – if the SVL is over 40 mm

Snout-to-Vent Length (SVL) – Measured by placing individual in palm of left hand, snout toward wrist, and firmly pressing flat ruler against dorsal surface to straighten and lengthen the spine.

Weight (g) – Measured by suspending the frog in a lightweight cotton bag from a Pesola spring scale (accurate to .5g). Weight is recorded to nearest .5 g and weight of cotton bag is subtracted entry.

GPS Coordinates – UTM Coordinates recorded using Datum NAD27, Zone 11

At the end of each study plot, water chemistry data, temperature, wind speed, and weather conditions will be recorded on data sheets by the wildlife biologist while the field technician marks off the next 25 m plot.

At the end of the day the ending UTM coordinates and elevation will be recorded and the end point marked with a rebar stake. Photographs will be taken at start and end points of the survey according to Hall (2001) protocols (or to specific protocols developed and documented prior to implementation of monitoring). The entire stream section will be walked when returning to vehicle and the land/vegetation use survey will be completed (Figure 4). The flagging used at the starting point will be replaced with a rebar stake. Data sheets from each surveyor will be stapled together and attached to a copy of the survey site map and returned to the Wildlife and Parks Department where it will be input into the computer database.

Data Handling, Analysis and Reporting

Data will be input into the computer database at least weekly and both surveyors will be involved in reviewing and verifying the accuracy of the computer-generated spreadsheets.

The spotted frog data will be entered into a GIS and used to generate maps indicating areas of the reservation where spotted frog monitoring has occurred as well as point data indicating the location of each spotted frog capture. This data will be shared with the Environmental Protection Office, Lands Department and Natural Resources Office on the Reservation so they may consider potential impacts of their activities on the species.

The presence/absence data and habitat evaluation data will be forwarded at the end of the season to the USFWS, Idaho Conservation Data Center and Nevada

Natural Heritage Program. Others interested in this data may obtain it from the Wildlife and Parks Department on the Duck Valley Indian Reservation.

The results of the presence/absence surveys will be reviewed with the USFWS in fall 2003 and may lead to a more intensive, statistical monitoring effort at selected sites in 2004.

Personnel Requirements and Training

Wildlife and Parks personnel will receive training by the U.S. Fish and Wildlife Service (Boise office) on proper monitoring protocols. The wildlife biologist and a field technician will conduct surveys.

References:

Declining Amphibian Task Force. 2001. Disease protocol (fieldwork code of practice). U.S. Fish and Wildlife Service website: http://ventura.fws.gov/SurveyProt/DAPTF_prot.htm)

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Figure 2. Disease Protocol

Disease Protocol

The Declining Amphibian Task Force
Fieldwork Code of Practice
(from: http://ventura.fws.gov/SurveyProt/DAPTF_prot.htm)

A code of practice, prepared by the Declining Amphibian Task Force (DAPTF) to provide guidelines for use by anyone conducting field work at amphibian breeding sites or in other aquatic habitats. Observations of diseased and parasite-infected amphibians are now being frequently reported from sites all over the world. This has given rise to concerns that releasing amphibians following a period of captivity, during which time they can pick up unapparent infections of novel disease agents, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried in a variety of ways between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to novel localities containing species which have had little or no prior contact with such pathogens or parasites. Such occurrences may be implicated in some instances where amphibian populations have declined. Therefore, it is vitally important for those involved in amphibian research (and other wetland/pond studies including those on fish, invertebrates and plants) to take steps to minimize the spread of disease and parasites between study sites.

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires and all other surfaces. Rinse cleaned items with sterilized (e.g. boiled or treated) water before leaving each study site.
2. Boots, nets, traps, etc., should then be scrubbed with 70% ethanol solution (or sodium hypochlorite 3 to 6%) and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond or wetland.
3. In remote locations, clean all equipment as described above upon return to the lab or “base camp.” Elsewhere, when washing machine facilities are available, remove nets from poles and wash with bleach on a “delicates” cycle, contained in a protective mesh laundry bag.
4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolated species, wear disposable gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean and store them separately at the end of each field day.
5. When amphibians are collected, ensure the separation of animals from different sites and take great care to avoid indirect contact between them (e.g. via handling, reuse of containers) or with other captive animals. Isolation from unsterilized plants or soils which have been taken from other sites is also essential. Always use disinfected/disposable husbandry equipment.

6. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.
7. Used cleaning materials (liquids, etc.) should be disposed of safely and if necessary taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

Figure 3. Amphibian and Reptile VES Data Sheet (Engle 2001)

Amphibian and Reptile Visual Encounter Search Data Record Sheet

Observer ____________	Sample Plot # ____ Compass Reading(s)________
Date ____________	Wind Speed ____________
Location ____________	Weather ____________
Start UTMs ____________	Temperature ____________
End UTMs ____________	Start Time ________ End Time ________
Elevation Start Elevation End	

Time	Sex	Mass	UTM	UTM	Transect #	Species	Specific Location and comments

Comments:____

Figure 4. Habitat/Land Use Ratiings (Platts 1987)

Habitat/Land Use Ratings (Platts 1987)

Streambank soil alteration rating

Rating	Description
0%	Streambanks are stable and are not being altered by water flows or animals.
1-25%	Streambanks are stable, but are being lightly altered along the transect line. Less than 25% of the streambank is receiving any kind of stress and if stress is being received, it is very light. Less than 25% of the streambank is false, broken down, or eroding.
26-50%	Streambanks are receiving only moderate alteration along the transect line. At least 50% of the streambank is in a natural stable condition. Less than 50% of the streambank is false, broken down, or eroding. False banks are rated as altered. Alteration is rated as natural, artificial, or a combination of the two.
51-75%	Streambanks have received major alteration along the transect line. Less than 50% of the streambank is in a stable condition. Over 50% of the streambank is false, broken down, or eroding. A false bank that may have gained some stability and cover is still rated as altered. Alteration is rated as natural, artificial, or a combination of the two.
76-100%	Streambanks along the transect line are severely altered. Less than 25% of the streambank is in a stable condition. Over 75% of the streambank is false, broken down, or eroding. A past damaged bank, now classified as a false bank, that has gained some stability and cover is still rated as altered. Alteration is rated as natural, artificial, or a combination of the two.

Streambank vegetative stability rating

Rating	Description
4	**Excellent** - Over 80% of the streambank surfaces are covered by vegetation in vigorous condition or by boulders and rubble. If the streambank is not covered by vegetation, it is protected by materials that do not allow bank erosion.
3	**Good** – 50-79% of the streambank surfaces are covered by vegetation or by gravel or larger material. Those areas not covered

by vegetation are protected by materials that allow only minor erosion.

2 **Fair** – 25-49% of the streambank surfaces are covered by vegetation or by gravel or larger material. Those areas not covered by vegetation are covered by materials that give limited protection.

1 **Poor** – Less than 25% of the streambank surfaces are covered by vegetation or by gravel or larger material. That area not covered by vegetation provides little or no control over erosion and the banks are usually eroded each year by high water flows.

Vegetation use by animals

Rating	**Description**
0-25%	**Light** – Vegetation use if very light or none at all. Almost all of the potential plant biomass at present stage of development remains. The vegetative cover is very close to that which would occur naturally without use. If bare areas exist (i.e., bedrock), they are not because of loss of vegetation from past grazing use.
26-50%	**Moderate** – Vegetation use is moderate and at least one-half of the potential plant biomass remains. Average plant stubble height is greater than half of its potential height at its present stage of development. Plant biomass no longer on site because of past grazing is considered as vegetation that has been used.
51-75%	**High -** Vegetative use is high and less than half of the potential plant biomass remains. Plant stubble height averages over two inches. Plant biomass no longer on site because of past grazing is considered as vegetation that has been used.
76-100%	**Very High –** Use of the streamside vegetation is very high. Vegetation has been removed to two inches or less in average stubble height. Almost all of the potential vegetative biomass has been used. Only the root system and part of the stem remains. That potential biomass that is now non-existent because of past elimination but grazing is considered vegetation that has been used.

Bat Monitoring Protocol

Background and Objectives:

Of the fourteen bat species that occur in the Owyhee subbasin, thirteen are thought to occur within Reservation boundaries. Ten of those species are species of concern for the state of Idaho, Nevada, and/or BLM (Saul et al. 2001)(Table 1).

