

# Protocols for the Upper Clark Fork River Basin Terrestrial Resource Assessment and Prioritization Effort



Montana Fish, Wildlife and Parks  
Wildlife Division

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# **Protocols for UCFRB Terrestrial Resource Assessment and Prioritization Effort**

## **Introduction**

FWP, in consultation with the NRDP, will assess and prioritize the terrestrial resources of the Upper Clark Fork River Basin (UCFRB), which refers to that portion of the watershed of the Clark Fork River extending from its headwaters, surrounding the city of Butte, downstream to its confluence with the Blackfoot River just upstream of the City of Missoula. The Upper Clark Fork Assessment (UCFA) will also highlight those areas of greatest conservation value, of greatest conservation risk, and those areas with the greatest restoration potential. The UCFA will, in concert with public input, be used by FWP to create a terrestrial prioritization document, which will guide future allocation of the priority terrestrial resource funds.

This document outlines the UCFA protocols that will be used to complete the Scope of Work that was approved by the Trustee Restoration Council at their May 29, 2008 meeting.

The purpose of the UCFA is to gather information needed to identify and prioritize areas where conservation efforts can be implemented to restore or replace terrestrial wildlife resources injured from exposure to or contact with hazardous substances generated by mining and mineral processing in the UCFRB conducted by ARCO and its predecessor, the Anaconda Company; who were the subject of the *Montana v. ARCO* lawsuit.

## **Summary of Injured Terrestrial Resources**

Under CERCLA and according to the NRD direction, damage settlements can only be used to restore or replace those resources and services that were lost or impaired, as defined in the *UCFRB Restoration Plan Procedures and Criteria*.<sup>1</sup> Releases of hazardous substances including arsenic, cadmium, copper, lead, and zinc from mining and mineral processing operations caused a reduction in fish and benthic macroinvertebrates that constitute the prey base for many wildlife species, and loss of riparian, grassland, and forested habitats from phytotoxic releases and footprints of tailings ponds and other industrial facilities.

Injured wildlife species in riparian zones include populations of birds, mammals, and other wildlife that would normally inhabit riparian zones, and otter, mink and raccoons that rely on fish or benthic macroinvertebrates in their diets. Injured wildlife species in grassland and forested habitats include birds of prey, woodpeckers, songbirds, squirrels, porcupine, marten, black bear, elk, and many other species. The services lost or impaired due to injuries to vegetation, wildlife and wildlife habitat include hunting, bird watching, hiking, observing wildlife and general recreation.

## **General Strategies to Complete the Scope of Work**

FWP proposes to develop a prioritization process for selecting restoration sites and actions based on the distribution and quality of the injured resources (wildlife habitat and populations) in the Upper Clark Fork Basin. In order to prioritize areas for restoration, the geographic extent and condition of wildlife species and their habitats need to be mapped and characterized. This will help us identify

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<sup>1</sup> UCFRB Restoration Plan, Procedures and Criteria, prepared by the NRDP, dated January 2007.

areas of high habitat quality that currently support important wildlife resources and could be the focus of protection efforts, areas where habitat quality could be enhanced through cost-effective conservation actions (such as modification of grazing regimes), and areas where restoration efforts may not be cost-effective.

Information needed for prioritizing restoration sites includes habitat quantity and distribution (land-cover maps), habitat quality, wildlife species diversity, geographic distribution of wildlife species of interest (those species defined as injured), and the population status of those species.

This assessment will focus on riparian and wetland habitats, grassland and shrub-steppe habitats, and to a lesser degree low-elevation forested habitats, along with the vertebrate wildlife species that inhabit those habitats. This assessment will focus primarily on private lands, although some sampling sites for both vegetation and wildlife may be located in targeted habitats on public lands.

Following is the scope of work for, and our approach to implement FWP's Terrestrial Resource Assessment and Prioritization effort that was approved by the Trustee Restoration Council at their May 29, 2008 meeting.

1. Compile available information, data, and maps for ownerships, infrastructure, wildlife populations, ecological sites, wildlife linkage zones, habitat types, vegetation, and similar information.

