

From: Ingrid Campbell
To: Anthony Wright; Bill Bates; Bruce Bonebrake; Carmen Bailey; Chris Ha...
CC: Dana Dean; Daron Haddock; John Rogers; OGMCOAL
Date: 3/14/2011 3:10 PM
Subject: 2011 Raptor survey training
Attachments: 2011Training.pdf

Please see the attached cover letter and agenda providing details for the upcoming 2011 Raptor Survey Training. Also attached are the Raptor Survey Guidelines. If you plan on attending, please reply to this email. If you have questions or comments in the interim, please email or call Ingrid Campbell at (801) 538-5318 ingridwieser@utah.gov or Joe Helfrich at (801) 538-5290 joehelfrich@utah.gov.

We look forward to your participation.

Thank you,

Ingrid Campbell
Environmental Scientist II
Coal Regulatory Program
Division of Oil Gas & Mining
1594 W North Temple, Suite 1210
PO Box 145801
Salt Lake City, UT 84114-5801
801-538-5318
IngridWieser@utah.gov

Subject: 2011 Raptor survey training
Created By: INGRIDWIESER@utah.gov
Scheduled Date:
Creation Date: 3/14/2011 3:10 PM
From: Ingrid Campbell

Recipient	Action	Date & Time	Comment
To: Anthony Wright (tonywright@utah.gov)			
To: Bill Bates (billbates@utah.gov)			
To: blbnead@altoncoal.com (blbnead@altoncoal.com)			
To: Bruce Bonebrake (brucebonebrake@utah.gov)			
To: Carmen Bailey (carmenbailey@utah.gov)			
To: Chris Hansen (CHansen@archcoal.com)			
To: Chris Wood (chriswood@utah.gov)			
CC: Dana Dean (danadean@utah.gov)			
To: dana_truman@blm.gov (dana_truman@blm.gov)			
CC: Daron Haddock (daronhaddock@utah.gov)			
To: Dave Shaver (dshaver@coalsource.com)			
To: Dave Waller (David_waller@blm.gov)			
To: Dennis Ware (dware@foundationcoal.com)			
To: Dustin Schaible (dustinschaible@utah.gov)			
To: Gary Bezzant (garybezzant@utah.gov)			
To: ggalecki@archcoal.com (GGalecki@archcoal.com)			
To: Jeff Jewkes (jjewkes@fs.fed.us)			
To: Jeff_McKenzie@blm.gov (Jeff_McKenzie@blm.gov)			
To: Jim Parrish (jimparrish@utah.gov)			
To: jmarshall@coalsource.com (jmarshall@coalsource.com)			
To: Joe Helfrich (joehelfrich@utah.gov)			
To: John Blake (jblake@utah.gov)			
CC: John Rogers (johnrogers@utah.gov)			
To: John Gefferth (JohnGefferth@consolenergy.com)			
To: kalbrecht@fs.fed.us (kalbrecht@fs.fed.us)			
To: Karl Houskeeper (karlhouskeeper@utah.gov)			
To: Kelle Reynolds (kareynolds@fs.fed.us)			
To: Kent Jones (kentljones@utah.gov)			
To: Kit Pappas (kit@emerytelcom.net)			
To: knicholes@altoncoal.com (knicholes@altoncoal.com)			
To: Leroy Mead (leroymead@utah.gov)			
To: Louis Amodt (louisamodt@utah.gov)			
To: Lucia Malin (luciamalin@utah.gov)			
To: Marc Stilson (marcstilson@utah.gov)			
To: mdavis@archcoal.com (MDavis@archcoal.com)			
To: Michael_Glasson@blm.gov (Michael_Glasson@blm.gov)			
To: Nicole Nielson (nicolenielson@utah.gov)			
CC: OGMCOAL (OGMCOAL@utah.gov)			
To: Pete Hess (petehess@utah.gov)			
To: Priscilla Burton (priscillaburton@utah.gov)			
To: Rhett Boswell (rhettboswell@utah.gov)			
To: rnetz@emerytelecom.net (rnetz@emerytelecom.net)			
To: Steve Demczak (stevedemczak@utah.gov)			
To: Steve_Falk@blm.gov (Steve_Falk@blm.gov)			
To: Steve_Rigby@blm.gov (Steve_Rigby@blm.gov)			