Duck Valley Reservation provides unique habitat features for a number of insectivorous bats. Cliff faces, caves, talus and slide rock provide suitable roosting habitat while an extensive wetland complex and intact uplands provide excellent foraging opportunities.

Table 1. Bat Species of Concern in Owyhee/Bruneau Subbasins (Saul et al. 2001)

Common Name	Species Name	State Species of Concern	BLM	USFWS	USFS
Pallid bat	Antrozous pallidus	ID			
Townsend's big-eared bat	Corynorhinus townsendii	ID, NV	Sensitive	Watch	Sensitive
Spotted bat	Euderma maculatum	ID, NV	Sensitive	Watch	Sensitive
Big brown bat	Eptesicus fuscus				
California myotis	Myotis californicus				
Western small-footed myotis	Myotis ciliolabrum	ID, NV	Sensitive		
Long-eared myotis	Myotis evotis	ID, NV	Sensitive		
Little brown bat	Myotis lucifugus				
Fringed myotis	Myotis thysanodes	ID, NV	Sensitive	Watch	
Long-legged myotis	Myotis volans	ID,NV	Sensitive		
Yuma myotis	Myotis yumanensis	ID, NV	Sensitive	Species of Concern	
Western pipistrelle	Pipistrellus hesperus	ID	Sensitive	Watch	
Brazilian free-tailed bat		NV			
Hoary bat	Lasiurus cinereus				

The objectives of this study are to:

- Perform a broad, preliminary survey to determine bat species presence/absence on the Reservation, with special emphasis on species of concern.
- Assess general patterns of habitat use.
- Verify, through mist netting, bat species presence.
- Establish a baseline for future bat monitoring and/or research.
- Collect specimens of any previously undocumented species (i.e., Brazilian free-tailed bat)

Sampling Design

A number of observational and capture techniques are available for studying bat species, including: disturbance counts, roost counts, hibernating bat counts, ultrasonic bat detection, hoop netting, mist netting, and use of harp trap. We chose to use a combination of mist-netting and ultrasonic bat detection to achieve survey goals. The ultrasonic bat detection technique was selected because it does not require handling of species and is the most effective method for large-scale recording of bat activity (White and Gehrt 2001). Ultrasonic echolocation calls by bat species can be detected using portable ultrasonic bat detectors and characteristic patterns could be used to make precise species determination. However, with the current technology, it is not always possible to classify calls to the species level, in some cases not even to the genus level (Doering and Keller 1998). The AnaBat II bat detector system uses a divide-by-counter for ultrasonic frequency compression and a zero crossing interface module for call analysis. (AnaBat II 2001). Limitations of the system are: some diagnostic call components are lost, including harmonics, and intra-specific and intra-individual call variation compound these limitations.

In light of the limitations of using bat detectors, Kunz et al. (1996) recommended that bat detector data be integrated with capture data to "characterize the composition of bat communities fully." Mist-netting is the most effective technique for capturing bats (Jones et al. 1996), provides more complete species information and allows for less ambiguous species identification(Doering and Keller 1998). Mist-netting will be conducted at 20 sites on the Reservation.

Sample sites will be selected as follows:

Of the 150 permanent sampling points selected for 2003 surveys, a random subset of 40 sites will be selected for bat echolocation surveys. The rationale behind this decision is that there are five sampling days per week but only four evening sampling opportunities (only one AnaBat II monitor would be purchased for this survey). One of the three sites that are monitored during the day will be monitored using AnaBat II recording equipment. The bat detector and laptop computer will be set up to record bat echolocation calls during the standardized observation period from dusk until 1:00 a.m.

Mist netting sample sites will be selected as follows. The grid that was used to select permanent sample points will be overlaid on a vegetation map of the Reservation. Riparian, canyon rim, permanent water sources and upland habitats will be randomly sampled using an unequal selection probability approach (Fancy 2000). This will allow sampling to occur in potential bat habitat, while avoiding some of the complications related to a stratified random sample approach. The number of sites to be sampled in 2003 is estimated to be 20 (subject to revision).

Field Methods

Pre-field preparations:

- Visit university/museum bat collections and study specimens.
- Obtain rabies shots for all field personnel.
- Consult with biologists familiar with the AnaBat II system to discuss potential monitoring issues.
- Have bat expert assist with field training of personnel.
- Obtain recordings of spotted bat calls.
- Obtain collection permit.
- Purchase mist nets, AnaBat II equipment, calipers, Pesola scale.

Field methods will be similar to those of Doering and Keller (1998) with the exception of the recording medium used. Bat echolocation calls will be recorded with a laptop computer instead of a tape recorder. White and Gehrt (2001) found that data recordings made directly to a computer were of greater quality than those made on tape and a significantly higher percentage of bat calls were classifiable to the species level.

Bat monitoring will occur in two phases. Forty sites will be monitored in conjunction with vegetation sampling from May through early July. The remaining sites (20) will be surveyed using mist-netting in conjunction with AnaBat II monitoring. These surveys will take place between the last week of July and second week of September (consistent with Doering and Keller).

Specific methods for mist netting (Doering and Keller 1998):

Each night, 50 and 110 denier 2.2 meter x 12.9 meter 2-ply nylon mist nets (6.0 centimeter mesh, Avinet Corp.) arrays will be deployed using 2.7 meter long telescoped PVC pipe at designated sample sites. The arrays will be set up in areas likely to intercept bats in flight. When appropriate, nets will be set up in Y or V shapes to promote bat encounters with the nets. Trapping effort is expressed in bats captured per # of net foot hours.

When a bat becomes entangled in the net the net is immediately lowered and the bat removed. Time of capture, GPS coordinates, and location in the net (number of meters above ground) are noted. Captured bats are identified to species, sexed and weighed. Forearm length is measured, reproductive status ascertained and then the bat is released.

The day after the trapping session the observers will return to the site and evaluate the habitat according to vegetation monitoring protocols.

Data Handling, Analysis and Reporting

Bat echolocation calls will be analyzed using AnaBat II call analysis software to determine bat activity level and species presence. Bat activity level will be expressed as number of passes per unit time and will be pooled both within cover types and across cover types. Species diversity will also be assessed both within and across cover types.

Data generated from this research effort will be shared with Idaho Conservation Data Center, Nevada Heritage Program, BLM, Idaho State University, and other interested parties.

Personnel Requirements and Training

Personnel will require training on the correct operation of AnaBat II equipment as well as proper bat handling techniques

References

Doering, R.W. and B.L. Keller. 1998. A survey of bat species of the Bruneau-Jarbidge River area of southwestern Idaho with special reference to the occurrence of the spotted bat (*Euderma maculatum*). Idaho Bureau of Land Management Technical Report #98-18. Boise, ID. 29 pp.

Fancy, S.G. 2000. Guidance for the design of sampling schemes for inventory and monitoring of biological resources in national parks. Accessed at http://www1.nature.nps.gov/im/monitor/nps_sg.doc on 3/7/02.

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White, E.P. and S.D. Gehrt. 2001. Effects of recording media on echolocation data from broadband bat detectors. Wildlife Society Bulletin 29(3):974-978.

Saul, D., C. Rabe, A. Davidson, W.A. Warren, D. Rollins, and S. Lewis 2001. Owyhee Subbasin Summary. Northwest Power Planning Council, Portland, OR. 112 p.

Raptor Monitoring Protocol

Background and Objectives:

The Owyhee and Bruneau Subbasins provide foraging, nesting and/or migratory habitat for up to 24 species of raptors, including golden eagles (*Aquila chryseatos*), peregrine falcons (*Falco peregrinus*) and prairie falcons (*Falco mexicanus*). The Tribes are very interested in protecting raptor species and would like to establish a long-term monitoring program in conjunction with regional monitoring efforts.

The objectives of this study are to:

- Determine presence/absence of the 24 raptor species that potentially utilize the Reservation for breeding, nesting or migration.
- Identify species/habitat associations.
- Document raptor nest sites.
- Establish a baseline for long-term monitoring program.

Sampling Design

Three methods will be used to obtain raptor data: point counts (see avian monitoring protocol section), aerial surveys and ground searches. Aerial surveys will be used during initial surveys because they are an efficient way of surveying large areas in a short period of time. Ground searches will be conducted in conjunction with the aerial surveys to verify nest sites and to determine presence/absence of less conspicuous raptor species.

