Balancing Energy Development and Raptor Conservation in the Western United States: Workshop Summary Report

Compiled by Jonathon Bart, Mark Fuller, Ruth Jacobs, Kate Kitchell, Cal McCluskey, David Mills, Lowell Suring, and Diana Whittington

June 2006

USGS science for a changing world

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

U.S. FISH & WILDLIFE SERVICE

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

DISCLAIMER: This document represents the opinions of the compilers and the presenters at the workshop. It does not represent peer-reviewed scientific findings, agency determination, or policy. The compilers have focused in this version of the report on representing the information presented and developed at the workshop. Additional refinement of the content and expanded goals, objectives, actions, and timeframes will occur in a future report.

Contents

Overview 1

Oral Presentations 4

Energy Outlook: Resource Demands and Opportunities 4

Current and Emerging Management Issues, Tools, and Practices in Balancing Energy Development and Raptor Conservation 6

Effects of Energy Development on Raptors in the West 11

What Do We Still Need to Know to Manage Energy Development and Balance it with Raptor Conservation? 18

Shared Perspectives on Balancing Raptor Conservation with Energy Development 22

Results from Work Groups to Identify Strategies and Actions 23

Group 1: Status and Trends of Raptor Populations 24

Group 2: Effectiveness of Management Practices 25

Group 3: Define Management Objectives 27

Group 4: Communication and Coordination 30

Group 5: Monitoring and Data Management 31

Building a Partnership: Strategies & Recommendations for Collaboration, Continuity, and Commitment 33

Appendixes 39

Appendix 1. Workshop Agenda 39

Appendix 2. Names and Contact Information for Participants 43

Balancing Energy Development and Raptor Conservation in the Western United States: Workshop Summary Report

Compiled by: Jonathon Bart, Mark Fuller, Ruth Jacobs, Kate Kitchell, Cal McCluskey, David Mills, Lowell Suring, and Diana Whittington

Overview

Progress toward the goal of energy independence for the United States has resulted in the growth of energy developments and energy-distribution networks, particularly in the western United States. Managers in private, public, and non-governmental organizations seek to understand the effects of those activities in order to achieve multiple-use, sustained-yield, and conservation goals for a variety of cultural and natural resources. A special group of wildlife known as birds of prey, or "raptors," is of particular interest. From a social perspective, raptors have high visibility, recognition, and interest for conservation strategies. Ecologically, raptors represent species of national and international importance as top predators in plant and animal communities, and as indicators of environmental health and ecosystem function. They are a useful focal group for understanding numerous ecological relationships and responses to change. Many species may be particularly sensitive to the effects of energy development and would function well as early indicators of change. Furthermore, raptors occur in comparatively small numbers, some are especially susceptible to perturbations, and some have special designations as species of concern.

The subject of balancing energy development and raptor conservation in the western United States was explored in a workshop held April 18-20, 2006 in Salt Lake City, Utah. Workshop hosts were joined by invited participants from the energy industry, state natural resource agencies, universities, and non-governmental organizations. The organizing hosts were the Bureau of Land Management (BLM), U.S. Geological Survey (USGS), U.S. Forest Service (USFS) and U.S. Fish and Wildlife Service (USFWS). Workshop participants, 76 in number, sought commitment to the task of balancing oil, gas, and coalbed methane development with raptor conservation. They also explored opportunities to promote partnerships and cooperation in research, technical assistance, and adaptive management related to balancing oil, gas, and coalbed methane development with raptor conservation. Workshop objectives were to:

- Provide an overview of the state of knowledge, ongoing research and monitoring, and information needs regarding the effects of oil, gas, and coalbed methane development on raptors
- Identify and prioritize short-term and long-term raptor research and monitoring needs relating to oil, gas, and coalbed methane development
- Initiate the development of strategies for advancing cooperative research, monitoring, and technical assistance to improve management of oil, gas, and coalbed methane development and raptors

This report summarizes the workshop. It represents the information presented and the outcome of discussions, including the goals and objectives that were identified for priority actions described by several workgroups. The compilers of the report, who also are the members of the organizing committee for the workshop, edited abstracts of the oral presentations and the reports of the work groups to facilitate presentation and understanding of the information. Their

intention was to retain the general integrity of the information as it was presented or developed at the workshop. Additional refinement of this report is planned once work groups have a chance to meet and prepare specific strategies for meeting the goals and objectives identified.

While there is a high level of interest in maintaining momentum from the workshop, and individual work groups initiated action planning to address the most compelling research and technical assistance needs, these efforts and products are separate, disparate, and lacking cohesion and commitment. While the workshop organizing committee continues to support the production of the report and work group strategy development, this role is ad hoc and short term. Roles currently filled by committee members in this interim capacity are not aligned with long-term position responsibilities and agency missions.

A significant gap looms ahead. There is no mechanism, organization, or specific commitment for leading, supporting, coordinating, or implementing the strategies and actions forthcoming from the work groups. Without institutional commitment, organizational structure, leadership, and communication, what was started at the workshop is likely to dissolve.

A special section of the report entitled, "Building a Partnership: Strategies and Recommendations for Collaboration, Continuity and Commitment," (p.30) brings attention to these issues and puts forward recommended strategies to overcome them. These initial recommendations have been drafted without workshop participant review or thorough vetting among stakeholders. Therefore, it is expected that they will change and evolve based on further review, revision, and dialogue among partners

Oral Presentations

Energy Outlook: Resource Demands and Opportunities

Interactions of Oil and Gas Development and Raptor Management - An Industry Perspective (Duane Zavadi)

From an industry perspective, the Intermountain West is an important and growing source of oil and natural gas. Raptor management, particularly in the context of management for other multiple uses, has a significant effect on production. This effect is not simply local because the way raptors are managed has a real effect on the price of oil and gas, on balance of trade, and even on national policy. Active management, including management that incorporates multiple locations, is important in accomplishing energy growth and achieving raptor management goals. In the eyes of industry, agency resource management plans must facilitate such active management. Furthermore, industry is a willing and able partner in mitigation that allows expansion of production. To facilitate industry involvement, studies should focus on developing techniques for active management rather than studies that only document the effects of energy development on raptors.

BLM Overview: Managing Oil, Gas, and Coalbed Methane Resources (Jim Perry)

The BLM has management authority over many acres of land with existing and potential energy developments; in fact, the BLM has an energy program which works to increase domestic energy supplies. BLM-managed lands total 262 million acres and are already a significant source of energy. These lands contribute 5% of domestic oil and 18% of domestic natural gas supplies. Even so, less than 5 percent of BLM-managed lands have leases with at least one producing well,

and at any one time, less than 1% of these have surface disturbance associated with oil and gas development.

Multiple laws affect BLM's energy leasing and development, some specifically focusing on development and leasing and others focusing on balance among the resources and multiple uses that the agency manages, including raptors. Mitigation of impacts of energy development originates in land-use plans and is carried through and supplemented during the fluid-mineral leasing, permit processing, development, and final reclamation stages. The BLM's resource management plans are where the major oil, gas, and wildlife-protection decisions are made. The USFWS is an important federal partner, both as a cooperative conservation partner and as one of two agency administrators of the Endangered Species Act. The BLM enters into consultation under the Endangered Species Act with the USFWS for all new resource management plans, and wells do not get drilled unless they are in conformance with these plans. Public involvement also is critical to ensuring a balanced plan that meets the needs of the public.

Leasing decisions are made in the resource management plans and associated planning documents. Areas that are open to leasing can further be managed with lease stipulations and with standard terms and conditions. For raptors, as an example, stipulations may be applied to protect raptor nests and other types of habitat. During a lease sale, the BLM conducts a final review of lease parcels to ensure that the correct wildlife stipulations are applied to the new lease, the lease is in conformance with the land-use plan, necessary consultation is up-to-date, and there are no significant new issues to be addressed. BLM also reviews the operator's application for a permit to drill and applies appropriate mitigation to reduce negative effects, conducts an inspection and enforcement program to ensure compliance with operational and environmental requirements during all phases of development, and monitors effects of energy

development on wildlife populations. Management practices, for example minimizing roads, burying utilities, and reducing noise, are critical to reducing impacts.

Current and Emerging Management Issues, Tools, and Practices in Balancing Energy Development and Raptor Conservation

Multiple tools, practices, and partnerships already exist that have varying types and degrees of use for balancing energy development and raptor conservation. Many of these were developed to specifically target raptor conservation; others, such as modeling of cumulative effects and long-term monitoring, have application far beyond this topic. The following examples showcase some of both and set the stage for consideration of how these might be refined or what other tools and practices should be considered.

USFWS Raptor Management Guidelines (Connie Young-Dubovsky)

In the mid 1990s, raptor protection measures were applied inconsistently across BLM and other public lands. This resulted in a request to the USFWS to develop guidelines that could be used to improve consistency and to reduce the likelihood of violating regulations promulgated under the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Endangered Species Act. Utah developed guidelines for the state in 1999, with a revision in 2002. Growing energy development concerns added pressure to the need for the guidelines, and the USFWS began developing regional guidelines. The regional guidelines are still a work in progress due to numerous differences between USFWS field offices regarding topography, state regulations, and other issues.