To: steven_petersen@byu.edu (steven_petersen@byu.edu)

To: Sue Wiler (Sue_Wiler@blm.gov)

To: Teresa Griffin (teresagriffin@utah.gov)

To: Vicky Miller (vmiller@archcoal.com)

To: Wayne Hedberg (WAYNEHEDBERG@utah.gov)

To: aaron.james@tetrattech.com (aaron.james@tetrattech.com)

To: charles.reynolds@hiawathacoal.com (charles.reynolds@hiawathacoal.com)

To: Dennis Oakley (Dennis.Oakley@PacifiCorp.com)

To: Derris Jones (djones@preciscom.net)

To: dfreeman@fs.fed.us. (dfreeman@fs.fed.us.)

To: Diana_Whittington@fws.gov (Diana_Whittington@fws.gov)

To: garthnielsen@savageservices.com (garthnielsen@savageservices.com)

To: jorg6993@yahoo.com (jorg6993@yahoo.com)

To: Karla Knoop (kknoop@jbrenv.com)

To: Ken Fleck (Kenneth.Fleck@PacifiCorp.com)

To: kevin_mcabee@fws.gov (kevin_mcabee@fws.gov)

To: ljohnsontalon@gmail.com (ljohnsontalon@gmail.com)

To: Mace Crane (mace.crane@westernls.com)

To: mserfustini@preciscom.net (mserfustini@preciscom.net)

To: Nathan Darnall (Nathan_Darnall@fws.gov)

To: PamJewkes (pjewkes@fs.fed.us)

To: Pat Collins (mt.nebo@xmission.com)

To: Stan_Perkes@ut.blm.gov (Stan_Perkes@ut.blm.gov)

To: tkrasko@fs.fed.us (tkrasko@fs.fed.us)

To: Twlloyd@fs.fed.us (twlloyd@fs.fed.us)



GARY R. HERBERT
Governor

GREGORY S. BELL
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

March 10, 2011

To: Raptor Survey Training Invitees

Subject: Annual Raptor Survey Training, Outgoing File

The Division of Wildlife Resources, the U.S. Fish and Wildlife Service, and the Division of Oil, Gas and Mining are hosting the 2nd Annual Raptor Survey Training on Thursday, April 28, 2011. The training is open to all Oil, Gas and Mining personnel, private consultants and government employees free of charge. The Division of Oil, Gas and Mining raptor survey protocol (attached) recommends that all raptor surveyors attend the training annually. There will also be an opportunity for participants to provide comments and suggestions for the protocol.

The training will consist of classroom and field identification training. See the attached agenda for more information. The training will be held at:

The Department of Natural Resources (Price Field Office)
319 North Carbonville Road
Price, Utah 84501

If you have any questions about this training, please contact Ingrid Campbell at Ingridwieser@utah.gov, (801) 538-5318 or Joe Helfrich at Joehelfrich@utah.gov, (801) 538-5290.

Sincerely,

Daron R. Haddock
Coal Program Manager

DRH/IC/sqs
Attachments
cc: Price Field Office
O:\Raptor\2011\Invitation.doc



2011 Annual Raptor Survey Training

4/28/2011
9:00 AM
Department of Natural
Resources
(Price Field Office)
319 North Carbonville Road
Price, UT 84501



Hosts: Dr. Jim Parrish, Avian Program Coordinator, Utah Division of Wildlife Resources
Nathan Darnall, Migratory Bird Coordinator, U.S. Fish and Wildlife Service
Utah Division of Oil, Gas and Mining

Please bring: Binoculars, appropriate field attire, hiking shoes, and extra clothing for inclement weather conditions

Agenda

Background and Protocol (Classroom)	Nathan Darnall	9:00 am- 10:30 am
Raptor Identification (Classroom)	Jim Parrish	10:30 am- 12:00 pm
Lunch Break		12:00 pm- 1:00 pm
Raptor and Nest Identification (Field)	Nathan Darnall & Jim Parrish	1:00 pm- 4:00 pm

Additional Information

For more information please contact Ingrid Campbell at 801-538-5318 or Joe Helfrich at 801-538-5290.