Site selection for the avian point counts is discussed in the avian monitoring protocol section. Aerial survey locations will be determined by overlaying the permanent grid of sample points over a vegetation map of the Reservation. Canyon habitats will be randomly sampled using an unequal selection probability approach (Fancy 2000). This will allow sampling to occur in potential raptor nesting habitat, while avoiding some of the complications related to a stratified random sample approach. One aerial survey will be conducted during 2003. The aerial survey will be followed up (within one week) with ground searches.

Field Methods

Pre-field preparations:

- Contract with helicopter pilot to conduct survey.
- Request assistance from Nevada Division of Wildlife (NDOW) or Snake River Birds of Prey biologists in conducting survey.
- Determine flight routes, set up transects.

Specific methods (Ministry of Sustainable Resource Management 2001):

- Aerial survey will take place during the first week of May in order to detect birds sitting on nests.
- Flights will be conducted at a minimum of 50 meters above the nest and between 30-130 km/hr
- For cliffs, outcrops and high soil banks (preferred nesting habitat) approach the study area along a path visible to the bird, permitting an incubating or brooding adult to leave unhurried.
- Try to maintain a safe distance from the nest to minimize risk of nest abandonment.
- Document all species detected (bird observations and nests)

Fill out raptor observation survey form including:

GPS coordinates of nest
Species
Number of eggs/nestlings
Nest substrate
Behavior of birds

Data Handling, Analysis and Reporting

A species list will be generated from the data collected as well as GPS locations of raptor nests. A measure of nesting density, lineal nesting density, will be expressed as the number of occupied nests per km based on survey results. This information will be shared with the Idaho Conservation Data Center, Idaho Department of Fish and Game, Nevada Heritage Program, Nevada Division of Wildlife, Boise State Raptor Research Institute, and the Snake River Birds of Prey Management Area staff.

Personnel Requirements and Training

Wildlife and Parks personnel will receive raptor identification training through the Snake River Birds of Prey Management Area.

Operational Requirements

A Bell Ranger helicopter will be used for surveys because it is more versatile than a fixed-wing aircraft (more maneuverable and slow moving).

References

Fancy, S.G. 2000. Guidance for the design of sampling schemes for inventory and monitoring of biological resources in national parks. Accessed at http://www1.nature.nps.gov/im/monitor/nps_sg.doc on 3/7/02.

Ministry of Sustainable Resource Management. 2001. Inventory methods for raptors. Standards for components of British Columbia's Biodiversity No. 11. Resources Inventory Committee. Accessed at www.for.gov.bc.ca/ric/Pubs/teBioDiv/Raptors/Version2/RAPT_ML_V2.pdf on 3/10/02.

White-faced Ibis Monitoring Protocol

Background and Objectives:

The Reservation supports a large colony of white-faced ibis (*Plegadis chihi*)(Figure 5), the only colony in southwestern Idaho. Due to the species' small population size and the dynamic nature of its breeding habitat, concern has been expressed over the status of the Great Basin population (Earnst et al. 1998). The objective of the white-faced ibis surveys is to obtain a better understanding about the population dynamics of the Reservation colony and to share the information with the U.S. Fish and Wildlife Service, Idaho Conservation Data Center and others interested in the species. The Tribes' anticipate collecting breeding pair data as well as information on nest success.

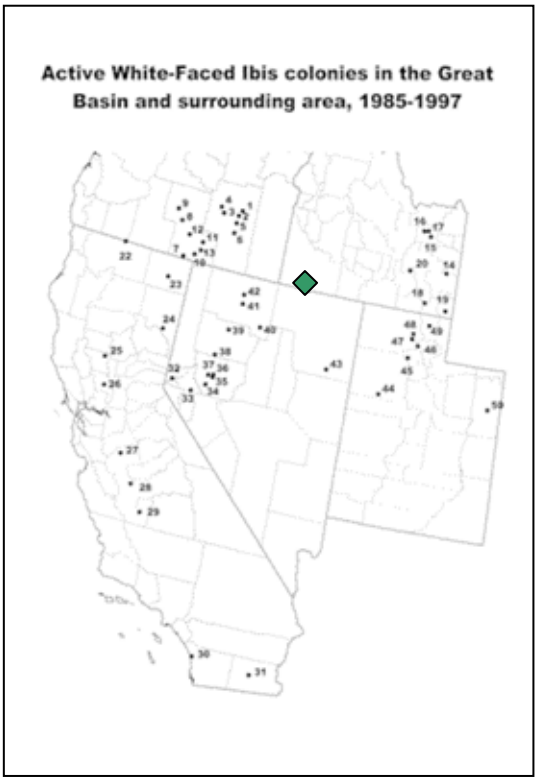

Figure 5. Map of white-faced ibis colonies in western U.S. (Earnst et al. 1998)

◆ Duck Valley Reservation Colony

Sampling Design

Sampling methods have not yet been determined. The Tribes are consulting with U.S. Fish and Wildlife Service Refuges in Oregon and Nevada as well as others to determine the most practical method(s) to employ to monitor the species.

Field Methods

To be determined.

Data Handling, Analysis and Reporting

Data will be shared with the Idaho Conservation Data Center, Nevada Natural Heritage Program and USFWS Refuges in the region.

References

Earnst, S.L. L. Neel, G.L. Ivey, and T. Zimmerman. 1998. Status of the white-faced ibis: breeding colony dynamics of the Great Basin population, 1985-1997. Colonial Waterbirds 21:301-476.

Small Mammal Monitoring Protocol

Background and Objectives:

Small mammals play an integral role in desert ecosystems. They serve as the prey base for higher order predator species, seed dispersal agents, and burrowing species influence soil aeration and seedling establishment.

The objectives of this research effort are to:

- Identify the composition of the small mammal community of the Reservation (species inventory).
- Investigate species/habitat relationships in a desert environment.
- Obtain measure of species abundance by cover type.
- Develop the foundation for a long-term monitoring plan.

Sampling Design

Small mammal surveys will follow the protocols outlined in the Albeni Falls Monitoring and Evaluation Plan (2001) with the following exceptions:

- Mammals will be captured using Sherman live traps instead of snap traps.
- One day prior to trapping, the traps will be baited and placed on the grid with the door locked open. Jones et.al (1996) suggests that trapping effectiveness will be increased if animals are exposed to the baited traps for 1-3 days prior to the onset of trapping.
- Due to the labor intensive nature of small mammal surveys, a random subset of the sample points selected for the habitat evaluation will be surveyed.

Field Methods (Albeni Falls M&E Plan 2001)

Pre-field preparations:

- Visit Idaho State University's Museum of Natural History, Boise State University or Washington State University's Museum to examine small mammal specimens.
- Order necessary supplies, including Sherman live traps.
- Confer with local universities to determine if there is any interest in small mammal research specimens (if there is, the protocol would be amended to include provisions for collection of specimens).
- Obtain necessary handling permits.
- Attend training on proper handling protocols for small mammals (disease protocols).
- Rabies vaccinations for all field staff.

Small mammal populations will be sampled by live trapping at randomly selected sample points. Traps will be baited with a mixture of peanut butter and rolled oats. An array of traps will be laid out as follows. A 100 meter baseline transect centered at the sample point and running along a random compass bearing and its back azimuth will be established. From the baseline transect, five 50 meter long trap lines that are centered on and run perpendicular to the baseline transect at 25 meter intervals will be established. Pairs of Sherman live traps will be placed at 12.5 meter intervals along the trap lines. Trapping will be conducted for two consecutive nights yielding a total of 100 trap nights per sample point. Traps will be checked prior to 8:00 a.m. MST the following morning. Sample point, cover type, date of capture, and species will be recorded for each small mammal captured. Small mammal processing protocols are as per Petryszyn (2002) (Figure 6). Mammals captured the first night of trapping will be marked with a permanent marker on their belly. Mark-recapture data will be collected if the animal is recaptured during the second night of trapping (Figure 7).

Data Handling, Analysis and Reporting (Albeni Falls M&E Plan 2001)

Data will be pooled both within cover types and across cover types within and across grazing districts. An index of the abundance of each species within a cover type will be expressed as number caught/100 trap nights. Indices of abundance across cover types within a grazing district will be expressed as the mean of the individual cover type data pooled across the grazing district and weighted by the proportionate areal extent of each cover type. Trend analysis (if this program develops into a long-term monitoring program) on abundance data will be done by regressing abundance on time and testing the null hypothesis that the slope of the regression is equal to 0 (Zar 1984). Regression analysis will not be performed with less than 6 data points. The Shannon-Weaver information function (H') will be used to measure small mammal community diversity, and Pielou's equitability index (J') will be used to measure the evenness of species distribution within the community (Hair 1980). Diversity indices will be compared using a t-test (P=0.1) following methodology described by Hutcheson (1970) and Zar (1984). A species list of all mammals will be developed and supplemented with observations throughout the year.