- ✓ *Addressed through the Crucial Areas and Connectivity Assessment, scheduled for completion in July, 2009. Species distribution models may be fine-tuned for greater accuracy in the UCFRB based on field data collected during the 2009 field season.*

2. Classify and describe native forest, grass, and shrub ecosystems for the area in terms of their compositions, structures, and processes.

- ✓ *Addressed through the ReGAP land-cover mapping efforts and wetland delineations by Montana Natural Heritage Program.*

3. Conduct field sampling to determine the quantity, quality, and condition of existing grass and shrub lands and where necessary ground-truth data on forested habitats.

- ✓ *Field data will be gathered by MNHP to assess plant composition and general conditions in important Tier 1 vegetation communities to include low to mid-elevation grasslands, riparian and wetland areas, and shrub-steppe communities.*

4. Integrate available data on riparian and wetland ecosystems and, where necessary, conduct fieldwork to collect additional information on these systems.

- ✓ *On-going through MNHP contract to complete delineations of wetland and riparian habitats. Existing and proposed wetland mapping will be overlaid on habitat maps to be prepared in 2009. Wildlife information will be collected in riparian and wetland systems to clarify habitat relationships.*

5. Quantify existing ecosystem types and distributions based on available data.

- ✓ *Related land-cover types will be grouped together into broader ecological units to delineate and quantify ecosystems (habitat blocks) important for wildlife, as part of mapping efforts by MNHP and FWP.*

6. Link wildlife habitat needs with ecosystem classifications.

- ✓ *Predicted species distributions from CACA will be assessed with field monitoring efforts within important land-cover vegetation communities.*

7. Review information with agency personnel.
  - ✓ *All species distribution maps, habitat maps, and ecosystem classifications will be reviewed by biologists and other experts familiar with the UCFRB to ensure the best possible accuracy of each layer.*
8. Estimate impacts that have resulted from development and human activities, to the extent feasible.
  - ✓ *GIS data layers that reflect anthropogenic impact, including roads, mapped weed infestations, industrial sites, and predicted growth models will be developed as part of a risk assessment through CACA.*
9. Identify areas of greatest ecological value and risk.
  - ✓ *Delineate areas that have high potential for conservation, restoration or replacement of wildlife resources versus areas with low potential.*
10. Present all information in a report with supporting maps.
  - ✓ *All information used to create maps will also be available as GIS layers and databases.*

The assessment will highlight those areas of greatest conservation value, of greatest conservation risk, and those areas with the greatest restoration potential. This assessment will, in concert with public input, be used by FWP to create a terrestrial prioritization document, which will guide future allocation of the priority terrestrial resource funds. The terrestrial prioritization document will be subject of public input as described in Section 4 of the *May 2008 Draft Conceptual Framework for an UCFRB Restoration Priorities Road Map*.

## **Assessment Protocols**

Existing information related to wildlife resources and their habitats will be compiled for the Clark Fork watershed. Most of this will be accomplished through the FWP Crucial Areas and Connectivity Assessment (CACA). Additional data layers will be compiled and refined specific to the UCFA as needed.

Ecosystems will be classified and described through the ReGAP land-cover mapping efforts, supplemented by collection of field data to increase the accuracy of the vegetation classification (**Land-cover Mapping and Delineation**). The focus of these efforts will be refining the classification to provide better accuracy, especially in grassland and shrub/steppe cover types.

While adequate information on big game species abundance and distribution has been collected, information on nongame wildlife species, especially those inhabiting grasslands and wetlands within the Clark Fork watershed is lacking. Distribution of these species within the area will be modeled as part of the CACA mapping efforts. These models predict habitat suitability for a species by using occurrence data and environmental feature layers (e.g. soils, precipitation, land-cover). A preliminary evaluation of these models has indicated they do a poor job of predicting species distribution in the Upper Clark Fork because few data points exist for most nongame species in this area, other than in forested types. Additional local species occurrence information within the UCFRB is required to refine the models. More accurate species occurrence models will help us assess factors such as areas with high species diversity, or areas with high habitat values for species targeted for restoration.