RAPTOR SURVEY GUIDELINES

Utah Coal Regulatory Program

Purpose

The purpose of this document is to:

- A) Provide the coal industries with a guideline for conducting raptor surveys,
- B) Ensure accurate and consistent data acquisition and reporting, and
- C) When completed and endorsed by other agencies used as an Agency Procedure

This is a cooperative document between the Division of Oil, Gas and Mining, the Division of Wildlife Resources and the U.S. Fish and Wildlife Service. This is a working document in which the procedures will be refined and updated as needed.

Background

The Bald and Golden Eagle Protection Act prohibits the "take" of bald and golden eagles. The Act defines "take" to mean kill, molest or disturb. "Disturb"¹ means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (50 CFR 22.3). A violation of the Act can result in a fine of \$100,000 (\$200,000 for organizations), imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of this Act is a felony.

The Migratory Bird Treaty Act implements four bilateral agreements between the United States and Canada, Mexico, Japan and Russia to protect migratory birds. This Act also prohibits the unlawful taking of migratory birds, which includes any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof. Most birds in Utah are protected by the Act as well as their parts, nests, or eggs. All of Utah's raptors are protected by this Act.

Utah law also protects wildlife existing within the state, except those held by private ownership and legally acquired (Utah Code Section 23-13-3). Sections 23-30-3, 23-20-4

¹ The term "disturb" under the Eagle Act was recently defined via a final rule published in the Federal Register on June 5, 2007 (72 Fed. Reg. 31332). This term now covers impacts that result from alterations that were started near a nest site during a time when eagles are not present if, upon the eagle's return, those alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and cause injury, death or nest abandonment

and 23-20-4.5 make illegal the taking, transporting, selling, purchasing or wanton destruction of protected wildlife.

The Utah Administrative Code Annotated (R645-301-358.300) states that coal mining and reclamation operations are prohibited from the taking of an endangered or threatened species or a bald or golden eagle, its nest, or any of its eggs in violation of the Endangered Species Act of 1973 or the Bald Eagle Protection Act, as amended, 16 U.S.C. 668 et seq. The coal mine operator must avoid and minimize disturbance and adverse impacts to wildlife species protected by state or federal law and describe in the mining and reclamation plan how this will be accomplished (R645-301-333).

Coal Mines have the potential to "take" eagles or other migratory bird species in several ways including direct or indirect disturbances to their nest, roosts, or food sources resulting from mining related disturbances due to:

- Subsidence;
- Surface facilities;
- Exploration drilling; or
- Gas or ventilation holes or openings.

In order to prevent the "take" of eagles and other raptor species in past years the mines in conjunction with DWR have typically conducted annual helicopter surveys. The Division of Oil, Gas and Mining (DOGM) has accepted those surveys, as adequately addressing raptor survey needs. Even though The Division of Wildlife Resources (DWR) is no longer conducting surveys, the mines are still required to provide the necessary information to demonstrate a "take" is being prevented. This document is meant only as a guideline; prior to conducting surveys, a DOGM biologist should be contacted to discuss specific project details. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (Romin and Muck 2002) guidelines are incorporated into these suggested procedures.

General Survey Guidelines

Survey methodology should be designed to inventory the species expected within the habitat to be disturbed. Aerial or ground survey methodologies target different raptor species and are used to collect different types of data. Appendix C lists recommended survey methodologies and typical nesting substrates for specific raptor species. Most coal operators are interested in nest locations and presence/absence data during the nesting season. Survey methodology should be designed by a qualified raptor biologist and reviewed on a case-by-case basis with DOGM in coordination with DWR, the US Fish and Wildlife Service (FWS), and the surface land management agency. Survey methods will be incorporated into the mining and reclamation plan. To be consistent with State AGRC standards, coordinates should be provided in UTM zone 12, NAD83.

Subsidence

Raptor surveys should be conducted to identify nest locations in areas where subsidence is possible. Aerial surveys are typically conducted.