The Role of Partners in Flight (Jim Perry for Eric Lawton)

Non-governmental organizations play important roles in bird conservation. Partners in Flight (PIF), for example, is an international coalition of federal and state agencies, private organizations, industry, and the public who share the vision of keeping bird populations and their habitats healthy. PIF was formed in the United States in 1990, and now has participation by Canada and Mexico. Western states have formed the Western Working Group and have completed individual multi-species, multi-habitat, and multi-year conservation plans. Raptors are covered in these plans.

A major planning effort of PIF is the Landbird Conservation Plan. It provides a continental synthesis of priorities and objectives that guide landbird conservation actions at national and international scales. Also, all states and territories recently completed comprehensive wildlife conservation strategies known as State Wildlife Action Plans. These plans include raptors and are required for state wildlife grant monies administered by the USFWS. Several members of PIF's Western Working Group also are part of the Western Association of Fish and Wildlife Agencies, an organization that recently formed a Wildlife and Energy Development Committee to work on specific energy development issues. Furthermore, the Western Working Group of PIF has identified the issue of bird conservation and energy development as a national conservation need for multi-state action. The group supports regional assessment of energy policy and potential impacts on raptor habitat conservation, science to address energy policy and raptor conservation issues, monitoring of effects of energy development on raptor conservation, and position statements and strategies to address energy policy issues and raptor conservation.

Protecting Birds while Powering America: An Overview of Efforts by the Electric Utility Industry to Reduce Bird Mortality and Improve Power Reliability (Sherry Liguori)

For over 30 years, the electric utility industry and the USFWS have worked together to reduce avian mortality associated with power lines. The Avian Power Line Interaction Committee (APLIC) was formed in the late 1980s to address sandhill crane collisions with power lines. Since then, APLIC has expanded its focus to include bird electrocutions and nests on power-line structures. APLIC members include rural electric cooperatives, federal power companies, investor-owned utilities, the Edison Electric Institute, the Electric Power Research Institute, the Rural Utilities Services, and the USFWS. APLIC and the USFWS have worked together to develop voluntary guidelines for avian protection. Utilities use the guidelines to design programs to protect migratory birds while enhancing service reliability. The 2006 edition of the guidelines will describe how birds are electrocuted, which species are at risk, applicable regulations, problem power-line designs and recommended solutions, and nest-management practices.

PacifiCorp, an electric utility that operates in six western states, has an active management program for birds dating back to the 1980s. The program, which served as one model for the national avian protection guidelines, implements reactive, preventative, and proactive measures to reduce mortalities on its facilities. The reactive component includes documenting electrocutions, collisions, and problem nests as they occur, and conducting appropriate remedial actions. Preventative measures include building new lines or refurbishing old lines in rural areas to standards that are safe for birds. Proactive efforts include risk assessment surveys and remedial actions associated with high-risk circuits in areas with concentrations of migratory birds. PacifiCorp's Bird Management Program is effective in

reducing avian mortality, improving service reliability, reducing long-term costs, and enhancing its environmental stewardship image to the public and regulatory agencies.

The Human Footprint and Wyoming Basin (Matthias Leu)

Some tools take a broad approach, such as modeling of the cumulative effects of multiple development activities on multiple species. For example, the USGS is developing a map of the total influence of human activities ("human footprint") for the western United States from an analysis of landscape structure and anthropogenic features. The map focuses on shrubland ecosystems and combines models of habitat use by predators and the risk of invasive plants to estimate the human footprint. All datasets used in the analysis are archived on the internet (http://sagemap.wr.usgs.gov). The actual mapping involves modeling human activities that benefit predators in order to understand the top-down interaction between predators and shrubland wildlife. The map also represents anthropogenic factors that interrupt connectivity and increase fragmentation of wildlands, such as roads.

The predictions from the human footprint model were substantiated with independent data from the USGS Breeding Bird Survey; however, the model needs further testing with additional avian predators. The ferruginous hawk can be used as an instance of applying the model to areas of coalbed-methane extraction. Modeling the human footprint across large landscapes also allows researchers to generate hypotheses about ecosystem change and to conduct studies in regions differing in potential impact. The human footprint aids managers in planning, implementing land-use actions, and developing strategies to conserve habitats and wildlife. As such, the human footprint model is an important first step toward understanding the synergistic effects acting on shrublands in the western United States.

Development of Oil and Gas Resources within Crucial, Important Wildlife Habitats (Susan Patla)

The Wyoming Game and Fish Department has developed a set of recommendations for development of oil and gas resources within crucial and important wildlife habitats as a planning tool for state and federal resource managers. The document is based on literature and is available on the agency's website: http://gf.state.wy.us/downloads/pdf/og.pdf. It compiles practices that avoid, minimize, and mitigate actual and anticipated impacts to habitat functions resulting from large-scale oil and gas development. Topics include impacts resulting from oil and gas, practices and mitigations for some of the most important wildlife in Wyoming, and an extensive, annotated bibliography. The document is revised as new information becomes available.

Monitoring and Assessment Needs: Guidelines for Site Evaluation and Implementation of a Regional Status-Monitoring Program (Jon Bart)

Many groups, including the U.S. Office of Management and Budget, are stressing the need for monitoring to determine whether management objectives are achieved, and the related requirement that goals be expressed in "ultimate" terms. For example, the USFWS can no longer justify budget requests by reporting acreages of habitat protected, but rather must document how bird populations respond. Thus, those involved in energy development need to document how birds, not just habitats, are affected by development. Questions of interest are local and landscape-level in spatial scale, and monitoring can occur at both scales. The greatest needs at the local scale are probably uniform approaches and a good system for data management, both to accumulate and distribute results. A great need at the broad scale is to integrate monitoring effects of energy development on raptors into a regional program. The Intermountain West Coordinated Bird Monitoring Program is appropriate for the regional program (http://greatbasin.nbii.gov/iwcbm/).

Effects of Energy Development on Raptors in the West

Many lines of inquiry provide information about the status and trends of raptors in the West and the response of raptors to anthropogenic activities. Because of their biology, life histories, position in the food web, and charismatic qualities, raptors should be important index species in tracking environmental health, including effects of energy development, but there are problems in interpreting observations or scientific findings and making them useful to all parties concerned. Specifically, managers need to beware of overly broad generalities based on few specific studies.

Raptor Ecology in the Developing West (Clayton White)

An examination of the status designations of raptors is a good case-in-point for considering some of the difficulties synthesizing what we know about raptors. Fifty-two species of owls, hawks, eagles, and falcons are listed for conservation protection in the continental United States. Within the 11 states in the West, 44 of the 52 species are listed in various categories of formal consideration by one agency or another. As an idea of the various categories, the terms “Species of Conservation Priority,” “Species of Greatest Conservation Needs,” “Indicator Species,” “Threatened or Endangered Species,” and many others have been used. There is one species listed for 18 of the states, and in most cases their listing indicates only that the species occurs within the boundaries of the state; for example, the common black hawk, a species of the tropics, occurs in Arizona. There are two or three species listed in four of the states. In most cases their listing is because they may be a localized species or perhaps unique to the state. In the cases, where the species is listed for 9 or 10 of the states, that species is usually a former or current Threatened or Endangered Species under the U.S. Endangered Species Act.

These usually are thought to be a candidate species for listing, or showing measurable declines and are considered to be species of concern.

An example of the difficulty of interpreting results and translating them to management guidance is provided by a study of ferruginous hawk sensitivity to disturbance. The largest hawk in North America, the ferruginous hawk is sensitive to disturbance and prone to nest desertion. The study focused on establishing behavioral and nesting data, conducting impact monitoring, and developing recommendations for buffer zones for future geothermal development activities. Researchers conducted various disturbances at nests and recorded how hawks responded. Findings were variable. For example, there was a seasonal factor. Hawks tended to flush more readily when approached on foot when it was close to the hatching date of young, compared to other times of the year. Additionally, a high prey base seemed to increase the threshold of sensitivity (decreased flushing distances), and adult hawks could be sensitized to human presence up to the time eggs hatched. However, the data were gathered during three years when the prey base was high. Thus, for the buffer distances to be of value, one had to first know the condition of the prey base. Most published buffer distances must have several caveats to be of value. Other variables, such as prey density, that are needed to make sense of the buffer distances are frequently not available. It is therefore risky for industry to use buffer recommendations as hard and fast rules.

Synthesis of Research and Information about Effects of Human Activity on Raptors (Rick Harness)

Effects of disturbance on raptors are variable, depending on the species and disturbance type, magnitude, and duration. Some raptors readily adapt to a human environment and others do not. Even within a species, variability in response seems to be the rule. Birds not subjected to

direct human persecution can habituate to human activity, although this would likely depend on a number of factors, including the species affected and the type of activity. Also, other factors, like prey availability, can influence effects of disturbance, and the disturbance response itself can be variable and hard to detect. Hard-to-detect responses include altered foraging patterns and foraging success.

Nesting raptors may be particularly susceptible to disturbance. Buffer distances are often used as a management tool to restrict certain activities near roosting sites and active raptor nests. More information is needed on the effectiveness of buffers and optimal buffer sizes. If development encroaches upon nesting raptors, nests can be successfully relocated if other suitable undisturbed habitat exists. Relocations are most successful when there is strong site fidelity due to young in the nest versus only eggs.