Field data will be collected on a variety of species through expansion of several on-going efforts into the Upper Clark Fork watershed. These include **Multiple Species Diversity Monitoring** (FWP, MNHP, and Montana Tech sampling of small mammals, bats, reptiles, amphibians), **Songbird Point Counts** (Avian Science Center sampling coordinated in conjunction with the Smelter Hill songbird study reference sampling locations, MNHP targeted sampling in broader geographic area focused on designated grasslands, shrub steppe and riparian/wetlands), **Colonial Waterbird Surveys** (in conjunction with a statewide effort coordinated by FWP and Montana Audubon), **Raptor Surveys** (in conjunction with bald eagle surveys conducted by FWP), **Otter/Aquatic Furbearer Surveys** (conducted by University of Montana in cooperation with FWP), and **Targeted Species Surveys** (primarily conducted by FWP) to gather information on selected species of interest not adequately covered by the other survey efforts. A description of these projects, including the portions of the scope of work addressed by each project is listed in Table 1.

We will coordinate wildlife efforts with on-going fisheries studies in the Upper Clark Fork, in particular to obtain incidental observations of amphibians, coordinate riparian assessments if needed, and coordinate future restoration efforts.

Information from these efforts that will be used to evaluate and prioritize areas for restoration include habitat extent and quality, habitat fragmentation and connectivity, occurrence and distribution of species that need to be replaced or restored, overall species diversity within each habitat or land-cover type, and potential of the area to replace lost services, including access for hunting, bird watching, hiking, wildlife viewing, and other wildlife-related recreation. Information gathered will also be used as a baseline to evaluate the effectiveness of restoration efforts.

### **Crucial Areas and Connectivity**

The Upper Clark Fork area has been chosen as a pilot area for the Crucial Areas and Connectivity Assessment (CACA). CACA is a MFWP initiative, endorsed by the Western Governor's Association, which seeks to identify "crucial habitat" and "important wildlife corridors" at a regional scale, in the face of significant land use changes in the west. The approach taken by CACA is a good match for addressing much of the information needed for NRD restoration planning. A spatial analysis using GIS and existing wildlife occurrence data is at the core of CACA, which will look at fish and wildlife resources, priority habitats and recreation values, assess risks to these resources and develop management guidelines for mitigating impacts associated with specific risk categories (energy development, urban growth, transportation, climate change).

CACA uses a "coarse filter/fine filter" approach to species and habitat assessment. The "coarse filter" approach focuses on preserving ecological communities with the highest species diversity, and core intact systems at the landscape scale. The "fine filter" approach looks at biodiversity at an individual species level, and focuses on areas important to meeting the life history needs of individual species that have specific habitat requirements or other unique life history requirements. Species that are important socio-economically in Montana (harvestable species) as well as a portion of the other vertebrate species in Montana will be addressed as part of the fine filter approach. The modeling program Maxent is used to predict where a species occurs on the landscape by looking at physical factors (elevation, precipitation, etc.), land-cover, geology, soils, and distance to water. The Connectivity portion of CACA aims to provide the greatest conservation benefit by identifying priority areas to improve wildlife connectivity between important habitats.

Table 1. Methods used to address the Assessments' scope of work.

Method and Cooperator	Description	Portions of Scope of Work Addressed
Crucial Areas and Connectivity Assessment – FWP	Compile existing wildlife information, create species distribution models, and compile GIS layers on human and natural features that impact wildlife	1, 6, 7, 8, 9
Landcover classification and mapping, wetland delineation – MNHP	Update landcover types using “ReGAP” to identify important vegetation communities within the UCF. Complete wetland riparian mapping efforts. Collect site-specific vegetation information (species composition and general condition) in important landcover types targeting Tier 1 vegetation community types.	2, 3, 4, 5
Multiple Species Diversity Monitoring – FWP, MNHP, Montana Tech	Gather data needed to complete more accurate species distribution maps, focused on grassland, shrubland, and riparian/wetland habitats. Species groups include small mammals, bats, amphibians, and reptiles.	1, 4, 6, 9
Songbird Point Counts – Avian Science Center & MNHP	Songbird point counts in grassland, riparian and shrub-steppe habitats. This data is needed to complete more accurate species distribution maps for birds.	1, 4, 6, 9
Colonial Waterbird Surveys – FWP and Montana Audubon	Aerial and ground surveys, to locate nesting colonies. This will help identify important areas for restoration and provide information to improve accuracy of species distribution maps.	1, 4, 6, 9
Raptor Surveys – FWP	Aerial and ground surveys to map raptor nests, in conjunction with bald eagle and waterbird surveys.	1, 4, 6, 9
Otter/Aquatic Furbearer Surveys – University of Montana	Targeted surveys for otter and collection of incidental observations of other aquatic furbearers	1, 4, 6, 9
Targeted Species Surveys – FWP	Targeted surveys for long-billed curlew, American bittern, and Columbian sharp-tailed grouse.	1, 4, 6, 9