1. Conduct survey for two years prior to permit issuance to determine resource.
2. Repeat surveys in subsidence zones prior to mining and then again two years post mining or until subsidence has ceased to verify no impact.
3. Surveys are best performed in May to determine nest status.
4. Survey information required,
 - i.) Species
 - ii.) Nest location
 - iii.) Nest status (active, inactive, tended, dilapidated...)
 - iv.) Additional information as shown in Appendix A is desirable but not required.
5. Raptor data are confidential and should not be shared with the public. The data must be submitted to DOGM and DWR. In the future, the data may be directly entered into an online database.
 - i) In an electronic format, suitable for uploading into ArcGIS (shapefiles).
 - ii) In a map format showing mine panels, subsidence boundary, dates of anticipated or completed mining activity, and nest locations indicating species, activity etc.

Surface facilities

Raptor surveys² for long-term surface facilities placement should be conducted to identify species, locate nests, winter roosts, and other important habitat so they can be avoided.

1. Conduct spring nesting and winter roosting surveys for three years prior to permit issuance to determine resource.
2. Survey within the spatial buffer of the target species (refer to Romin and Muck, 2002) at the proposed facility.
3. Nesting surveys are best performed in May to determine nest status.
4. Bald Eagle Roost surveys should be conducted in January within winter roosting habitat.
5. Survey information required
 - i) Species
 - ii) Nest location
 - iii) Bald Eagle Roost location
 - iv) Nest status (active, inactive dilapidated...)
 - v) Additional information as shown in Appendix A.
6. The initial survey should be an aerial and ground survey; however, this will depend on terrain of proposed facilities and raptor species targeted. Follow-up surveys may be ground if the status of the nest can be accurately determined.

² A prey-based survey may also be required, especially if applying for an incidental take permit.

7. A qualified wildlife biologist should be retained to annually inventory and document raptor nesting and winter roosting status within the one-mile disturbance radius.
8. If a surface facility is inactive before the site is reclaimed another survey will be required prior to the start of reclamation activities. These surveys should include the surface structures such as conveyors and buildings as well as surrounding terrain.

Exploration drilling

Exploration drilling is generally a one-time short duration occurrence. The surface management agency needs to be contacted for specific survey requirements and to determine if existing data are available. If nest locations are known aerial or ground surveys can verify nest status so that appropriate spatial and season buffers can be determined. Generally, plan exploration drilling between August and November to avoid seasonal buffers.

Gas or Ventilation Holes or Openings

1. Conduct spring and winter surveys for one year prior to permit issuance to determine resource.
2. Survey within the spatial buffer of the target species (refer to Romin and Muck, 2002) at the proposed facility.
3. Nest surveys are best performed in May to determine nest status.
4. Bald Eagle Roost surveys should be conducted in January within winter roosting habitat.
5. A prey-based survey may also be required.
6. Survey information required
 - i) Species
 - ii) Nest location
 - iii) Bald Eagle Roost location
 - iv) Nest status (active, inactive dilapidated...)
 - v) Additional information as shown in Appendix A.
7. The initial survey should be an aerial and ground; however this will depend on terrain of proposed facilities and raptor species potentially present. Follow-up surveys may be ground if the status of the nest can be accurately determined.
8. A qualified wildlife biologist should be retained to annually inventory and document raptor nesting and winter roosting status within the one-mile disturbance radius.

Protocol

The following protocol has been developed in consultation with DOGM, DWR and FWS.

Qualifications: Individuals responsible for designing and conducting the survey should have a Bachelor or higher degree in Wildlife Biology or a related discipline and experience in raptor behavior and excellent raptor identification skills. The act of surveying has the potential to disturb or molest the species surveyed and the qualified biologist will be responsible to prevent "take" during the survey. Safety of the surveyors and the birds are more important than obtaining all of the data attributes. All surveyors must attend the Utah Raptor Identification and Survey training, held annually by the US Fish and Wildlife Service. (For more information please contact the Division of Oil, Gas and Mining.) Qualified individuals should have a good working knowledge of GIS and GPS tools. Qualification statements or resumes must be submitted to DOGM prior to the survey.