Energy development results in the construction of artificial structures which can positively affect raptor numbers by providing nesting sites in areas where nest sites are the limiting factor. Structures such as power poles also can benefit some raptors by providing hunting and roosting sites; however, these perching sites may put other species such as sage-grouse, burrowing owls and black-footed ferrets at increased predation risk. Structures such as power lines can also present collision and electrocution risks to raptors. Accordingly, power lines should be constructed and retrofitted using the documents, "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996." Power lines should be routed and constructed using "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994." Habitat alteration such as constructing water holding facilities can also have both positive impacts for some species and negative impacts for others. Water impoundments may also spread West Nile Virus which can negatively impact a variety of bird species.

Elapsed Time between Raptor Nest Uses (Bekee Megown)

One of the recommendations in the Utah Guidelines for Raptor Protection from Human and Land-Use Disturbances is to protect unoccupied nests for seven years. That protective window was based on information provided by wildlife experts, based in part on prey population fluctuations. Frequency of nest use is dependent on multiple factors. Some species may return to nests after extended periods of time beyond the seven-year recommendation, including northern goshawk, common black-hawk, ferruginous hawk, golden eagle, bald eagle, peregrine falcon, northern pygmy-owl, and burrowing owl. Other species that have returned to a nest after at least a one year period of absence include turkey vulture, red-shouldered hawk, red-tailed hawk, osprey, and great horned owl. Yet other species require that a nest rest for at least one year before it is suitable for nesting again, including boreal owl and northern saw-whet owl.

Ferruginous Hawk Productivity in Relation to Distance to Roads in South-central Wyoming (Michael Neal)

Near Rawlins, Wyoming, over 100 artificial nest structures have been built for raptor use over the last two decades. Between 2000 and 2003, ferruginous hawks nests were inventoried and monitored for use and reproductive success. Some of the hawks used artificial structures and others used natural nest sites. In a cursory examination designed to formalize other research objectives, activity records were analyzed to determine the mean productivity of fledglings per nest start for an area of low-traffic disturbance and an area of high-traffic disturbance. Ferruginous hawks nesting on natural nests and artificial structures in low-traffic areas appeared to be sensitive to disturbance and predation. Productivity rates of hawks nesting on artificial structures in high-traffic areas did not seem to be affected by linear disturbance corridors,

regardless of distance to the nearest road. These and other observations need to be further explored.

Cooperative Approach to Raptor Protection and Coalbed Methane Development in Southeastern Utah (Chris Colt and Jean Semborski)

Since the 1980s, the Utah Division of Wildlife Resources has consistently worked with energy industries to protect the high density of cliff-nesting raptors in Carbon and Emery counties of Utah by conducting annual nest surveys and using the results to shape development. Each May, biologists survey nests that are in close proximity to proposed developments. Maps are produced with nest locations, flight paths are surveyed, and the information is provided to energy companies. Since 1998, the state has worked with one company in particular, ConocoPhillips, to collect nest status and location information. The two groups have collaboratively used this information to locate coalbed methane infrastructure in ways intended to avoid disturbance to nesting birds. The guidance associated with environmental compliance documents and the USFWS Utah Raptor Protection Guidelines is used to locate wells and infrastructure within the development field. Accurate knowledge of nest locations has allowed use of spatial buffers and topographic visual barriers to locate the infrastructure and protect nesting birds.

Raptor Management and Energy Development Challenges from the BLM Vernal Field Office (Steve Madsen and Tim Faircloth)

Specific concerns persist over conflicts with ferruginous hawk nesting and foraging habitat in the Uintah Basin of eastern Utah and rapidly expanding energy development activities. Prolonged drought in this part of the West is compounding the concerns. A goal is to allow for 40-acre well spacing associated with energy developments while providing suitable nesting and

foraging habitat for ferruginous hawks. This goal is tied to environmental-compliance documents and management plans that contain specific decisions for protection of ferruginous hawk nests. Nonetheless, the cumulative effects of agency and company mitigation efforts, including artificial nesting platforms and buffer zones around nests, have not yielded benefits for ferruginous hawks based on the observation that many nesting territories have not been used since 2000.

Ferruginous Hawks in Uintah Basin (Heather Keough and Mike Conover)

Between 2002 and 2004, the reasons for a decline in number of ferruginous hawks on land managed by the BLM in the Uintah Basin of eastern Utah were studied. Active nest sites were associated with high numbers of active oil or gas wells, but greater reproductive success was associated with larger distances to the closest active well. Thus, although development of oil and gas wells did not appear to have a negative influence on the suitability of breeding habitat, development might have had a negative influence on reproductive success if active wells were placed too close to nest sites.

The primary problem for breeding ferruginous hawks in the Uintah Basin appears to be predation. Avian predation was the primary cause of juvenile mortalities and might have resulted from increased competition among avian predators for scarce prey resources, or from increased utilization of juvenile ferruginous hawks as an alternative prey source by golden eagles in years of very low lagomorph abundance.

Federal Laws Applicable to Migratory Birds and Implications for Energy Development (John M. Neal)

Multiple federal laws apply to migratory birds and have implications for energy development. The USFWS has a regulatory role associated with several of these laws. Chief among these laws is the Migratory Bird Treaty Act of 1918, with the main purpose of protecting migratory birds, their parts, nests, and eggs. This act protects all birds in the wild in the United States with minor exception. Under this act, "take" is prohibited, which is defined to include several forms: "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt any of these acts." Take of even a single bird is a violation.

There are many issues with energy development and migratory birds. Oil pits and electrical distribution facilities are examples with associated issues. Oil pits "take" birds when the birds fail to differentiate natural ponds from oil pits. When mistaken, birds can die from a variety of causes or their reproduction may be impaired. Mitigation measures include cleanup of oil pits and installations of bird-exclusion devices.

Birds also can die through electrocution, for example when raptors perch or nest on electrical distribution facilities. These facilities consist of millions of poles and many thousands of miles of circuit lines, some to support energy development and others to convey developed energy supplies. Techniques to mitigate bird electrocution problems often involve deterrence devices or insulating structures.

For oil pits, electrocution, or most other problems involving possible violation of the Migratory Bird Treaty Act, the USFWS looks for good-faith efforts to correct the issue. Tangible results toward change determine the USFWS response even in situations where no quick fix exists.

What Do We Still Need to Know to Manage Energy Development and Balance it with Raptor Conservation?

Wyoming-Colorado-Utah Raptor Radii Research Project (David Mills and David Roberts)

The Wyoming-Colorado-Utah Raptor Radii Research Project, a three-year project starting in 2006, is conducted under the U.S. Department of Energy Partnership Program. The project is expected to yield sound, quantifiable, scientific information to either support or modify existing protection measures used by the BLM for raptor nesting sites. Key players are the Wyoming, Colorado and Utah state offices of the BLM, with assistance from the USGS, USFWS, and several state wildlife agencies. The first phase of work focuses on analysis of existing raptor and energy development data from project areas in Wyoming and Utah. The second phase consists of field research to understand effects of oil and gas development on selected raptor nest sites in project areas in Wyoming, Colorado, and Utah.

Golden Eagle Mitigation Example: Coal Mining (Diana Whittington, Chris Colt, and Jeri Ann Ernsten)

In 1999, the Utah Division of Wildlife Resources determined that the proposed disturbance associated with a high-elevation surface facility of a coal mine would be less than a quarter mile from a raptor nest. In the process of decision making associated with this nest, the state and the USFWS went further to develop a joint recommendation for habitat enhancement for raptors nesting within the area of the proposed development, with the primary goal of improvement in prey for raptors. Questions associated with the recommendation, such as the foraging range of nesting raptors, resulted in a general study of prey used by raptors nesting at high elevations to gain information for broad use in enhancement and mitigation projects. The mining company agreed to conduct the prey study to mitigate impacts to the raptor nest that initiated the discussion. The actual study occurred in 2005 and showed that the majority of

identifiable prey remains came from high-elevation forested area species (e.g., yellow-bellied marmot and snowshoe hare). Findings from this short-term study are expanding as agencies coordinate with other companies that are planning and conducting habitat enhancement for raptors.

Ferruginous Hawk Migration in North America and Implications of Energy Development (Jim Watson)

In 2001, a tri-national team of private and public agencies and groups initiated an investigation of ferruginous hawk migration, mortality, and breeding behavior in western grasslands using satellite telemetry. Between 2003 and 2006, 26 breeding hawks were equipped with tracking devices, and by March 2006, 12,140 satellite locations were recorded. Several distinct migration patterns were documented. Sixteen hawks that were monitored over two full breeding seasons were faithful to breeding territories. The monitored hawks covered vast areas where they had ample opportunity for exposure to a wide variety of impacts. Three hawks were confirmed moralities: one electrocuted, another with a broken wing, and another with the cause unknown. Loss of ground squirrels in the northern portion of the hawks' range due to habitat conversion and poisoning, and loss of prairie dogs and jackrabbits in the central and southern range from energy development, residential development, and agricultural conversion were important concerns based on the overlap of migration routes with these developments. In general, the results demonstrate the importance of connected grassland and shrubland ecosystems in North America for this species.

Examples of Field Information Needs to Address Real-life Management Issues (Brett Smithers, Larry Apple, Jim Parrish, and Brent Bibles)

The BLM Rawlins Field Office in south c0entral Wyoming supports one of the largest nesting populations of ferruginous hawks in the West. Conventional forms of natural gas development also are extensive in this area, and development of coal-bed methane fields began about five years ago. The BLM monitors up to 80 nesting pairs of ferruginous hawks, primarily in areas with extensive natural gas development. Raptor nest inventories and monitoring are conducted as requirements of management plan. Also, more than a thousand nestling ferruginous hawks have been banded, and their fidelity to nesting areas has been documented through subsequent years. The BLM also erects artificial nesting structures for ferruginous hawks and golden eagles that nest on condensation tanks at gas wells, and the birds tend to relocate to the artificial structures when they return the subsequent year. These three undertakings are considered essential for raptor management, but the agency also seeks information on nestlings population characteristics, including survival, dispersal, and movements.