Personnel Requirements and Training

One wildlife biologist and one field technician will conduct small mammal sampling. Each week two sites will be trapped for a total of 200 trap nights per week.
Training of personnel will involve examination of museum specimens and in-field training with an experienced mammalogist

Materials Required

The following equipment is needed to conduct small mammal trapping:

Collapsible Sherman live traps (100- 3.0 x 3.5 x 9.0 in. in size), compass, GPS unit, 100 m tapes, bait (rolled oats and peanut butter), cloth and plastic bags for processing small mammals, 2 Pesola scales (100 g, 300 g, accurate to 1g), field guide, data sheets, flagging tape.

References

Albeni Falls Interagency Work Group. 2001. Draft monitoring and evaluation plan for the Albeni Falls Wildlife Mitigation Project (BPA Project Numbers 19926100 and 19910600). Albeni Falls Interagency Work Group. Available at www.cbfwa.org.

Hair, J.D. 1980. Measurement of ecological diversity. In Wildlife Management Techniques Manual. S.D. Schemnitz (ed.), The Wildlife Society, Washington, DC. 686 pp.

Hutcheson, K. 1970. A test for comparing diversities based on the Shannon formula. Journal of Theoretical Biology 29:151-154.

Jones, C., W.J. McShea, M.J. Conroy and T.H. Kunz. 1996. Capturing mammals. Pages 115-155 in Wilson, D.E., F.R. Cole, J.D. Nichols, R. Rudran, and M.S. Foster (eds.) Measuring and monitoring biological diversity: standard methods for mammals. Smithsonian Institute Press, Washington, DC.

Petryszyn, Y. 2002. Small nocturnal mammals monitoring protocol for the ecological monitoring program in Organ Pipe Cactus National Monument, Arizona. Accessed from http://www.nature.nps.gov/im/monitor/protocoldb.cfm on 3/13/02.

Figure 6. Small Mammal Processing Protocols

Processing Small Mammals (adapted from Petryszyn 2002)

The basic protocols for processing rodents are:

1. Carry a cloth bags, 100- and 300-gm scales, a marking pen (on the first morning only), data forms, and field guide.

2. Wrap the mouth of the cloth bag around the end of the trap, gathering the extra cloth with one hand so that no opening is presented to the rodent. With the other hand, use two fingers to open the trap door (through the cloth of the bag). While doing this, make sure that the rodent is not behind the trap door.

3. Turn the trap upside down and firmly shake the rodent into the bag. When it is at the bottom of the cloth bag, make a ring with your fingers to close around the top of the bag (leaving no openings) and place the trap back in its location.

4. Remove the rodent from the bag with a firm grip on the skin behind its ears. Face away from the sun while handling to minimize the animal's stress from heat and light.

5. Determine species, sex, and weight; record this information on the data form (see specific notes below).

6. Make a wide, thick ink mark on the rodent's belly and release.

7. Close each trap for the day as you progress along the grid.

8. On the second morning of processing, note on the data form if a rodent is recaptured (®), along with its species, but do not weigh or sex.

Sex
Record whether the animal is male or female. Generally, sex is determined by comparing the relative distance between the anus and the base of the urethral papilla. In packrat males, for example, this distance is at least twice that found in females.

Weight
The weight of the animal should be taken. This information is used to calculate the biomass of each species present. A hand-held, metric Pesola scale is the easiest and most convenient to use. If the animal is small (up to kangaroo rat size), the clip of the scale can be attached to the base of the animal's tail and the weight read directly as the animal dangles. Determine weight to the nearest 1.0 gm. Be cautious of rodents chewing on or wrapping their tails around the scale, as such behavior may impair accurate weight reading. A cloth bag is

needed to weigh larger animals, such as packrats. The animal's weight is computed by subtracting the weight of the bag with the animal included, less the weight of the empty bag.

A 100 gm capacity scale and a 300 gm capacity scale are the most appropriate. The 100 gm scale, with increments of 1 gm, will suffice for most small mammals. The 300 gm scale, with 2 gm increments, is needed for larger mammals, such as packrats and ground squirrels (*Spermophilus* spp. and *Ammospermophilus* spp.).

Notes:
Include in this section information such as age (adult or juvenile) and reproductive condition (females pregnant or lactating, males testes descendant [TD] or inguinal). Also note any obvious ectoparasites, such as fleas or ticks, that the animal carries.

Additional information included on each data form is (1) date, (2) time traps were checked, (3) information on the weather (wind direction and estimated speed, cloudiness, rain, etc.), and (4) phase of the moon, along with time of moon rise. (The best trapping success usually coincides with no or little moon.)

Figure 7. Small Mammal Data Sheet (Petryszyn 2002)

Small Mammal Trapping Field Data Form **Page ___ of ___**

Field site ID _____ UTM Coord._____

Moon Phase _____ Personnel _____

Weather_____ _____ Elevation _____

Traps set (date/time/temp C): _____ Traps checked (date/time/temp C):_____

Notes_____

_____

_____

	Species	Sex	Age	Weight	®	Notes
1						
2						
3						
4						
5						
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Big Game Monitoring Protocol

Background and Objectives:

A number of big game species are common on the Reservation including mule deer (*Odocoileus hemionus*) , elk (*Cervus elaphus*), pronghorn (*Antilocapra americana*), and mountain lions (*Felis concolor*). Historically, bighorn sheep (*Ovis canadensis*) occupied the canyons of the East Fork Owyhee River. The Tribes endeavor to maintain the existing big game populations and to reestablish bighorn sheep in suitable habitats on the Reservation.

Aerial surveys will be conducted for elk, mule deer, and pronghorn. These species were chosen for the following reasons:

(1) Elk were recently translocated into the Jarbidge/Bruneau River area and the Tribes (and state of Nevada) are interested in determining population size, sex and age ratio, and dispersal patterns across the northeastern portion of the state.
(2) Mule deer populations have declined in Nevada, in part because recent wildfires (2000) impacted over 700,000 acres of mule deer habitat throughout the state (NDOW 2001). The Tribes would like to determine the level of winter use on the Reservation.
(3) Pronghorn is an economically important species to the Tribes. Since 2001 the Wildlife and Parks Department has sold hunting packages to the public and they are interested in monitoring herd health, sex ratios and productivity levels.

Sampling Design

Aerial surveys were the method chosen to monitor big game populations because it is a quick and efficient way to obtain data on species that are easily observable from the air (Lancia et al. 1996, Rudran et al. 1996).

A helicopter survey of mule deer and elk will be conducted during December/January. Pronghorn will be surveyed by fixed-wing aircraft in September (postseason). The big game biologist from the Elko office of the Nevada Division of Wildlife (NDOW) will participate in the surveys during the first year, along with the Tribal Wildlife Biologist and Wildlife and Parks staff member. In future years, the Tribes hope to survey collaboratively with NDOW in order to minimize survey costs.

Field Methods

Pre-season activities:

- Two months prior to surveys, obtain bids from helicopter rental contractors. Select contractor and generate purchase order.
- Coordinate survey schedule with wildlife biologist from NDOW.
- Prepare data collection sheets.
- Check weather conditions in days preceding surveys.

On survey date, Tribal biologist, NDOW biologist, and Wildlife and Parks Department staff member fly out of Elko airport and proceed to the southeast boundary of the reservation. Helicopter to fly transects in south to north fashion. Transect width has yet to be determined (upon consultation with NDOW). Using two dependent observer estimation approach, one biologist will be designated the primary observer, the other the secondary observer. The primary observer communicates the number of animals observed and the secondary observer notes the number of additional animals he/she observes. This method assumes equal sighting abilities of the observers and allows estimation of population size based on the two-sample removal model (Pollock and Kendall 1987).

Data on species observed, group size, sex ratio and age class and GPS coordinates will be recorded on data sheets.

Data Handling, Analysis and Reporting

Data will be input into a computer database and shared with NDOW, IDFG, Rocky Mountain Elk Foundation, and other interested entities.