Accuracy of the CACA effort will be driven by the available data, and as data sources improve, the ability to more accurately identify crucial areas will improve. The data sources that will have the greatest impact on revising the delineations include both species location information and habitat information. Species location information gathered in the UCFRB will improve model performance in the vicinity of the location, help verify the accuracy of the existing models, and allow refinement of species habitat associations.

The CACA prediction models will highlight areas of greatest species diversity in the UCFRB based on the ReGAP maps. If the maps are inaccurate, the models will be inaccurate. If the maps are accurate, the models may still be inaccurate, because the ecological systems may be in poor condition. We can use CACA and other GIS filters to identify occurrences of ecological systems that are likely to be in good to excellent condition, which could be targeted for conservation easements or acquisition.

### **Land-cover Mapping and Delineation**

Montana Fish, Wildlife & Parks will subcontract with Montana Natural Heritage Program to complete land-cover mapping and habitat classification in the UCFRB. This effort will be focused on riparian, shrubland, and grassland systems since these habitats compose the most important habitats in the UCFRB. Existing ReGAP maps indicate with varying accuracy where these habitats are, and depict their extent.

MNHP ecology staff will evaluate the extent and condition of riparian, grassland and shrubland ecological systems in the UCFRB. Under the direction of the MNHP Senior Ecologist, staff will carry out field work to 1) link mapable environmental variables such as soils, aspect, elevation and relative precipitation to specific vegetation associations within the three broad ecological system types; 2) assess the overall condition of these broad system types with rapid assessment protocols, using both targeted and probabilistic sampling approaches; 3) identify areas within the UCFRB where high-quality or restorable grasslands, shrublands and/or riparian systems are concentrated. Following field data collection, MNHP image analysts will use the data collected under step 1 to correct erroneous land cover classifications in current ReGAP maps to the extent possible, and will investigate whether this data can be used to produce more refined classifications (e.g. at the association or alliance level). Finer-scale riparian mapping being completed in the Flint/Rock subbasin under a separate NRDP contract, and other previously-completed riparian and wetland delineations in the UCFRB will be “burned in” on the final landcover map to provide better detail for these cover types.

#### Products:

1. A report on the extent and condition of riparian, grassland and shrubland ecological systems in the UCFRB, detailing methods and findings; and
2. Land cover maps of the UCFRB with corrections and refinements made pursuant to field data.
3. Maps showing areas within the UCFRB where high-quality or restorable grasslands, shrublands and/or riparian systems are concentrated.

The ultimate result of MNHP work will be a map of habitat types in the UCFRB that has been ground-truthed to assure accurate classification of key habitats. This map will be paired with data from wildlife species surveys to show areas with the highest value for conservation.

## **Multiple Species Diversity Monitoring (small mammals, bats, reptiles, amphibians)**

Small mammals inhabiting grasslands and riparian areas provide the primary prey base for many birds of prey. Several vole species (*Microtus*), which live in thick grass cover in or adjacent to riparian and wetland habitat), likely suffered local population declines and extirpation in areas with phytotoxic soils. These species constitute the primary prey for several raptor species. Several species of shrews (*Sorex*) are heavily dependent on riparian and wetlands, where they feed on potentially contaminated invertebrates such as grasshoppers and earthworms. Other shrew species live exclusively in grasslands or sagebrush-grasslands. Areas impacted by contamination are likely to support much lower densities of small mammals as well as lower species richness.