The BLM Miles City Field Office covers most of the eastern quarter of Montana. Most of the raptor species that occur in the Rawlins Field Office also occur there, but red-tailed hawks, merlins, and bald eagles are more abundant and ferruginous hawks are less abundant. This region has considerable potential for coalbed methane development. The field office has developed a database with records of all known raptor nests from past surveys. Staff continues to conduct raptor surveys and archive the information. BLM management plans impose some limitations on surface disturbances based on timing of raptor breeding and, for two species, distance to nest and nest use. Like the Rawlins Field Office, BLM staff in Miles City is interested in expanding raptor surveys and in determining the fate of nestlings.

The Comprehensive Wildlife Conservation Strategy, recently completed for Utah, identified several raptor species in need of conservation actions. Some of these species have been impacted by energy developments in Utah, particularly in certain portions of the state. Monitoring of raptors has been conducted annually in portions of Utah, and data exist for many areas where energy development activities have occurred or are currently underway. The Utah Division of Wildlife Resources supports the recommendations provided in the guidelines developed by the USFWS Utah State Office for conserving raptor species in jeopardy from energy developments. Increased and detailed monitoring of raptors as related to energy development activities is needed in Utah to effectively evaluate the real or potential effects of those activities on local and statewide populations.

Development of oil and gas resources is occurring at record high levels in all regions of Colorado, with four primary basins (Julesberg Basin in the northeast, Piceance Basin in the northwest, Raton Basin in the southeast, and San Juan Basin in the southwest) of particular importance. Knowledge of the impacts of oil and gas development on Colorado's raptor populations is limited. In addition, management recommendations for mitigating potential impacts through buffers and seasonal restrictions are based on guidelines derived from studies dealing with other sources of disturbance, mostly recreation, and may not be appropriate or effective for mitigating disturbance or maintaining habitat.

Twenty-six species of raptors are known to breed in Colorado. Several species have federal protection beyond the Migratory Bird Treaty Act, and several have conservation designations at the state level. The state's Comprehensive Wildlife Conservation Strategy identifies 14 of the 26 breeding raptor species in the state as "Species of Conservation Need." The state has unofficial guidelines specifying buffer zones and seasonal timing restrictions

recommended for nine raptor species. These guidelines specify recommended nest buffer distances dealing with surface occupancy and seasonal disturbance buffers dealing with human activity. With minor exceptions involving bald eagles and peregrine falcons, the state has no regular program for collecting data on raptor breeding, wintering, or foraging areas; rather, most information concerning raptors is collected opportunistically and not centrally compiled.

Shared Perspectives on Balancing Raptor Conservation with Energy Development

One session at the workshop was managed to promote dialogue and to foster understanding of different points of view. This session was used to transition from presentations about what is known about energy development and raptors to the essential discussions needed to identify and prioritize research and technical assistance needs.

The session began with the presentation of a concept paper for a national center for interagency raptor research and technical assistance. The presentation was prefaced with the caveat that the concept was introduced as an informal proposal and did not represent the formal views or positions of any agencies or individuals at the workshop. Many management issues and challenges were acknowledged that face those working for common ground in energy development and raptor conservation. Specifically, the BLM has a long history of concerns regarding birds of prey and associated management actions. The agency oversees the Snake River Birds of Prey National Conservation Area in Idaho and established a raptor research and technical assistance center in Idaho. The BLM staffed this center with raptor research biologists and funded raptor research, especially in the national conservation area. The center's research biologists also provided technical assistance to biologists working with raptor management throughout the BLM. As a result of organizational changes in the Department of Interior, this

center is now part of the USGS, and the research staff has broader research responsibilities than under BLM administration.

Reestablishment of the center was proposed in the form of a national interagency raptor research and technical assistance center. The center could serve as a technical working group of federal agency staff. It could provide a coordinated leadership role in the identification, development, design, implementation, and oversight of raptor research and management.

A wide variety of other needs and ideas for action were generated in an open discussion that followed this presentation. The discussion served as a springboard for additional discussion in work groups about priority strategies and actions associated with energy development and raptor conservation.

Results from Work Groups to Identify Strategies and Actions

Five themes emerged from the workshop as relatively distinct areas for advancing cooperative research, monitoring, and technical assistance to improve management of oil, gas, and coalbed methane development with raptor conservation. The third day of the workshop was largely devoted to identification of these themes and to small-group work to identify strategies and objectives associated with each of these themes.

The initial reports of the work groups that convened in the last sessions of the workshop are presented in the next section of this report. There are five groups:

- Status and trends of raptor populations
- Effectiveness of management practices
- Definition of management objectives
- Monitoring and data management
- Communication

Each group selected a coordinator to continue to lead the group's efforts to refine the goals and objectives, develop actions and timelines for proposed accomplishments, and seek the necessary resources and partnerships to accomplish the work. Groups are open-ended in terms of membership. Because some goals and objectives crosscut groups, group coordinators also are responsible for coordination among groups.

Group 1: Status and Trends of Raptor Populations

1. TOPIC: Improve understanding of long-term regional raptor population status and trends, with a focus on areas with current or projected fluid minerals development in the western United States.

2. PROBLEM STATEMENT[1]: Raptor population status and trends at the regional scale are neither well understood nor documented. This makes it difficult to determine how local or site-specific actions and disturbances may affect a population or species as a whole. For example, an individual nest or nesting pair may be adversely affected by some site-specific disturbance, but there is no mechanism for understanding how such localized effects may impact the viability of raptor populations in the broader context. There is some site-specific information about raptor presence, productivity, migration, and trends over time, but it is disparate, dispersed, and not compiled in a manner that allows for scaling local information up to regional or population-level scales.

3. GOALS

   3.1 Goal #1: Establish raptor population trends and status in potential areas of energy development.

   - Objective # 1: Identify and map potential areas of energy development. The scope of area is the Great Plains and Rocky Mountains.

   - Objective # 2: Identify and prioritize species of concern in potential areas of energy development.

   - Objective # 3: Assess current status of species of concern at the range-wide scale in potential areas of energy development based on synthesis of current available data. Attributes to consider in the assessment include abundance, distribution, demographic rates, or species.

   - Objective # 4: Estimate population trend at spatial extent of species range.

[1] A brief description of the current condition that needs to be addressed.

- Objective # 5: Assess individual identified populations in terms of status and trends.

3.2 Goal #2: Identify, define, and report on factors affecting species of concern at the local and broad scales (e.g., disturbance, prey, weather/climate).

- Objective # 1: Based on existing knowledge and science, identify and define the "natural" factors affecting raptor populations at the local and range-wide scales.

- Objective # 2: Based on existing knowledge and science, identify and define the anthropogenic factors affecting raptor populations at the local and range-wide scales [e.g., infrastructure, disturbance activities (scaring, sound, visual, fragmentation)].

- Objective # 3: Determine the habitat status at the point of population estimates and correlate with population status and trends determined above under objective # 5. Consider factors such as nest-site availability, prey abundance and availability, competitor abundance, weather.

3.3 Goal #3: Improve understanding of the interaction of energy development and raptors, their habitat, and prey. Increase capability to assess impacts to raptors from energy development and vice versa.

3.4 Goal #4: Make data and scientific results available and useful for management applications through the use of web technology, technical-assistance expertise, and training.

4. "SELF-SELECT" TEAM EXPRESSING INTEREST IN FURTHER WORK ON TOPIC
   Kate Kitchell, USGS, Forest and Rangeland Ecosystem Science Center (Coordinator)
   Jeff Smith, Hawkwatch International, Inc.
   Frank Howe, Utah Division of Wildlife Resources
   Sue Patla, Wyoming Game and Fish
   Brent Bibles, Colorado Division of Wildlife
   Brett Smithers, Bureau of Land Management
   Joe Helfrich, Utah Department of Natural Resources
   Desa Ausmus, Bureau of Land Management
   Jim Watson, Washington Department of Fish and Wildlife
   Heather Keough, Utah State University
   Jon Bart, USGS, Forest and Rangeland Ecosystem Science Center

Group 2: Effectiveness of Management Practices

1. TOPIC: Conservation of raptor populations through identification and implementation of management practices for raptors in association with development of oil, gas, and coalbed methane energy resources.

2. PROBLEM STATEMENT: The implementation of current management practices for raptors (e.g., stipulations, mitigation, reclamation) in association with development of energy resources is time-consuming and costly for land- and resource-management agencies and the resource-development industry. Furthermore, it is not known if these practices are effective in maintaining local or regional populations of raptors that may be at risk. Information is needed to determine if current practices are useful for conservation of raptors. If they are not, we need to know how they may be modified to become useful or we need new techniques.

3. GOALS

3.1 Goal #1: Inventory current management practices and evaluate their effectiveness to conserve raptor populations.

- Objective #1: Identify, describe, and catalog management practices implemented to conserve raptor populations associated with oil, gas, and coalbed methane development by June 2007.