Personnel Requirements and Training

Training for Wildlife and Parks staff personnel will be a pre-requisite to participating in any aerial surveys. Potential observers will go through a series of training exercises to ensure that they can count the species of interest quickly and accurately.

Operational Requirements

Equipment needed to conduct these surveys include: data collection sheets, GPS unit, binoculars, and maps of the Reservation.

References

Lancia, R.A., J.D. Nichols, and K.H. Pollock. 1996. Estimating the number of animals in wildlife populations. Pages 215-253 *in* T.A. Bookhout (ed.) Research and management techniques for wildlife and habitats. The Wildlife Society, Bethesda, MD.

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Amphibian and Reptile Monitoring Protocol

Background and Objectives:

The southwestern portion of Idaho has been recognized as an area of high herptile diversity and identified as an area where conservation efforts should be concentrated (IDFG 1994, Schnitzspahn 2000). Up to 25 of the 37 amphibian and reptile species that inhabit Idaho may potentially occur on Duck Valley Indian Reservation (Table 2).

Common Name	Scientific Name
Western rattlesnake	*Crotalus viridis*
Great Basin gopher snake	*Pituophis catenifer*
Western yellow-bellied racer	*Coluber constrictor*
Western striped whipsnake	*Masticophis taeniatus*
*Western ground snake	*Sonora semiannulata*
Night snake	*Hypsiglena torquata*
*Western longnose snake	*Rhinocheilus lecontei*
Western terrestrial garter snake	*Thamnophis elegans*
Common garter snake	*Thamnophis sirtalis*
Rubber boa	*Charina bottae*
Longnose leopard lizard	*Gambelia wislizenii*
Western whiptail	*Cnemidophorus tigris*
Desert horned lizard	*Phrynosoma platyrhinos*
Short horned lizard	*Phrynosoma douglassi*
Side-blotched lizard	*Uta stansburiana*
Western fence lizard	*Sceloporus occidentalis*
Sagebrush lizard	*Sceloporus graciosus*
*Mojave Black-collared lizard	*Crotaphytus bicinctores*
*Western skink	*Eumeces skiltonianus*
Pacific treefrog	*Pseudacris regilla*
Columbia spotted frog	*Rana luteiventris*
Northern leopard frog	*Rana pipiens*
Western toad	*Bufo boreas*
*Woodhouse's toad	*Bufo woodhousei*
Great Basin spadefoot toad	*Spea intermontanus*

Table 2.Reptile and amphibian species potentially occurring on Duck Valley Indian Reservation (IDFG 1994, Gerber et al. 1997). *Suitable habitat may exist but no documented occurrences in southernmost portion of Idaho.

The objectives of this survey are to determine reptile and amphibian species presence/absence on the Reservation and to provide baseline data for future studies.

Sampling Design

A combination of visual encounter searches (VES) and drift fence funnel trapping will be used to ascertain species diversity of the Reservation. Visual encounter surveys involves the systematic search of an area or habitat for a prescribed period of time. The method is based on the following assumptions:

- Every individual has the same chance of being observed during the survey
- An individual is recorded only once during the survey
- There are no observer-related effects (Crump and Scott 1994)

Because some snake species are nocturnal and others are closely associated with canyons and rocky outcrops, VES alone may not be adequate to detect the full range of herptile diversity on the Reservation. Gerber et al. (1997) found a limited number of snake species using VES during surveys of Big Jacks and Little Jacks Creek drainages in the northern portion of the Bruneau subbasin. A limited funnel trapping effort will be conducted in suitable habitat types such as the East Fork Owyhee River canyon area to ensure that the full spectrum of herptiles inhabiting the reservation is documented (see Figure 8 for funnel trap and drift net specifications).

Sample sites will be selected in the following manner:

Using the Universal Transverse Mercator (UTM) coordinate system, a permanent grid with spacing of 200 meters will be established for the Duck Valley Indian Reservation. The starting grid point will be determined by selecting a random number from 1 to 200 meters from the northern boundary of the Reservation and from 1 to 200 meters from the western boundary of the Reservation. Each grid point will be sequentially numbered. A total of 300 sample points will be selected for vegetation surveys (150 plots per year) based on taking a systematic sample of the reservation (random start). Of the 150 plots selected for monitoring each year, a random subsample of 50 plots will be surveyed using the visual encounter search method.

Field Methods

Each survey site will be visited once during the May-July sampling frame. One wildlife biologist and one field technician will arrive at survey site and be prepared to start surveying between 10:00 a.m.-noon MST. GPS coordinates, elevation and start time will be recorded and the starting location marked with flagging tape. Visual encounter surveys will be conducted using a transect design. A random compass reading will define the first of four 100 meter transect lines that will emanate from the sample point UTM coordinates. The other three transect

lines will be determined by varying compass reading by 90 degrees. An intermediate-intensity search will be conducted whereby each observer will walk the transect and turn over surface objects (rocks, branches, etc.) in order to increase the probability of detecting herptiles. Each 100 meter transect will be surveyed in 20 minutes. Each animal encountered will be captured and the following information noted (Figure 3):

Time of capture
Individual's gender
Snout-to-Vent Length (mm)
Weight
GPS coordinates (Datum NAD27, Zone 11)
Abnormalities, unique habitat, etc. (in comments section)

Amphibians or reptiles displaying physical deformities will be placed in a temporary holding container until the end of the sampling period (20 minutes maximum). A photograph will be taken of the individual and the habitat from which it was captured. The data collected from the individual, along with the photographs, will be forwarded to USFWS or appropriate entity involved in researching incidences of amphibian and/or reptile deformities.

Specific details on measurements, etc. are according to Engle 2001a. This information will be expanded on prior to surveying to include information regarding other herptiles:

Determining Gender –

Adults (M or F): gender of adult frogs is determined by examining their thumbs for presence/absence of enlarged, dark nuptial pads which are characteristic of adult males. Females lack these pads and typically attain snout-to-vent lengths (SVL) of greater than 65 mm whereas males are typically 50-60 mm.

If sex is not distinguishable it is recorded as:

Metamorph (MT) – if the SVL is 40 mm or less or young of year
Subadult (SA) – if the SVL is over 40 mm

Snout-to-Vent Length (SVL) – Measured by placing individual in palm of left hand, snout toward wrist, and firmly pressing flat ruler against dorsal surface to straighten and lengthen the spine.

Weight (g) – Measured by suspending the frog in a lightweight cotton bag from a Pesola spring scale (accurate to .5g). Weight is recorded to nearest .5 g and weight of cotton bag is subtracted entry.

GPS Coordinates – UTM Coordinates recorded using Datum NAD27, Zone 11

Data Handling, Analysis and Reporting

Data will be input into the computer database at least weekly and both surveyors will be involved in reviewing and verifying the accuracy of the computer-generated spreadsheets.

The data will be entered into a GIS and used to generate maps indicating areas surveyed and locations of all herptiles captured or observed. This information will be shared with Charles Peterson at Idaho State University, Idaho Conservation Data Center and Nevada Natural Heritage Program and other interested entities. It will also be used to develop the Reservation's species list.

Personnel Requirements and Training

Personnel will be required to attend training on the proper handling of snakes and reptiles.

References

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Drift Fence and Funnel Trap Construction and Installation (taken from Berger et al. 1997)

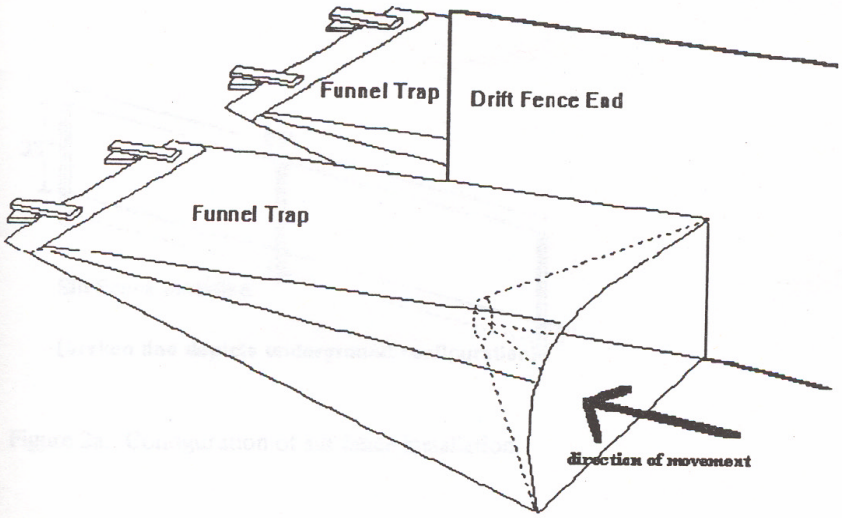
Drift fence construction: Drift fences will be constructed from two sections of sheet metal flashing. Each section of flashing will be 21” wide x 25’ long. The edge of each section will be buried a minimum of six inches underground. On windy slopes the bottom four inches will be bent over before burying to keep the fence from blowing out of the ground. Steel fencing will be installed in a trench that is no deeper than six inches and only wide enough to fit the steel in with the bottom four inches bent at a right angle to the fence (Figure 8). Twelve different arrays will be configured based on analysis of which arrays (Figure 8) were most effective in capturing herptiles in the Gerber et al. (1997) study.