Aerial Surveys

Golden Eagle and cliff nesting raptor surveys need to be initiated as close to May 10 as possible. This date will prevent "take" since eagle chicks have generally hatched and parent birds are less likely to abandon the nest. Surveys need to be completed by June 1 to ensure that the chicks are young enough that they will not be prematurely flushed from the nest by the disturbance.

Survey participants for aerial surveys historically included four members: the pilot, a company representative (scribe), a navigator, and a spotter/identifier (biologist). At least three people should be present. The navigator and spotter need to be qualified individuals as noted in the previous section of this document who can properly identify raptor species.

It is recommended that the navigator use moving-map type GPS technology to navigate during the survey to ensure adequate coverage of the survey area, navigate and identify known nests, and accurately record the location of newly discovered nests. Software that has been proven effective for these types of surveys include: ArcPad, Fugawi, Xmap, and National Geographic Map. These programs should show a topological map of the area, the surveyor's real-time location on the map, the locations of the known raptor nests and the track that the survey has covered.

The spotter/identifier finds new nests and birds; and assists in finding the known nest as the navigator explains its location on the computer. Once the nest is located, the spotter/identifier confirms the species, determines nest status and other information using the terms and data fields listed on the attached tables.

The company representative or scribe ensures that the area within 1 mile of the affected or potentially impacted area is thoroughly surveyed. The scribe records the information

listed on the attached table, i.e. nest number, date, time, species, status of the nest, nest type (i.e. cliff, tree...), number of eggs, number of young, age of young, and any additional comments that are deemed necessary, preferably in an electronic format on the GPS.

For active territories, the surveyor(s) must conduct a second survey to gather productivity data. The productivity survey should be conducted when the young have reached acceptable fledging age (51 days old) but have not yet left the nest. All nests in which occupancy or breeding status could not be collected during the presence/absence survey should be revisited at this time. The surveyor(s) must analyze the productivity data by calculating the percent of eagle pairs laying eggs.

GPS track logs should be recorded and submitted to DOGM as well as photographs of the nest. When a new nest not in the database is found, a point of that nest should be taken with a GPS handheld, or the Trimble Laser Pointer. At a minimum, latitude and longitude coordinates must be submitted to DOGM. Each new nest will be assigned an original nest ID # given by DWR.

Ground Surveys

Ground surveys generally target tree and ground nesting species and are used when there is adequate road access. Some species, including Northern Goshawk, Mexican Spotted Owl and Burrowing Owl, require a ground or calling survey. When used to inventory remote or cliff habitat they generally require more time than aerial surveys. Surveyors must obtain a permit from FWS before surveying for Mexican Spotted Owls

Survey methodology should be designed by a qualified raptor biologist and reviewed on a case-by-case basis with DOGM in coordination with DWR, the US Fish and Wildlife Service (FWS), and the surface land management agency. Ground surveys require all data collection as described in the aerial survey.

Species Specific Surveys

See Appendix B for a list of protocols.

Data Collection and Formatting

Surveyors must obtain existing survey data prior to conducting aerial or ground surveys. This information can be obtained by contacting DWR at 801 538 5700 and filling out the requisite release forms. In addition, the applicant needs to contact the Division to verify the necessary location and extent of the survey. This will assist in locating known nests and so that unique identifying numbers can be assigned to new nests.

After field data has been collected all GPS tracks need to be downloaded into separate company or mine files, and all collected nest data needs to be added to the master database.

After all newly collected data and new nest information has been entered into the master database, the data should be imported into ArcGIS and saved as a shapefile or other compatible geospatial file.

Survey data are confidential and should not be shared with the public. The data must be submitted to DOGM in the following formats.

- 1.** In an electronic format, suitable for uploading into ArcGIS.
- 2.** A report with photographs and a map format showing all surface facilities and pertinent raptor use area, an appropriate size buffer (.25-1 mile depending on species), nests indicating species and status.

BIBLIOGRAPHY

Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. Interim Golden Eagle technical guidance: inventory and monitoring protocols; and other recommendations in support of eagle management and permit issuance. Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

Romin, L.A. and J.A. Muck. 2002. Utah Field Office guidelines for raptor protection from human and land use disturbances. U.S. Fish and Wildlife Service unpublished report.