- Objective #2: Identify, compile, and assess data resulting from efforts to monitor 1) raptors, 2) their prey, and 3) implementation of management practices associated with oil, gas, and coalbed methane development by June 2007.

- Objective #3: Conduct a retrospective analysis by December 2008 to determine response of raptors to conservation practices implemented with oil, gas, and coalbed methane development.

- Objective #4: Revise Best Management Practices (BMPs) by July 2009 based on the findings of the retrospective analysis (Objective #3).

3.2 GOAL #2: New and innovative practices to manage for maintenance of raptor populations during development of oil, gas, and coalbed methane resources will be developed, tested, and implemented.

- Objective #1: Organize a multi-disciplinary work group of agency, industry, academic, and non-governmental organization personnel by 1 June 2007.

- Objective #2: Develop alternatives to current management practices for raptors during development of energy resources by 1 September 2007.

- Objective #3: Select sites to test alternatives to current management practices for raptors during development of energy resources by 1 November 2007.

- Objective #4: Implement test application of alternatives to current management practices for raptors during development of energy resources and evaluate their effectiveness by 31 December 2010.

3.3 GOAL #3: Implement revised Best Management Practices (BMPs) based on review of current management practices (i.e., Goal #1) and evaluation of new management practices (i.e., Goal #2).

- Objective #1: Revise BMPs by July 2011 based on the findings of the evaluation of new management practices (Goal #2, Objective #4).

- Objective #2: Collaborate with local stakeholders to facilitate implementation of revised BMPs in 2012 and to ensure compliance.

- Objective #3: Implement an adaptive management program of monitoring raptor response to energy development and associated BMPs in 2012 and adjust BMPs as needed.

4. "SELF-SELECT" TEAM EXPRESSING INTEREST IN FURTHER WORK ON TOPIC

Lowell Suring, US Forest Service (Coordinator)
Dan Svingen, US Forest Service
Mike Neal, US Fish and Wildlife Service
Jim Perry, Bureau of Land Management
Heather Keough, Utah State University
Larry Apple, Bureau of Land Management
Richard Ranger, American Petroleum Institute

Group 3: Define Management Objectives

1. TOPIC: Define management objectives for raptors in association with development of oil, gas, and coalbed methane energy resources.

2. PROBLEM STATEMENT: Activity associated with development of energy resources is occurring across large areas of the western United States, and this activity has potential to adversely affect raptors. Currently, natural resources managers make decisions largely based on a local, site-specific geographic scale, and a current to near-term temporal scale. Because the scope of energy development might affect large areas, including the entire range of some raptor "populations," and long-term population status, we need to define management objectives to which responsible organizations and interested persons can refer. Common management objectives will facilitate communication, expedite decision making, and better ensure consideration of conservation priorities.

3. GOALS: When addressing the following goals it is important to include representation from federal, tribal, state, industry, and non-governmental organizations that have a mutual interest in energy development and natural resources conservation.

3.1 Goal #1: Categorize and describe geographic (spatial) and temporal scales at which management is to be conducted. *Example: proposed energy project and duration of project (including reclamation phase and post-reclamation monitoring and adaptive*

management period), community or ecosystem for 25 years, district or refuge or management area or county for unlimited duration, state or region for unlimited period, western United States as ongoing monitoring, species' North American distribution as ongoing monitoring.

3.2 **Goal #2:** Establish status of each raptor species.

- Objective #1: Coordinate with Status and Trends Work Group.
- Objective #2: Provide status designations assigned by various governments in region.
- Objective #3: Provide assessment of status based on literature, survey and monitoring results (e.g., Breeding Bird Survey), and evaluation led by USFWS Migratory Bird Management Office.
- Objective #4: Assign status for each species at key geographic scales identified in Goal 3.1.
- Objective #5: Distribute status list to all responsible and interested parties.

3.3 **GOAL #3:** Identify which species are at risk from energy development.

- Objective #1: Rank species based on status assessment.
- Objective #2: Review literature and reports, and draw on personal experience to identify risk factors. Relate risk factors to spatial and temporal scales, then integrate information with ranking from Objective #1. *Examples: 1) road construction a risk for disturbance to proximate nesting, short-term because occurs only once and species "x" exhibits strong nest site fidelity; 2) change of vegetation from shrub-steppe to 50% not vegetated within 2 km radius, long-term because likely to cause species "y" to abandon home range.*
- Objective #3: Circulate ranking from Objective #2 to representatives and solicit rationale for species at risk.
- Objective #4: Integrate new information and create list of priority risk raptor species to be considered for research and management in association with energy development.

3.4 **GOAL #4:** Implement a raptor status monitoring strategy.

- Objective #1: Coordinate with Coordinate with Status and Trends Work Group.
- Objective # 2: Identify spatial and temporal scales at which monitoring is needed.
- Objective #3: Develop objectives for status monitoring at each scale.

- Objective #4: Identify established survey and monitoring strategies and identify research and technical assistance needs to be used in the monitoring strategy.

- Objective #5: Develop instructions for conducting monitoring strategy.

- Objective #6: Implement monitoring strategy.

3.5 Goal #5: Identify management goals. *Examples: by species - maintain stable "population" (+ or – x # nesting pairs or stable wintering #), ensure distribution of birds within x area for y years, minimize disturbance by human proximity (x m) to y % of all nests from a month through b month for duration of project and reclamation, provide habitat to support z # of prey species p for duration of project.*

3.6 Goal #6: Discuss seasonal considerations for the field tasks that industry must accomplish, by type of development and by geographic and climate "regimens"; and review stipulations, management procedures, etc. to ensure that unnecessary restraints are not applied to energy development.

3.7 Goal #7: Establish effectiveness criteria for off-site mitigation.

3.8 Goal #8: Define objectives and develop criteria for evaluation of "success" of management for raptors prior to implementation of adaptive management (how to manage oil and gas leases once stipulations are applied; what is administrative mechanism(s) for adaptive management to initiate changes in priorities cross; conduct checks among geographic scales; reprioritize). This will require coordination with the Effectiveness of Management Practices Work Group.

3.9 Goal #9 Investigate option of creating regulation or policy rather than having only guidelines.

3.10 Goal #10: Establish reclamation techniques and standards. Discuss seasonal considerations for the field tasks that industry must accomplish, by type of development and by geographic and & climate "regimens;" and review stipulations, management procedures, etc., to ensure that unnecessary restraints are not applied to energy development.

3.11 Goal #11: Other goals and objectives you'd like to add relative to: Define Management Objectives for Raptors in association with development of oil, gas, and coalbed methane energy resources.

4. "SELF-SELECT" TEAM EXPRESSING INTEREST IN FURTHER WORK ON TOPIC

Mark Fuller, USGS, Forest and Rangeland Ecosystem Science Center (Coordinator)
Cal McCluskey, Bureau of Land Management
Kristin Hasselblad, Bureau of Land Management

Richard Ranger, American Petroleum Institute
Steve Madsen, Bureau of Land Management
Heather Keough, Utah State University

Group 4: Communication and Coordination

1. TOPIC: Increasing understanding within the conservation community on procedures, standard practices, and constraints faced by the oil and gas industry in exploration and development of oil and gas resources.

2. PROBLEM STATEMENT: Wildlife conservation community does not clearly understand the procedures, constraints, and plans for energy development as they relate to wildlife and research.

3. GOALS:

3.1 Goal #1: Improve availability of raptor and related wildlife management training for agency and organizations that work with energy companies on conservation and management issues.

- Objective #1: Compile existing list or catalog of training that exists that could potentially address achieving Goal 1

- Objective #2: Complete wildlife and energy training needs assessment of agency personnel working in areas targeted for development.

- Objective #2: Design and develop training curriculum that addresses identified priority training needs.

3.2 Goal #2: Facilitate transfer and application of the best available science and information into management and decision making toward the goal of conserving raptors in the context of energy development.

- Objective #1: Develop a information sharing working group modeled after the APIC working group
- Objective #2: Develop a standard approach to outreach and training that has regional focus

- Objective #3: Develop a "Suggested Management Practices" or Guidelines reference for addressing raptor conservation with areas targeted for energy development

3.3 Goal: 3: Develop a long-term strategic approach to target education and training efforts effectively address raptor conservation within energy target areas;

- Objective #1: Identify both short and long-term industry priorities for development at the regional and landscape scale in order to effectively target training and technical information dissemination;

- Objective #2: Effectively utilize internet to enhance communications and information distribution of technical information to industry and the conservation community;

5. "SELF-SELECT" TEAM EXPRESSING INTEREST IN FURTHER WORK ON TOPIC
   Richard Ranger, Coordinator, American Petroleum Institute
   Bob Lehman, USGS Forest and Rangeland Ecosystem Science Center
   Doug Cook, BLM Utah State Office
   Diana Whittington, USFWS Utah Field Office
   Rick Harness, EDM International Inc
   Scott Franklin, BLM Arizona Strip Field Office
   Barry Burkhardt, USFS Intermountain Region
   Cal McCluskey, BLM Washington Office

Group 5: Monitoring & Data Management

1. TOPIC: Establish widely endorsed protocols for conducting raptor surveys in energy development areas and a data management system for archiving the results and making them available to interested parties.

2. PROBLEM STATEMENT: Numerous surveys are conducted annually for raptors in energy development areas, yet no agreement exists on what methods to use and no data management system exists to collect the survey data. As a result, disagreements exist about appropriate methods in different situations and much of the data collected is being lost.