Bats feed and roost in riparian habitat, and many species feed heavily on aquatic insect emergences and other insects produced in high abundance in riparian habitat. Bats are long-lived with a low reproductive rate, making them especially vulnerable to impacts from contaminants that bioaccumulate. The little brown bat was specifically mentioned as a species that has been lost in the UCFRB due to loss of riparian habitat. Hoary bats and silver-haired bats are obligate tree roosting bats, which would have been heavily impacted by loss of riparian habitat along the Clark Fork and loss of forested habitats in the uplands near the smelter site. All bat species present in the area are likely to have suffered some degree of reduced viability due to reductions of insect populations in impacted areas.

Amphibians require wetland and riparian areas for breeding sites, and some species forage in adjacent upland areas. They are dependent on aquatic invertebrates during larval stages, and utilize terrestrial invertebrates that often live in the soil areas as adults. Some species (boreal toads) live in direct contact with potentially contaminated soils. Most amphibians are very sensitive to contaminants. Amphibians have probably suffered reduced viability and loss of populations in the UCFRB due to contamination, and they have suffered loss of breeding habitat due to physical loss of wetlands from tailings deposits and other mining-related disturbance.

Reptiles depend heavily on riparian and wetland habitats for foraging. Some species (garter snakes, painted turtles) forage underwater in aquatic environments and depend heavily on small fish and aquatic invertebrates. They are likely to have suffered reduced viability due to contaminated food sources.

The Diversity Monitoring methodology is designed to collect information on animal distribution, and estimate occupancy for species for which enough data is collected. Species groups include small mammals (squirrels, mice, voles, shrews), bats, reptiles, and amphibians. Additionally, point location information will be used to refine the species distribution models being developed as part of the Crucial Areas and Connectivity Assessment to provide more accurate predictions of species distributions in the Upper Clark Fork watershed.