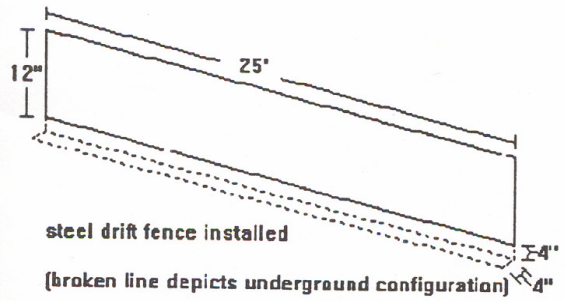
Funnel trap construction: Funnel traps will be constructed of aluminum window screen. A piece of screen will be cut to 24” x 20”. The screening will be rolled into a cylinder 24” long and stapled together with a staple gun. One end of the cylinder will be flattened, folded over and clipped with clothespins. To make the funnel, a half circle was cut from the same screening material and rolled into a funnel with a diameter of 22 cm at the widest point. The point end of the funnel will be cut off to make a hole that is about 3 cm across. This funnel will be inserted into the open end of the cylinder and stapled in place with the small hole inside the trap (Figure 8).

On each section of the drift fence four funnel traps will be placed, two on either side of each opening facing the center of the section of drift fence (as in Figure 8). A dirt ramp will be constructed leading into the opening of the funnel trap to prevent reptiles from passing beneath the trap. To provide reptiles a place of refuge from the sun, a piece of cardboard will be placed inside each trap, and a shade of wood, cardboard or branches will be placed over the top.

Monitoring: Arrays will be checked every other day. Each animal caught in the trap will be identified to species, measured, sexed, marked and released.

Figure 8. Funnel Trap and Drift Net Specifications (Gerber et al. 1998)





Array No.	Orientation No.
1	
2	
3	
3.5	
4	
4.5	
5	
5.5	
6	
7	
8	
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Waterfowl Monitoring Protocol

Background and Objectives:

The Duck Valley Indian Reservation, its reservoirs, and surrounding wetland areas provide critical nesting, brood rearing and resting habitat for ducks, geese and a diversity of shorebirds. A portion of Reservation lands, as well as a large area just north of the Reservation border, comprise approximately 60,000 acres of wetland habitat. The Nature Conservancy, through its ecoregional planning process, has identified Duck Valley as a priority conservation site due to its high diversity of wetland plants and wildlife species (Saul et al. 2001).

The Reservation waterfowl population receives minimal hunting pressure as hunting is restricted to tribal members. However, the Tribes recognize that the productivity of the wetlands it manages significantly affects waterfowl populations on a regional level and is interested in gaining a better understanding of the resource and how current and future land use activities may impact it.

Waterfowl breeding-pair and brood count surveys will be conducted to estimate waterfowl numbers and to establish a baseline for future waterfowl monitoring. Due to the expansiveness of the wetland complex on the reservation, aerial surveys will be also be conducted to complement the on-the-ground monitoring effort.

Sampling Design

The breeding-pair and brood count survey methods that will be utilized were chosen for their ease of implementation and compatibility with U.S. Fish and Wildlife Service (Hammond 1970) and Albeni Falls monitoring protocols. Aerial survey methods (not discussed here) will be compatible with survey methods used by Malheur Wildlife Refuge.

The Reservation has three large fishing reservoirs: Sheep Creek, Lake Billy Shaw and Mountain View. Breeding-pair and brood counts will be conducted on all three reservoirs. Aerial surveys will be used on the Blue Creek wetland complex.

Field Methods (taken directly from Albeni Falls 2001)

Four waterfowl production surveys will be conducted: goose breeding pair counts, goose brood counts, duck breeding pair counts and duck brood counts. Because of differences in nesting phenology between geese and ducks some different surveys may be conducted concurrently on the same visit to the site (i.e. goose brood counts and duck breeding pair counts). Surveys will be conducted as a combination of observation point counts, walk/wade surveys, and boat and motor runs as appropriate for the landscape.

Observation point counts are used where there is good visibility, especially from elevated positions, to observe open water areas. When using observation points, disturbance must be kept to a minimum. Observation point counts are best conducted with the aid of a spotting scope. After data is gathered via observation points, a walk/wade survey may need to be conducted to observe additional open water areas that are not visible from observation points.

Walk/wade surveys are best applied to wetlands with shorelines having little emergent vegetation and can be walked efficiently. Small wetland areas with shorelines having little emergent vegetation should be approached carefully and quietly because the broods of some species (especially mallards and pintails) may move over land to avoid detection. When properly conducted, a high proportion of all broods may be seen with this method.

Boat and motor runs are most efficient on open shorelines. A single observer will survey the entire lake at a constant boat speed of 5-10 miles per hour, stopping only to count broods and/or identify species.

Counts will be completed within the three-hour periods beginning either 15 minutes after sunrise or ending 15 minutes before sunset. Wade/walk surveys may be conducted throughout the day. All surveys will be conducted as close as practical to the identified target dates for data consistency. Surveys should be conducted when temperatures are moderate and wind speeds are less than 10 mph. Excessive wind moves birds into protected areas. If practical, surveys should not take place on rainy days.

Goose breeding pair surveys are conducted twice, once each on or near April 15th and May 2nd. Goose brood counts are conducted twice, once each on or near May 16th and again on June 6th. Goose brood surveys will be done in conjunction with second duck breeding-pair survey and the first duck brook survey.

Duck breeding-pair surveys will be conducted twice, once on or near May 2nd for early nesters, and once on or near May 16th for late nesters. Although some protocols call for only two duck brood sampling periods, three surveys will be conducted: on or near June 6th, June 28th and July 26th.

For waterfowl pair counts, the species and number of pairs should be recorded. For ducks, both paired ducks and lone males representing indicated pairs should be tabulated for all species. During brood counts the observer should record species, number in brood, and the age class of the brood (Dimmick and Pelton 1996).

Data Handling, Analysis and Reporting

Data will be summarized by species and reported annually. Long-term trends will be monitored against Malheur Wildlife Refuge data as well as the national waterfowl surveys.

The data will also be used to compare species diversity and waterfowl productivity between water bodies.

Personnel Requirements and Training

A wildlife biologist and technician will conduct surveys on an annual basis.

Certification will be required for staff members that will participate in low level flying such as is necessary for conducting waterfowl surveys. Training may be made available by naval air stations or in conjunction with U.S. Fish and Wildlife Service training.

References

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Avian Monitoring Protocol

Sampling Design (from Albeni Falls M&E Plan 2001)

Point counts will be used to monitor land birds on the Reservation. Point counts are the most widely used quantitative method used for monitoring birds and involve an observer recording birds from a single point for a standardized time period (Ralph et al. 1995).. The methodology follows the recommendations of Ralph et al. (995) and is consistent with the methodology employed by the U.S. Forest Service Northern Region Land Bird Monitoring Project (Hutto et al. 2001) and recommendations for the Idaho Partners in Flight Bird Monitoring Plan (Leukering et al. 2000).

Field Methods (Albeni Falls M&E Plan 2001)

Land bird monitoring will be conducted according to protocols described in Albeni Falls M&E Plan (2001) with the following modifications:

- Two thirds of the permanent sample points will be monitored. Due to the difficult terrain and inaccessibility of many sites, it is unlikely that more than one site could be visited between 7:00 a.m. – 10:00 a.m. Therefore, one observer will conduct a point counts at the first plot of the day, the other will conduct a point count at the second plot to be monitored during the day.
- Only one count will be conducted per year at each survey site.