3. GOALS:

   3.1 Goal #1: Establish widely endorsed protocols for conducting raptor surveys in energy development areas (*Note: times under Objectives indicate completion dates, measured from beginning of project, e.g., "3 months" means "to be completed by 3 months from the beginning of the project to achieve goal #3*")

   - Objective #1: Establish protocols for abundance surveys

   - Objective #2: Establish protocols for demographic surveys

   3.2 GOAL #2: Create a data management system for archiving the results and making them available to interested parties

   - Objective #1: Produce the needed data management system

4. "SELF-SELECT" TEAM EXPRESSING INTEREST IN FURTHER WORK ON TOPIC

Jon Bart, USGS, Forest and Rangeland Ecosystem Science Center (Coordinator)
Michael Madrid, Bureau of Land Management
Jennifer Liebeler, Chevron
Melinda Dorin, California Energy Commission
Patty Stevens, USGS, Fort Collins Science Center
Ruth Jacobs, USGS, Forest and Rangeland Ecosystem Science Center

Building a Partnership: Strategies & Recommendations for Collaboration, Continuity, and Commitment

Feedback from workshop participants has indicated that the workshop was a success in accomplishing the objectives. For some, their expectations were exceeded, particularly in terms of the high level of agreement and interest on the majority of topics. People departed with enthusiasm and a willingness to continue what had been started at the workshop; a belief that following through with workshop strategies and actions should be a priority for management and research agencies as well as industry and NGO partners. There is a high level of interest in maintaining the momentum on the priority issues and action items.

Problem Statement: While individual workshop work groups initiated action planning to address the most compelling research and technical assistance needs, these efforts and products are separate, disparate, and lacking cohesion and commitment. While the workshop organizing committee[2] continues to support the production of the report and work group strategy development, this role is ad hoc and short term. Roles currently filled by committee members in this interim capacity are not aligned with long-term position responsibilities and agency missions.

A significant gap looms ahead. There is no mechanism, organization, or specific commitment for leading, supporting, coordinating, or implementing the strategies and actions forthcoming from the work groups. Without institutional commitment, organizational structure, leadership, and communication, what was started at the workshop is likely to dissolve.

[2] Organizing committee: USGS: K. Kitchell, M. Fuller, R. Jacobs; BLM: C. McCluskey, D. Mills, J. Perry, K. Hasselblat; USFS: L. Suring; USFWS: D. Whittington;

This section of the report is intended to bring attention to these issues and to put forward recommended strategies to overcome them. These initial recommendations have been drafted without workshop participant review or thorough vetting among stakeholders. Therefore, it is expected that they will change and evolve based on further review, revision, and dialogue among partners and affected parties.

Goals:

1. Maintain momentum, continuity, focus, and follow-through on workshop strategies, actions, and relationships.

2. Establish and solidify a collaborative partnership of key stakeholders that supports and guides collaborative research, technical assistance, monitoring and integration of science into management and land use. This includes leadership and organizational commitment from key stakeholders.

3. Establish mechanisms for communication, coordination, cohesion, and efficiency in development and implementation of strategies and to address new issues and needs as they arise among stakeholders.

4. Obtain funding, personnel, and other resources needed to address priority actions and strategies.

5. Facilitate transfer and application of the best available science and information into management and decision making toward the goal of conserving raptors in the context of energy development.

Challenges & Barriers to Building a Viable Partnership:

1. Priority overload: agencies and other partners have limited time and often too many commitments. This may not be a compelling priority for key management agencies.

2. Articulating importance of this topic may be a challenge, particularly to audiences with a focus on short-term management rather than improved scientific understanding and technology transfer.

3. Funding long-term commitments such as these is often difficult unless line items or base allocations are mandated within federal budgets.

4. Need for strategies, actions, and proposals that clearly articulate research, and technical assistance needs, along with well-defined proposals to fulfill these needs.

5. Finding the appropriate scientific, analytical, and communication skills to meet the goals.

Opportunities:

1. Partners may have ongoing activities and/or funds to address some of these tasks.

2. There is a high level of interest among key players in industry and NGOs. This presents an opportunity for a broad-based collaborative partnership.

Stakeholders & Roles: Key stakeholders identified to date are listed below. This is not an all-inclusive list, and it should be assumed that it could grow and evolve with changing issues, needs, and opportunities.

1. Management agencies: BLM, USFS, USFWS, state wildlife agencies, state mineral/energy agencies.

2. Research and technical assistance agencies: US Geological Survey (DOI); USFS Research (DOA); universities

3. Industry: Energy extraction and transmission companies (oil, gas, wind, electric utilities, etc.)

4. Non-governmental organizations (NGOs): organizations with missions related to raptor, wildlife, and land conservation and/or research, including but not limited to: the Association of Fish and Wildlife Agencies (AFWA) and the Western Association of Fish and Wildlife Agencies (WAFWA)

Recommended Actions & Strategies (listed in relative priority order, with the most important listed first)

1. Goal 1: Maintain momentum, continuity, focus, and follow-through on workshop strategies, actions, and relationships.

    a. Action: Assign and/or hire an individual to serve as project coordinator and spearhead workshop follow-up. The individual must have a strong commitment to consensus, collaboration, and objective research. Assignments would include:

        i. Communication & coordination among work groups
        ii. Consolidation of work group strategies to distill focused products and eliminate unnecessary overlap
        iii. Lead the development of coordinated proposals from work group strategies that focus on addressing priority research and technical assistance questions.

iv. Lead the development and maintenance of website for information sharing and communication.

b. **Partners:** All. Recommended lead: BLM.

c. **Funding Source:** BLM, contributed funds from grants and industry, in-kind contribution from USGS on item a.iii.

d. **Time Frame:** By 9/1/06

e. **Implementation considerations:** Recommended lead: BLM, although the position could reside under any of the partner organizations. An existing organization, such as the Wildlife Habitat Council or the WAFWA energy and wildlife subcommittee, may have a mechanism to do this. Position duties, oversight, and accountability should be articulated under agreement among partners.

2. **Goal 2:** Establish and solidify a collaborative partnership of key stakeholders that supports and guides collaborative research, technical assistance, monitoring and integration of science into management and land use. This includes leadership and organizational commitment from key stakeholders.

    a. **Action:**

        i. Establish a management oversight/steering committee with representation assigned from the key stakeholder organizations listed above.
        ii. Establish agreement document that defines the purpose, roles, and responsibilities of the partnership (e.g., charter, MOU).
        iii. Develop agreement(s) that allow for sharing resources and transfer of funds.

    b. **Partners:** All. Recommended lead: American Petroleum Institute

    c. **Funding Source:** Funding required would primarily be in-kind commitment of personnel involvement from partner organizations

    d. **Time Frame:** Initiate asap. Complete agreement by 11/1/06

    e. **Implementation Considerations:** Consider building upon existing organizations or forums such as the wildlife habitat council, WAFWA subcommittee on energy, state conservation plans, PIF. Look at examples such as APLIC. Position identified under Goal #1 could work under the direction of this committee.

3. **Goal 3:** Establish mechanisms for communication, coordination, cohesion, and efficiency in development and implementation of strategies and to address new issues and needs as they arise among stakeholders.

a. **Action:** Same as above. Establish web site as described under Goal # 1.

b. **Partners:** All. Recommended lead: BLM & American Petroleum Institute

c. **Funding Source:** Funding required would primarily be in-kind commitment of personnel involvement from partner organizations

d. **Time Frame:** Initiate asap. Complete agreement by 11/1/06

e. **Implementation Considerations:** Consider building upon existing organizations or forums such as the wildlife habitat council, WAFWA subcommittee on energy, state conservation plans, PIF. Look at examples such as APLIC. Position identified under Goal #1 could work under the direction of this committee.

4. **Goal 4:** Obtain the funding, personnel, and other resources needed to address priority actions and strategies.

    a. **Action:** Based on strategies and action plans developed by work groups and consolidated by project coordinator, develop specific research and technical assistance proposals. Consider development of a cohesive package to be proposed by federal and state appropriators for line item funding.

    b. **Partners:** All: under oversight of partnership steering committee. As DOI's lead research organization, USGS could play an active role in developing specific research proposals.

    c. **Funding Source:** Identify and pursue funding via wide array of sources, including federal/state agency budgets, industry, and other granting sources.

    d. **Time Frame:** To follow from goals 1 & 2. Target time frame for priority proposals: January 2007.

    e. **Implementation Considerations:** Consider no more than 5 proposals, with at least a couple that have the potential for short-term results and products to demonstrate relevance and build buy-in.

5. **Goal 5:** Facilitate the transfer and application of best available science and information into management and decision making toward the goal of conserving raptors in the context of energy development.

    a. **Action alternatives:** 1) Establish a technical advisory committee and/or 2) a long-term raptor research and technical assistance organization within an agency such as USGS. Functions would include:

        i. Identifies and defines science and technical assistance needs and questions

ii. Provides review and quality assurance of science and technical assistance
iii. Conducts research and facilitates monitoring on priority research questions
iv. Provides technical assistance and advice to management agencies
v. Facilitates data collection, data delivery, and information delivery

b. **Partners:** BLM, USFS, USFWS, USGS, state wildlife agencies. Potential lead: USGS (funding dependent)

c. **Funding Source:**
   i. Primarily in-kind support under the advisory committee scenario; travel and some operational expenses would be required.
   ii. For technical assistance organization: federal appropriation

d. **Time Frame:** 1) Technical advisory committee: by 11/1/06; 2) Long-term organization: FY09

e. **Implementation Considerations:** Consider placing under steering committee and building upon existing organizations such as WAFWA, Wildlife Habitat Council, etc.