APPENDIX A
RAPTOR SURVEY FORM

BACK OF PAGE

NEST STATUS *

Active

Active nest; a nest in which a breeding attempt was made as indicated by:

- 1) Eggs in nest, or
- 2) Young in nest, or
- 3) Fledged young near nest, or
- 4) Incubating/brooding adult

ActiveFail

An active nest that did not fledge young, indicated by:

- 1) Egg shells in or around nest with no young when, young should be in the nest, or
- 2) Young present but known not to have fledged, or
- 3) Eggs in nest but obviously abandoned (past the time when eggs should have normally hatched).

Not Found:

Did not locate; surveyor searched but was unable to locate the nest

Tended:

Tended or Occupied; a nest with one or more of the following:

- 1) Fresh lining material;
- 2) Adult presence at or near the nest; and
- 3) Recent and well-used perch site near the nest.

TendedAL:

Occupied Alternate; a tended nest within the boundaries of a territory housing an active nest.

Inactive:

Inactive; a nest with no apparent recent use or adult presence at the time of observation, but in good condition.

Dilapidated:

an inactive nest in a state of ruin due to weather, natural aging and/or neglect.

Destroyed:

Inactive Destroyed; a nest showing no sign of raptor activity that is destroyed to the point that it is no longer usable without major reconstruction. These nests have disappeared, but there is often still lingering evidence of an historic presence.

Predated:

Predated; the nest was active, but there is evidence that it was predated (remains of adults or young, feathers or egg shells scattered)

NEST CONDITION*

Gone:

There may or may not be evidence of where the nest was, but it is no longer there.

Remnants:

Scant material remaining and not usable unless fully rebuilt.

Poor:

Nest is dilapidated, in need of major repair to be used.

Fair:

Nest is not dilapidated, but needs significant repair in order to be used.

Good:

Nest is in need of only minor attention in order for it to be used.

Excellent:

Nest is able to be used with little or no attention or maintenance.

Unknown:

The nest is obviously present (i.e., a tree cavity, rock cavity), but because of its location, a determination can not be made.

SUBSTRATE*

CAV:	Cavity
BLT:	Broadleaf tree
CLF:	Cliff/ Rock outcrop
CON:	Conifer
GHS:	Ground/Hillside
MMS:	Manmade Structure
UTL:	Utility
SNG:	Snag or dead tree
UNK:	Unknown

EXPOSURE OF NEST*

N:	North
S:	South
W:	West
E:	East
NW:	Northwest
NE:	Northeast
SW:	Southwest
SE:	Southeast

APPENDIX B
SPECIES SPECIFIC PROTOCOLS



Appendix B

BALD EAGLE WINTER ROOST SITES (BLM 2009)

Recommended protocol

1. Survey suitable roosting stands of coniferous and cottonwood trees during the period of Dec.1 to March 1 from 1 hour before sunrise or sunset to 1 hour after sunrise or sunset. Surveys after this period are not reliable. Evening surveys may be preferable as eagles often leave roost sites at or before dawn and may return to roost throughout the afternoon.
2. Helicopters or fixed-wing airplanes can be used for surveys. If not following a drainage, suspected roost habitat should be flown on north - south transects with lines about one km (.6 mi) apart. Under conditions of marginal light, transect width should be narrowed. Transects should be flown at about 100-150 meters (300-450 ft) above ground level. Whenever possible, two observers should be used in addition to the pilot so that one observer is always looking away from the sun regardless of the direction the aircraft is flying. Surveys should begin at the east edge of the survey area and work west to minimize the possibility of the plane flying over roost sites prior to them being observed.
3. Document all bald eagle observations using GPS equipment (UTMs - NAD83). Record: date, location, number seen, age class (adult, juvenile, unknown eagle) and habitat
4. Ground surveys will consist of at least three visits, with at least 1 week between visits. Visits should extend throughout the winter roosting season (recommended minimum of 1 visit per month), as eagle use is largely dependent on regional weather patterns, and eagle use often increases as the roosting season progresses.