A ten-minute point count will be conducted at 2/3 of the randomly selected permanent sample points within a cover type. All points will be visited once during the breeding season (mid-May to early July). Point counts will start no earlier than 15 minutes after official sunrise and will be completed by 10:00 a.m. MST. Weather conditions should be warm and calm enough for bird detection by sight or sound. All birds seen or heard within the 10-minute count period are recorded. During the count, data should be recorded in three time periods (0-3 minutes, 3-5 minutes, and 5-10 minutes). This will allow the data to be partitioned or pooled for comparison to the U.S. Fish and Wildlife breeding bird survey data, research data reported in the literature that commonly use 5-minute point counts and 10-minute point counts data recommended and collected by national bird monitoring programs. Field observers should be highly qualified to detect birds by sight and sound. Fixed-radius plots (where the radius is arbitrarily small) reduce the interspecific difference in detectability by assuming that: all the birds within the fixed radius are detectable; observers do not actively attract or repel birds; and birds do not move into or out of the fixed-radius during the counting period. This allows for comparisons of abundance among species. Unlimited radius plots maximize the amount of data collected because they include all detections and are appropriate when the objective is to monitor population changes within a

single population (Ralph et al. 1995). Birds should be tallied in two distance bands, one 0-50 meters from the point center and one >50 meters from the point center. Additional information on establishing point count stations, data collection, and sample data forms can be found by referencing Ralph et al. (1993, 1995) and Huff et al. (2000).

Data Handling, Analysis and Reporting

Data will be pooled both within cover types and across cover types within grazing districts. The mean number of detections per point (by species) within a cover type will be used as an index to species abundance. Abundance across cover types within a grazing district will be expressed as the grand mean of the individual cover-type data pooled across the grazing district and weighted by the proportionate areal extent of each cover type. Should this effort result in a long-term monitoring effort, trend analysis on abundance data will be done by regressing abundance on time and testing the null hypothesis that the slope of the regression is equal to 0 (Zar 1984). Regression analysis will not be conducted with less than 6 data points. The Shannon-Weaver information function (H') will be used to measure land bird community diversity, and Pielou's equitability index (J') will be used to measure the evenness of species distribution within the community (Hair 1980). Diversity indices will be compared using a t-test following methodology described by Hutcheson (1970) and Zar (1984). A species list will also be developed as a measure of diversity. The species list will be developed and supplemented with incidental sightings from throughout the year.

Personnel Requirements and Training

If the wildlife biologist hired for this research effort does not have extensive experience conducting point counts, the land bird monitoring portion of this effort may be subcontracted out. If this occurs, the Albeni Falls protocol will be followed (all points will be sampled and will be monitored twice during the breeding season).

References

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Leukering, T., D. Faulkner, and M. Carter. 2000. Monitoring Idaho's birds: a plan for count-based monitoring. Colorado Observatory, Brighton, CO. 23 pp.

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Table 3. FY2003 Schedule

2003 Wildlife Inventory/Habitat Evaluation Schedule				Month								
Task	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**
Develop wildlife monitoring plan												
Purchase field equipment												
Prepare for data collection												
DVIR Habitat Evaluation (year 1)												
Conduct wildlife monitoring												
Sage Grouse (Lek Surveys)												
Land Birds (Avian Point Counts)												
Spotted Frogs (Suitable Habitat Searches)												
Small Mammals (Live Trapping)												
Waterfowl (Aerial and Ground Surveys)												
Amphibians/Reptiles (Visual Encounter Searches, Funnel Traps)												
White-Faced Ibis (TBD)												
Raptors (Aerial and Ground Surveys)												
Medium-Sized Mammals (Sign Surveys)												
Big Game (Aerial Surveys)												
Bats (Echolocation Recording[1], Mist Netting[2]								1	1	1	2	2
Compile data, evaluate/report results												

Appendix A. Wildlife species potentially occurring on Duck Valley Indian Reservation

Common Name	Species Name
Amphibians	
Western toad	*Bufo boreas*
Woodhouse's toad	*Bufo woodhousii*
Pacific tree frog	*Pseudacris regilla*
Great Basin spadefoot	*Spea intermontana*
Bullfrog	*Rana catesbeiana*
Northern leopard frog	*Rana pipiens*
Columbia spotted frog	*Rana luteiventris*
Birds	
Common loon	*Gavia immer*
Pied-billed grebe	*Podilymbus podiceps*
Eared grebe	*Podiceps nigricollis*
Western grebe	*Aechmophorus occidentalis*
Clark's grebe	*Aechmophorus clarkii*
American white pelican	*Pelecanus erythrorhynchos*
Double-crested cormorant	*Phalacrocorax auritus*
American bittern	*Botaurus lentiginosus*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Snowy egret	*Egretta thula*
Cattle egret	*Bubulcus ibis*
Black-crowned night-heron	*Nycticorax nycticorax*
White-faced ibis	*Plegadis chihi*
Canada goose	*Branta canadensis*
Wood duck	*Aix sponsa*
Green-winged teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Blue-winged teal	*Anas discors*
Cinnamon teal	*Anas cyanoptera*
Northern shoveler	*Anas clypeata*
Gadwall	*Anas strepera*
American wigeon	*Anas americana*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Barrow's goldeneye	*Bucephala islandica*
Bufflehead	*Bucephala albeola*
Common merganser	*Mergus merganser*
Ruddy duck	*Oxyura jamaicensis*
Turkey vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
Bald eagle	*Haliaeetus leucocephalus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Northern goshawk	*Accipiter gentilis*
Swainson's hawk	*Buteo swainsoni*
Red-tailed hawk	*Buteo jamaicensis*
Ferruginous hawk	*Buteo regalis*
Golden eagle	*Aquila chrysaetos*
American kestrel	*Falco sparverius*

Common Name	Species Name
Merlin	*Falco columbarius*
Peregrine falcon	*Falco peregrinus anatum*
Prairie falcon	*Falco mexicanus*
Gray partridge	*Perdix perdix*
Chukar	*Alectoris chukar*
Ring-necked pheasant	*Phasianus colchicus*
Greater sage grouse	*Centrocercus urophasianus*
California quail	*Callipepla californica*
Mountain quail	*Oreortyx pictus*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
American coot	*Fulica americana*
Sandhill crane	*Grus canadensis*
Killdeer	*Charadrius vociferus*
Black-necked stilt	*Himantopus mexicanus*
American avocet	*Recurvirostra americana*
Willet	*Catoptrophorus semipalmatus*
Spotted sandpiper	*Actitis macularia*
Long-billed curlew	*Numenius americanus*
Common snipe	*Gallinago gallinago*
Wilson's phalarope	*Phalaropus tricolor*
Ring-billed gull	*Larus delawarensis*
California gull	*Larus californicus*
Caspian tern	*Sterna caspia*
Forster's tern	*Sterna forsteri*
Black tern	*Chlidonias niger*
Rock dove	*Columba livia*
Mourning dove	*Zenaida macroura*
Yellow-billed cuckoo	*Coccyzus americanus*
Barn owl	*Tyto alba*
Flammulated owl	*Otus flammeolus*
Western screech-owl	*Otus kennicottii*
Great horned owl	*Bubo virginianus*
Northern pygmy-owl	*Glaucidium gnoma*
Burrowing owl	*Athene cunicularia*
Long-eared owl	*Asio otus*
Short-eared owl	*Asio flammeus*
Northern saw-whet owl	*Aegolius acadicus*
Common nighthawk	*Chordeiles minor*
Common poorwill	*Phalaenoptilus nuttallii*
White-throated swift	*Aeronautes saxatalis*
Black-chinned hummingbird	*Archilochus alexandri*
Calliope hummingbird	*Stellula calliope*
Broad-tailed hummingbird	*Selasphorus platycercus*
Rufous hummingbird	*Selasphorus rufus*
Belted kingfisher	*Ceryle alcyon*
Lewis' woodpecker	*Melanerpes lewis*
Red-naped sapsucker	*Sphyrapicus nuchalis*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
White-headed woodpecker	*Picoides albolarvatus*
Northern flicker	*Colaptes auratus*
Olive-sided flycatcher	*Contopus cooperi*
Western wood-pewee	*Contopus sordidulus*
Willow flycatcher	*Empidonax traillii*