Appendixes

Appendix 1. Workshop Agenda

Tuesday, April 18, 8:00 A.M.-5:00 P.M.

Welcome, Meeting Goals and Objectives, Introductions
AJ Martinez, Applied Empowerment Solutions, Facilitator (8:00-8:20 A.M.)

What Brings Us Together?
David Mills, BLM (8:20-8:25 A.M.)

Theme 1— Agency Leadership Perspectives about Promoting Partnerships in Research and Management of Raptors in the Context of Energy Development
Moderated by Kate Kitchell, USGS

Bureau of Land Management, Washington Office
Dwight Fielder, Chief, Division of Fish, Wildlife and Plant Conservation; Tom Spisak, Group Manager, Fluid Minerals

U.S. Geological Survey
Frank Shipley, Western Regional Biologist

US Fish and Wildlife Service, Washington Office
George Allen, Chief, Branch of Policies, Permits, and Regulations

US Forest Service, Washington Office
Chris Iverson, Assistant Director; Wildlife, Threatened and Endangered Species, Rare Plants, and Planning

Western Association of Fish and Wildlife Agencies
Miles Moretti, Utah Division of Wildlife Resources

Questions, Answers, Discussion

Theme 2— Energy Outlook: Resource Demands and Opportunities
Moderated by Jim Perry, BLM (10:15-11:15 A.M)

Interactions of Oil & Gas Development & Raptor Management - An Industry Perspective
Duane Zavadil, Bill Barrett Corporation

BLM Overview: Managing Oil, Gas, and Coalbed Methane Resources
Jim Perry, BLM

Questions, Answers, Discussion

Theme 3—Current and Emerging Management Issues, Tools, and Practices in Balancing Energy Development and Raptor Conservation
Moderated by Cal McCluskey, BLM (11:15 A.M.-2:30 P.M.)

Overview and Introduction of Theme
Cal McCluskey, BLM

Fish and Wildlife Service Raptor Management Guidelines
Connie Young-Dubovsky, FWS

Raptor Conservation in North America - The Role of Partners in Flight
Eric Lawton, BLM

Protecting Birds while Powering America: An Overview of Efforts by the Electric Utility Industry to Reduce Bird Mortality and Improve Power Reliability
Sherry Liguori, Pacificorp

The Human Footprint and Wyoming Basin
Matthias Leu, USGS

Development of Oil & Gas Resources within Crucial, Important Wildlife Habitats
Sue Patla, Wyoming Game and Fish Department

Monitoring and Assessment Needs: Guidelines for Site Evaluation and Implementation of a Regional Status-Monitoring Program
Jon Bart, USGS

Questions, Answers, Discussion

Theme 4— Effects of Energy Development & other Activity on Raptors in the West Moderated by Mark Fuller, USGS (3:00-5:00 P.M.)

Raptor Ecology in the Developing West
Clayton White, Brigham Young University

Synthesis of Research and Information about Effects of Human Activity on Raptors
Rick Harness, EDM International, Inc., and Mark Fuller, USGS

Elapsed Time between Raptor Nest Uses
Bekee Megown, FWS

Ferruginous Hawk Productivity in Relation to Distance to Roads in South-central Wyoming
Michael Neal, HawkWatch International and University of Wyoming

Questions, Answers, Discussion

Evening (6:30-8:30 P.M.)
Balancing Development and Conservation—Policy Directives and Public Expectations
Robert Keiter, Wallace Stegner Center at the University of Utah

Wednesday, April 19 (8:00 A.M.–4:00 P.M.)

Welcome Back
AJ Martinez, Applied Empowerment Solutions, Facilitator (8:00-8:15 A.M.)

Theme 4—Continued
Moderated by Mark Fuller, USGS (8:15-10:00 A.M)

A Cooperative Approach to Raptor Protection and Coalbed Methane Development in Southeastern Utah
Christopher Colt, Utah Division of Wildlife Resources and Jean Semborski, ConocoPhillips

Raptor Management/Energy Development Challenges from the BLM Vernal Field Office
Steve Madsen, BLM and Tim Faircloth, BLM (20 min.)

Ferruginous Hawks in Uintah Basin
Heather Keough and Mike Conover, Utah State University and Jack H. Berryman Institute

Federal Laws Applicable to Migratory Birds and Implications for Energy Development
John M. Neal, FWS

Question, Answers, Discussion

Theme 5—What Do We Still Need to Know to Manage Energy Development and Balance it with Raptor Conservation?
Moderated by David Mills, BLM (10:30 A.M.-12:15 P.M)

Introduction
David Mills, BLM

Colorado, Wyoming, and Utah Raptor-Radii Study Proposal
Phase 1— David Mills, BLM
Phase 2—David Roberts, BLM

Golden Eagle Mitigation Example/Coal Mining
Diana Whittington, FWS; Chris Colt, Utah Division of Wildlife; Jeri Ann Ernsten Utah Oil Gas & Mining

Ferruginous Hawk Migration in North America and Implications of Energy Development
Jim Watson Washington Department of Fish and Wildlife

Other Case Studies: Examples of Field Information Needs to Address Real-life Management Issues
Brett Smithers, BLM Colorado Meeker Field Office
Larry Apple, BLM Montana Miles City Field Office
Jim Parrish, Utah Division of Wildlife Resources
Brent Bibles, Colorado Division of Wildlife

Questions, Answers, Discussion

Theme 6—Discussion: Sharing Perspectives on Balancing Raptor Conservation with Energy Development
Facilitated by AJ Martinez (1:15-2:30 P.M.)
The purpose of this session is to promote dialogue and to foster understanding of different points of view. The session begins with a brief presentation and then becomes an open microphone time to allow participants to share their perspectives about challenges, tradeoffs in seeking balance, and success stories.

Cooperative research and technical assistance ideas and opportunities
David Mills, BLM

Discussion

Theme 7—Work Groups to Explore Research and Technical Assistance - Synthesis and Prioritization of Needs (five facilitated groups) (3:00-5:00 P.M.)

The goal of this session is to discuss, identify, and prioritize research and technical assistance needs. Potential discussion points include:

- *Cause and effect, including proximity of activity, magnitude, cumulative effects, and stage (construction, maintenance, or decommissioning)*
- *Mitigation*
- *Technical-assistance forum*
- *Priority short- or long-term needs*

Evening—Live-Bird Demonstration by Tracy Aviary, Social Gathering, Poster Session (6:30-8:30 P.M)

Thursday April 20 (8:00 A.M.-5:00 P.M.)

Welcome Back
AJ Martinez, Applied Empowerment Solutions, Facilitator (8:00-8:15 A.M.)

Theme 7—Reports and Discussion (8:15-9:30 A.M.)

Theme 8—Work Groups to Identify Strategies and Actions to Promote Cooperative Research and Raptor Conservation with Energy Development (five facilitated groups) (10:00 A.M.-12:00 P.M.)
The goal of this session is to develop actions to address priority needs identified in the previous session. What should be done to address these needs, and how should these actions be accomplished? Who are the key players for implementing these actions?

Lunch: 12:00-1:00 P.M. (Working lunch for agency leaders and steering/organizing committee to discuss feedback report to workshop participants)

Theme 8— Reports and Discussion (1:00-2:30 P.M.)

Theme 9—Agency Leadership Feedback (3:00-4:00 P.M.)
AJ Martinez, Applied Empowerment Solutions, Facilitator
Agency leadership provides feedback on workshop findings and reports, and will discuss agency next steps, including assigning actions and work groups.

Workshop Report and Products, Wrap-up (4:00-4:15 P.M.)
AJ Martinez, Applied Empowerment Solutions, Kate Kitchell, USGS

Interagency Working Groups Convene (4:15-5:00 P.M.)