MEXICAN SPOTTED OWL PROTOCOL

U.S. Fish and Wildlife Service. (2003). Mexican Spotted Owl Survey Protocol.
<http://www.fws.gov/mountain-prairie/endspp/protocols/MSOSurveyProtocol.pdf>

BURROWING OWL PROTOCOL

Colorado Division of Wildlife. (2007). Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls When Conducting Prairie Dog Control.
<http://wildlife.state.co.us/NR/ronlyres/C5D61571-F1DC-4679-ADD7-F3ABB339FB1C/0/BUOWSurveyProtocol2007.pdf>

NORTHERN GOSHAWK PROTOCOL

Woodbridge, B.; Hargis, C.D. (2006). Northern Goshawk Inventory and Monitoring Technical Guide. Gen. Tech. Report WO-71. Washington, DC: U.S. Department of

Agriculture, Forest Service. 80p.

<http://www.fs.fed.us/biology/wildecology/GoshawkTechGuideJuly06.pdf>

PEREGRINE FALCON PROTOCOL

Pagel, J.E. 1992. Protocol for observing known and potential peregrine falcon eyries in the Pacific Northwest. Pp. 83-96 *in* Pagel, J.E. (ed). Proceedings; symposium on peregrine falcons in the Pacific Northwest. Rogue River National Forest.

FERRUGINOUS HAWK PROTOCOL

Taylor, B.N. 2003. Population estimates and a survey protocol for ferruginous hawks in Alberta. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 70. Edmonton, AB.

http://www.srd.alberta.ca/BioDiversityStewardship/SpeciesAtRisk/documents/SAR_70.pdf

CAVITY-NESTING BIRDS PROTOCOL (Flammulated owl, Northern saw whet owl)

Dudley, J. and Saab, V. 2003. A Field protocol to monitor cavity-nesting birds. Res. Pap. RMRS-RP-44. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 16p.

APPENDIX C
RECOMMENDED SURVEY METHODOLOGIES,
TYPICAL NESTING SUBSTRATES AND BUFFER DISTANCES
FOR SPECIFIC RAPTOR SPECIES

From Romin and Muck (2002)



Recommended Survey Methodologies for Specific Raptor Species

Species	Ground searches			
	Sign/nest searches	Begging young	Snag tapping	Call playback
Bald Eagle	X			
Golden Eagle	X			
N. Harrier	X			
Osprey	X			
N. Goshawk	X	X		X
Cooper's hawk	X	X		X
Sharp-shinned hawk	X	X		
Peregrine falcon	X	X		
Prairie falcon	X	X		
American kestrel	X			
Merlin	X			
Ferruginous hawk	X			
Red-tailed hawk	X			
Swainson's hawk	X			
Boreal owl	X			X
Burrowing owl	X			X
Flammulated owl			X	X
Great-horned owl	X	X		
Long-eared owl	X			X
Northern saw-whet owl			X	X
Short-eared owl	X			
N. pygmy owl	X			X
W. screech owl	X		X	X
Common barn owl	X	X		
Mexican spotted owl	X	X		X
Turkey vulture	X			

Aerial Searches		Comments
Helicopter	Fixed-wing	
	X	Large, conspicuous nest
X		
X	X	Large, conspicuopus nest
X		Helicopter only in aspen, difficult
		butcher blocks, squirts
		butcher blocks, squirts
X		Helicopter can miss
X		Helicopter can miss
		Nesting very uncommon Utah
X		Pinyon nests in tops, easy to see
X		
X		
		Difficult, can use radio telemetry
		roosts - pellets, whitewash near nests
		Very difficult, will not look out