Common Name	Species Name
Hammond's flycatcher	*Empidonax hammondii*
Dusky flycatcher	*Empidonax oberholseri*
Gray flycatcher	*Empidonax wrightii*
Cordilleran flycatcher	*Empidonax occidentalis*
Say's phoebe	*Sayornis saya*
Ash-throated flycatcher	*Myiarchus cinerascens*
Western kingbird	*Tyrannus verticalis*
Eastern kingbird	*Tyrannus tyrannus*
Horned lark	*Eremophila alpestris*
Tree swallow	*Tachycineta bicolor*
Violet-green swallow	*Tachycineta thalassina*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Bank swallow	*Riparia riparia*
Cliff swallow	*Petrochelidon pyrrhonota*
Barn swallow	*Hirundo rustica*
Black-billed magpie	*Pica hudsonia*
American crow	*Corvus brachyrhynchos*
Common raven	*Corvus corax*
Black-capped chickadee	*Poecile atricapilla*
Mountain chickadee	*Poecile gambeli*
Bushtit	*Psaltriparus minimus*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Brown creeper	*Certhia americana*
Rock wren	*Salpinctes obsoletus*
Canyon wren	*Catherpes mexicanus*
House wren	*Troglodytes aedon*
Marsh wren	*Cistothorus palustris*
American dipper	*Cinclus mexicanus*
Golden-crowned kinglet	*Regulus satrapa*
Ruby-crowned kinglet	*Regulus calendula*
Blue-gray gnatcatcher	*Polioptila caerulea*
Mountain bluebird	*Sialia currucoides*
Swainson's thrush	*Catharus ustulatus*
Hermit thrush	*Catharus guttatus*
American robin	*Turdus migratorius*
Gray catbird	*Dumetella carolinensis*
Northern mockingbird	*Mimus polyglottos*
Sage thrasher	*Oreoscoptes montanus*
Cedar waxwing	*Bombycilla cedrorum*
Loggerhead shrike	*Lanius ludovicianus*
European starling	*Sturnus vulgaris*
Warbling vireo	*Vireo gilvus*
Cassin's vireo	*Vireo cassinii*
Orange-crowned warbler	*Vermivora celata*
Virginia's warbler	*Vermivora virginiae*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated gray warbler	*Dendroica nigrescens*
Macgillivray's warbler	*Oporornis tolmiei*
Common yellowthroat	*Geothlypis trichas*
Wilson's warbler	*Wilsonia pusilla*
Yellow-breasted chat	*Icteria virens*
Western tanager	*Piranga ludoviciana*
Black-headed grosbeak	*Pheucticus melanocephalus*

Common Name	Species Name
Blue grosbeak	*Guiraca caerulea*
Lazuli bunting	*Passerina amoena*
Green-tailed towhee	*Pipilo chlorurus*
Spotted towhee	*Pipilo maculatus*
Chipping sparrow	*Spizella passerina*
Brewer's sparrow	*Spizella breweri*
Vesper sparrow	*Pooecetes gramineus*
Lark sparrow	*Chondestes grammacus*
Black-throated sparrow	*Amphispiza bilineata*
Sage sparrow	*Amphispiza belli*
Lark bunting	*Calamospiza melanocorys*
Savannah sparrow	*Passerculus sandwichensis*
Grasshopper sparrow	*Ammodramus savannarum*
Fox sparrow	*Passerella iliaca*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
White-crowned sparrow	*Zonotrichia leucophrys*
Dark-eyed (Oregon) junco	*Junco hyemalis*
Bobolink	*Dolichonyx oryzivorus*
Red-winged blackbird	*Agelaius phoeniceus*
Western meadowlark	*Sturnella neglecta*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Brewer's blackbird	*Euphagus cyanocephalus*
Common grackle	*Quiscalus quiscula*
Brown-headed cowbird	*Molothrus ater*
Bullock's oriole	*Icterus bullockii*
Pine grosbeak	*Pinicola enucleator*
Cassin's finch	*Carpodacus cassinii*
House finch	*Carpodacus mexicanus*
Red crossbill	*Loxia curvirostra*
Pine siskin	*Carduelis pinus*
American goldfinch	*Carduelis tristis*
Evening grosbeak	*Coccothraustes vespertinus*
House sparrow	*Passer domesticus*
Mammals	
Vagrant shrew	*Sorex vagrans*
Water shrew	*Sorex palustris*
Merriam's shrew	*Sorex merriami*
Little brown bat	*Myotis lucifugus*
Yuma myotis	*Myotis yumanensis*
Long-eared myotis	*Myotis evotis*
Fringed myotis	*Myotis thysanodes*
Long-legged myotis	*Myotis volans*
California myotis	*Myotis californicus*
Western small-footed myotis	*Myotis ciliolabrum*
Silver-haired bat	*Lasionycteris noctivagans*
Western pipistrelle	*Pipistrellus hesperus*
Big brown bat	*Eptesicus fuscus*
Hoary bat	*Lasiurus cinereus*
Spotted bat	*Euderma maculatum*
Townsend's big-eared bat	*Corynorhinus townsendii*
Pallid bat	*Antrozous pallidus*
Nuttall's (mountain) cottontail	*Sylvilagus nuttallii*
White-tailed jack rabbit	*Lepus townsendii*
Black-tailed jack rabbit	*Lepus californicus*

Common Name	Species Name
Pygmy rabbit	*Brachylagus idahoensis*
Least chipmunk	*Tamias minimus*
Yellow-pine chipmunk	*Tamias amoenus*
Yellow-bellied marmot	*Marmota flaviventris*
White-tailed antelope squirre	*Ammospermophilus leucurus*
Belding's ground squirrel	*Spermophilus beldingi*
Golden-mantled ground squirre	*Spermophilus lateralis*
Wyoming ground squirrel	*Spermophilus elegans*
Townsend's pocket gopher	*Thomomys townsendii*
Northern pocket gopher	*Thomomys talpoides*
Great basin pocket mouse	*Perognathus parvus*
Ord's kangaroo rat	*Dipodomys ordii*
Chisel-toothed kangaroo rat	*Dipodomys microps*
American beaver	*Castor canadensis*
Western harvest mouse	*Reithrodontomys megalotis*
Deer mouse	*Peromyscus maniculatus*
Canyon mouse	*Peromyscus crinitus*
Pinyon mouse	*Peromyscus truei*
Northern grasshopper mouse	*Onychomys leucogaster*
Desert woodrat	*Neotoma lepida*
Bushy-tailed woodrat	*Neotoma cinerea*
Montane vole	*Microtus montanus*
Long-tailed vole	*Microtus longicaudus*
Sagebrush vole	*Lemmiscus curtatus*
Muskrat	*Ondatra zibethicus*
House mouse	*Mus musculus*
Western jumping mouse	*Zapus princeps*
North American porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Red fox	*Vulpes vulpes*
Northern raccoon	*Procyon lotor*
Ermine	*Mustela erminea*
Long-tailed weasel	*Mustela frenata*
American mink	*Mustela vison*
American badger	*Taxidea taxus*
Western spotted skunk	*Spilogale gracilis*
Striped skunk	*Mephitis mephitis*
Northern river otter	*Lontra canadensis*
Bobcat	*Lynx rufus*
Mountain lion	*Puma concolor*
Elk	*Cervus elaphus*
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
Pronghorn	*Antilocapra americana*
Bighorn sheep	*Ovis canadensis*
Reptiles	
Mojave black-collared lizard	*Crotaphytus bicinctores*
Longnose leopard lizard	*Gambelia wislizenii*
Pygmy short-horned lizard	*Phrynosoma douglasii*
Desert horned lizard	*Phrynosoma platyrhinos*
Sagebrush lizard	*Sceloporus graciosus*
Western fence lizard	*Sceloporus occidentalis*
Side-blotched lizard	*Uta stansburiana*
Western skink	*Eumeces skiltonianus*
Western whiptail	*Cnemidophorus tigris*

Common Name	Species Name
Rubber boa	*Charina bottae*
Racer	*Coluber constrictor*
Night snake	*Hypsiglena torquata*
Striped whipsnake	*Masticophis taeniatus*
Gopher snake	*Pituophis melanoleucus*
Longnose snake	*Rhinocheilus lecontei*
Western ground snake	*Sonora semiannulata*
Western terrestrial garter	*Thamnophis elegans*
Common garter snake	*Thamnophis sirtalis*
Western rattlesnake	*Crotalus viridis*