Appendix 2. Participant Contact Information

Last Name	First Name	Org. Group	Position	Office	E-Mail	Phone Number
Allen,	George	FWS	Chief, Branch of Policies, Permits, and Regulations	Migratory Bird Management	george_t_allen@fws.gov	703-358-1825
Apple	Larry	BLM	Wildlife Biologist	Miles City Field Office	larry_apple@blm.gov	406-233-2800
Ausmus	Desa	BLM	Wildlife Biologist	Little Snake Field Office	desa_ausmus@co.blm.gov	
Bart	Jon	USGS	Research Wildlife Biologist	Forest and Rangeland Ecosystem Science Center	jon_bart@usgs.gov	208-426-5216
Berbling	Gerry, Jr.	Private	Regulatory Development Coordinator, EP Americas	Shell Exploration & Production Company	gerald.berbling@shell.com	713-241-7286
Bibles	Brent	State	Avian Researcher-Raptors	Colorado Division of Wildlife	brent.bibles@state.co.us	970-472-4307
Brown	David	Private	Manager, Regulators Affairs, Health, Safety and Environment	BP America Production Company	browndr1@bp.com	303-830-3241
Burkhardt	Barry	FS	AD for Minerals & Geology	Intermountain Region	bburkhardt@fs.fed.us	801-625-5157
Clayton	Creed	FWS	Fish and Wildlife Biologist	Colorado, Grand Junction.	creed_clayton@fws.gov	970-243-2778 x18
Colt	Chris	State	Wildlife Program Manager	Utah Division of Wildlife Resources	chriscolt@utah.gov	435-636-0279
Conover	Michael	Academic	Professor	Utah State University	conover@cc.usu.edu	435-797-2436
Cook	Doug	BLM	Chief, Branch of Fluid Minerals	Utah State Office	dcook@blm.gov	801-539-4070
Davison	Aimee	Private	Sr. Contracts Analyst	Shell Rocky Mountain Production, LLC.	aimee.davison@shell.com	307-367-7904
Diwachak	George	BLM	Environmental Scientist	Utah State Office	george_diwachak@blm.gov	801-539-4043
Dorin	Melinda	State	Energy Commission Specialist	California Energy Commission	mdorin@energy.state.ca.us	916-654-4024

Ernstsen	Jerriann	State	Senior Reclamation Specialist	Utah Division of Oil, Gas and Mining	jerriannernstsen@utah.gov	801-538-5214
Faircloth	Tim	BLM	Wildlife Biologist	Vernal Field Office	tim_faircloth@blm.gov	435-781-4465
Fielder	Dwight	BLM	Chief, Division of Fish, Wildlife & Plant Conservation	Washington Office	dwight_fielder@blm.gov	202-452-7761
Franklin	Scot	BLM	Wildlife Biologist	Arizona Strip District Office	scot_franklin@blm.gov	435-688-3305
Fresques	Tom	BLM	Wildlife Biologist	Glenwood Springs Field Office	tom_fresques@co.blm.gov	970-947-2814
Fugal	Debbie	BR	Human Resource Specialist	Upper Colorado Regional Office	dfugalabe@aol.com	801-524-3757
Fuller	Mark	USGS	Research Wildlife Biologist	Forest and Rangeland Ecosystem Science Center	mark_fuller@usgs.gov	208-426-4115
Haak	Bruce	State	Wildlife Biologist	Idaho Department of Fish and Game	bhaak@idfg.idaho.gov	208-456-8465 ext 353
Harness	Rick	Private	Wildlife Biologist	EDM International Inc	rharness@edmlink.com	970-204-4001
Hasselblad	Kristin	BLM	Wildlife Intern	Washington Office	kristin_hasselblad@blm.gov	208-373-4041
Hayward	Greg	FS	Regional Wildlife Ecologist	Rocky Mountain Region	ghay@uwyo.edu	307-766-2839
Helfrich	Joe	State	Wildlife Biologist	Utah Department of Natural Resources	joehelfrich@utah.gov	801-538-5290
Howe	Frank	State	Nongame Avian Program Coordinator	Utah Division of Wildlife Resources	frankhowe@utah.gov	801-538-4764
Iverson	Chris	FS	Assistant Director	Washington Office	civerson@fs.fed.us	202-205-3199
Jacobs	Ruth	USGS	Information & Outreach Biologist	Forest and Rangeland Ecosystem Science Center	ruth_jacobs@usgs.gov	541-750-1047
Jorgensen	Brianne	BLM		Utah State Office	Brianne_jorgensen@blm.gov	801-539-4001
Keefe	Chris	BLM	Wildlife Biologist	Utah State Office	chris_keefe@blm.gov	801-539-4254
Keiter	Robert	Academic	Department Chair	University of Utah	keiterb@law.utah.edu	801-581-5035
Keough	Heather	Academic	Ph.D Candidate	Utah State University	heatherkeough@hotmail.com	435-245-4849

Kitchell	Kate	USGS	Deputy Center Dircter	Forest and Rangeland Ecosystem Science Center	kkitchell@usgs.gov	541-750-1033
Lehman	Bob	USGS	Research Wildlife Biologist	Forest and Rangeland Ecosystem Science Center	bob_lehman@usgs.gov	208-426-5205
Leu	Mathias	USGS	Ecologist	Forest and Rangeland Ecosystem Science Center	mleu@ugsg.gov	208-426-2598
Liebeler	Jennifer	Private	Environmental Scientist	Chevron	jennifer@chevron.com	510-242-1030
Liguori	Sherry	Private	Wildlife Biologist	PacifiCorp	sherry.liguori@pacificorp.com	801-220-4736
Madrid	Michael	BLM	Branch Chief, Fluid Minerals and Lands	Wyoming State Office	michael_madrid@blm.gov	307-775-6201
Madsen	Steve	BLM	Wildlife Biologist	Utah State Office	steve_c_madsen@blm.gov	801-539-4058
Martinez	AJ	Private	Facilitator	Applied Empowerment Solutions LLC	applied_solutions@netscape.com	801-718-4049
McCluskey	Cal	BLM	Sr. Wildlife Specialist	Washington Office	cal_mccluskey@blm.gov	208-373-4042
Megown	Bekee	FWS	Fish and Wildlife Biologist	Utah Field Office	bekee_megown@fws.gov	801-975-3330
Mills	David	BLM	Special Status Wildlife Species Biologist	Utah State Office	david_mills@blm.gov	435-896-1571
Moretti	Miles	State	Deputy Director	Utah Division of Wildlife Resources	milesmoretti@utah.gov	801-296-2761
Neal	John	FWS	Resident Agent in Charge	Office of Law Enforcement	john_m_neal@fws.gov	801-625-5570
Neal	Mike	NGO	Field Studies Coordinator	HawkWatch International, Inc.	mneal@hawkwatch.org	(801) 484-6808, ext 110
Nebeker	Glen	BLM	Assistant Field Manager	Fillmore Field Office	glen_nebeker@blm.gov	435-743-3163
Painter	Jeff	BR	Resource Management Specialist	Upper Colorado Regional Office	jpainter@usbr.gov	801-524-3711
Parrish	Jim	State	Partners in Flight Program Coordinator	Utah Division of Wildlife Resources	jimparrish@utah.gov	801 538-4788
Patla	Susan	State	Nongame Biologist	Wyoming Game and Fish Department	susan.patla@wgf.state.wy.us	307 733-2383 x. 229

Perry	Jim	BLM	Senior Natural Resource Specialist	Washington Office	jim_perry@blm.gov	202-452-5063
Peterman	Larry	State	Chief of Field Operations	Montana. Fish, Wildlife and Parks	lpeterman@mt.gov	406-444-9817
Ranger	Richard	Private	Upstream Manager	American Petroleum Institute	rangerr@api.org	202-682-8057
Roberts	David	BLM	Wyoming Wildlife Program Leader	Wyoming State Office	dave_a_roberts@blm.gov	307-775-6099
Rutledge	Brian	NGO	Executive Director	Audubon Wyoming	brutledge@audubon.org	307-745-4877
Shipley	Frank	USGS	Acting Western Regional Biologist	Western Region	frank_shipley@usgs.gov	206-220-4600
Singler	Dyanne	NGO	Land Stewardship Manager	National Wildlife Federation	singler@nwf.org	303-441-5163
Smith	Shelley	BLM	Branch Chief	Utah State Office	shelley_j_smith@blm.gov	801-539-4053
Smith	Jeff P.	NGO	Director of Conservation Science	HawkWatch International, Inc.	jsmith@hawkwatch.org	801-484-6808, ext. 109
Smith	Marc	Private	Executive Director	IPAMS	msmith@ipams.org	303-623-0987
Smithers	Brett	BLM	Wildlife Biologist	White River Field Station	brett_smithers@blm.gov	
Spisak	Tim	BLM	Group Manager - Fluid Minerals	Washington Office	tim_spisak@blm.gov	202-452-5061 x3061
Stevens	Patty	USGS	Branch Chief	Central Region	patty_stevens@usgs.gov	
Suring	Lowell	FS	Wildlife Ecologist	Washington Office, Wildlife, Fish & Rare Plants Program	lsuring@fs.fed.us	208-373-4351
Svingen	Dan	FS	Grasslands Biologist	Dakota Prairie Grasslands	dsvingen@fs.fed.us	701-250-4443, ext. 107
Swilling	Randy	BLM	Wildlife Biologist	Salt Lake Field Office	randy_swilling@blm.gov	801-977-4300
Tom	Clayson	Private	Regulatory Affairs Advisor	Anadarko Petroleum Corporation	tom_clayson@anadarko.com	307-233-4503
Tribby	Dale	BLM	Supervisory Natural Resource Specialist	Miles City Field Office	dtribby@mt.blm.gov	406-233-2812
Waller	David	BLM	Wildlife Biologist	Price Field Office	dwaller@blm.gov	435-636-3624

Warrick	Curtis	BLM	Shrub-Steppe Restoration Initiative Coordinator	Utah State Office	cwarrick@ut.blm.gov	801-539-4072
Watson	James	State	Wildlife Research Scientist	Washington Department of Fish and Wildlife	watsojww@dfw.wa.gov	360.853.8031
White	Clay	Academic	Professor of Zoology	Brigham Young University	clayton_white@byu.edu	801-422-4860
Whittington	Diana	FWS	Fish and Wildlife Biologist	Utah Field Office	diana_whittington@fws.gov	801-975-3330 x128
Young-Dubovsky	Connie	FWS	Regional NEPA Coordinator	Denver	connie_youngd@fws.gov	303-236-4265
Zavadil	Duane	Private	Vice President, Government and Regulatory Affairs	Bill Barrett Corporation	dzavadil@billbarrettcorp.com	303 312-8128