Typical Nesting Substrate

Species	Coniferous	Broadleaf	Pinyon/ Juniper	Cavity	Cliff	Utility	Cave	Building	Ground	Comments
Bald Eagle	X	X								Super-dominant trees
Golden Eagle		X			X					Cliffs, large agricultural area trees
N. Harrier									X	Grassy fields
Osprey	X	X				X				Artificial platforms too
N. Goshawk	X	X								Often aspen
Cooper's hawk	X	X	X							Both riparian and forest trees
Sharp-shinned hawk	X		X							Dense conifers
Peregrine falcon					X			X		Scrapes on ledges
Prairie falcon					X					Scrapes on ledges
American kestrel				X						Both tree and cliff cavities
Merlin	X									Nesting very uncommon in Utah
Ferruginous hawk			X		X					Isolated or edge trees, bluffs and pinacles
Red-tailed hawk	X	X	X		X					Often cliffs, large pinyons
Swainson's Hhawk		X	X			X				Hedgerows, powerlines, isolated trees
Boreal owl				X						Boreal climate zone
Burrowing owl				X						In ground or gully wall
Flammulated owl				X						Flicker holes
Great-horned owl	X	X			X		X			Low on cliffs, old raptor nests, broken snags
Long-eared owl	X	X	X		X		X			Dense cover
Northern saw-whet owl				X						tree cavities, often snags
Short-eared owl										Grassy fields, wetlands
N. pygmy owl										tree cavities, often in snags
W. screech owl										tree cavities
Common barn owl				X			X	X		Behind ivy, holes in gully walls, farm buildings
Mexican spotted owl					X		X			Small caves on cliff walls
Turkey vulture					X					Also talus, brush piles

Species	Spatial Buffer (miles)	Seasonal Buffer	Incubation, # Days	Brooding, # Days Post-Hatch	Fledging, # Days Post-Hatch	Post-fledge Dependency to Nest, # Days ¹
Bald eagle	1.0	1/1-8/31	34-36	21-28	70-80	14-20
Golden eagle	0.5	1/1-8/31	43-45	30-40	66-75	14-20
N. Goshawk	0.5	3/1-8/15	36-38	20-22	34-41	20-22
N. Harrier	0.5	4/1-8/15	32-38	21-28	42	7
Cooper's hawk	0.5	3/15-8/31	32-36	14	27-34	10
Ferruginous hawk	0.5	3/1-8/1	32-33	21	38-48	7-10
Red-tailed hawk	0.5	3/15-8/15	30-35	35	45-46	14-18
Sharp-shinned hawk	0.5	3/15-8/31	32-35	15	24-27	12-16
Swainson's hawk	0.5	3/1-8/31	33-36	20	36-40	14
Turkey vulture	0.5	5/1-8/15	38-41	14	63-88	10-12
California condor	1.0	NN yet	56-58	5-8 weeks	5-6 months	2 months
Peregrine falcon	1.0	2/1-8/31	33-35	14-21	35-49	21
Prairie falcon	0.25	4/1-8/31	29-33	28	35-42	7-14
Merlin	0.5	4/1-8/31	28-32	7	30-35	7-19
American kestrel	NN ²	4/1-8/15	26-32	8-10	27-30	12
Osprey	0.5	4/1-8/31	37-38	30-35	48-59	45-50
Boreal owl	0.25	2/1-7/31	25-32	20-24	28-36	12-14
Burrowing owl	0.25	3/1-8/31	27-30	20-22	40-45	21-28
Flammulated owl	0.25	4/1-9/30	21-22	12	22-25	7-14
Great horned owl	0.25	12/1-9/31	30-35	21-28	40-50	7-14
Long-eared owl	0.25	2/1-8/15	26-28	20-26	30-40	7-14
N. saw-whet owl	0.25	3/1-8/31	26-28	20-22	27-34	7-14
Short-eared owl	0.25	3/1-8/1	24-29	12-18	24-27	7-14
Mex. Spotted owl	0.5	3/1-8/31	28-32	14-21	34-36	10-12
N. Pygmy owl	0.25	4/1-8/1	27-31	10-14	28-30	7-14
W. Screech owl	0.25	3/1-8/15	21-30	10-14	30-32	7-14
Common Barn-owl	NN ²	2/1-9/15	30-34	20-22	56-62	7-14

¹ Length of post-fledge dependency period to parents is longer than reported in this table. Reported dependency periods reflect the amount of time the young are still dependent on the nest site; i.e. they return to the nest for feeding.

² Due to apparent high population densities and ability to adapt to human activity, a spatial buffer is not currently considered necessary for maintenance of American kestrel or Common barn-owl populations. Actions resulting in direct mortality of individual birds or take of known nest sites is unlawful.