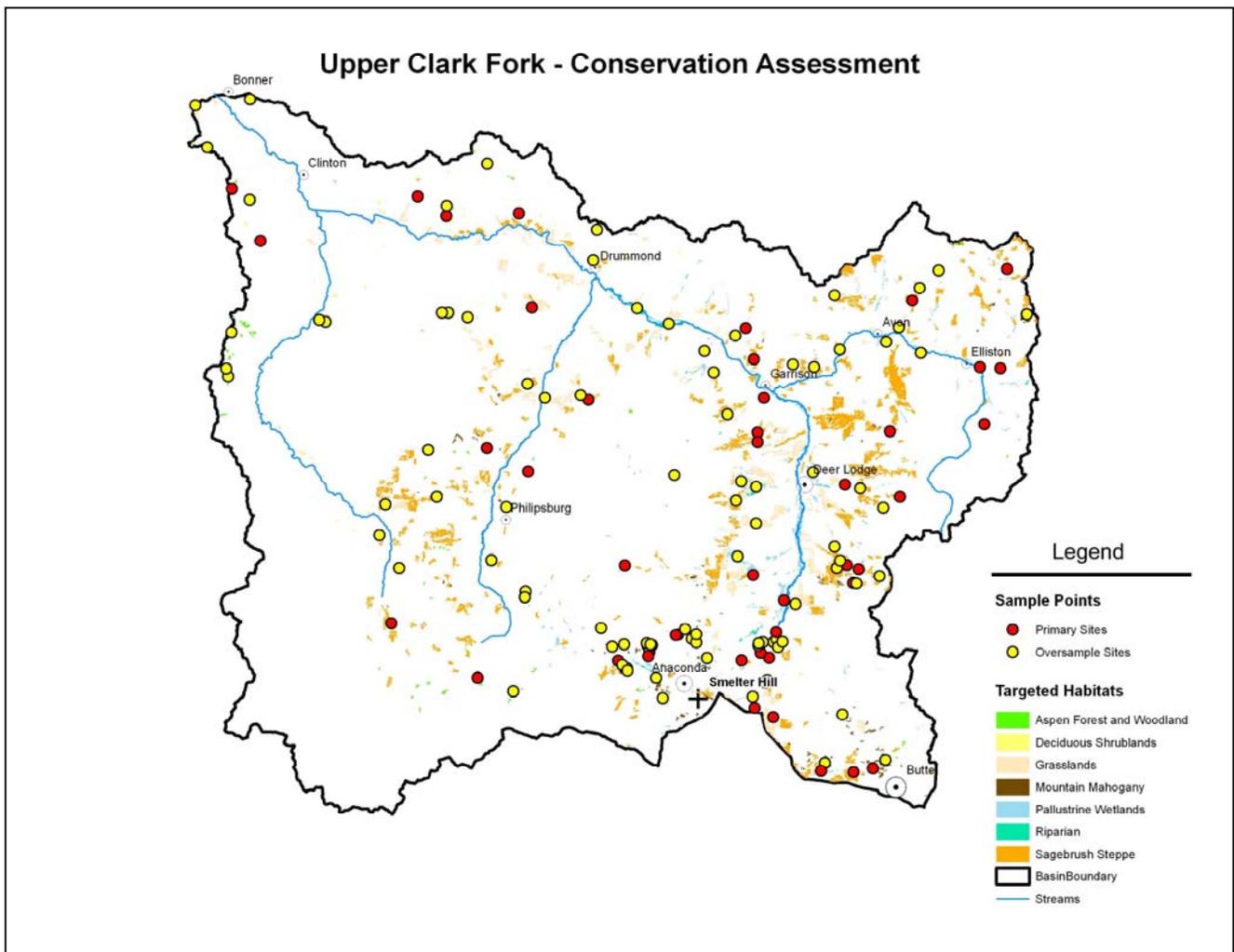
Sample sites will be selected using a stratified random sample of points within targeted vegetation cover classes (e.g. Grasslands, Deciduous Shrublands, Riparian). The sampling scheme is shown in Figure 1. Oversample sites will be chosen to replace sites where access cannot be obtained. Diversity monitoring sampling will be done at the same sample points used for songbird point counts, when practical, but fewer points will be sampled because of the longer time needed to complete small mammal trapping at each site. Coordinates are collected for each sampling location and vegetation

sampling will be centered around these locations to the extent possible. Survey methods vary by species group, as described below.

**Small mammals**—Traplines are set in the cover type targeted by the selected sample point. Traplines are 100 meters in length with stations every ten meters. Each station includes a combination of snap traps, live traps, and pitfalls. Tomahawk live traps may also be set in conjunction with traplines for larger mammals.

**Bats**—Acoustic detectors will be set out at or near the sample points in locations most likely to attract bats. Water sources (streams, wetlands, ponds, stock tanks), roost habitat (rocky outcrops, cliffs, abandoned buildings, trees) and potential flyways will be targeted when available to maximize the likelihood of detecting all the bat species using the area. Bat calls will be downloaded and annotated with site information using Sonobat software, and analyzed for species identification at a later date by biologists experienced with bat call analysis. Mist netting and trapping may be used in a few selected locations to capture bats for species verification (some species are best distinguished through external measurements, and others through genetic analysis of tissue biopsies).

Figure 1. Proposed songbird and diversity monitoring sampling sites in the UCFRB.



Reptiles—Southeast facing aspects with some topographic relief are searched using visual encounter surveys (area searches) and examination of likely refugia. Multiple observers cover the same area. Suitable wetlands and riparian habitats will be surveyed visually for painted turtles and garter snakes.

Amphibians—Lentic sites are searched by multiple observers using dipnets. Search is for all life stages. Incidental amphibian observations will be obtained from fisheries crews.

Incidental observations of other species—diversity monitoring crews will record incidental observations of other species of interest, including Species of Concern, raptor nest sites, and waterbird observations.

Habitat Information—General habitat information is collected at traplines, acoustic sites, and lentic sites. In the Upper Clark Fork Assessment, we will attempt to coordinate diversity monitoring sites with vegetative sampling sites used for the land-cover and wetland mapping efforts, as much as possible to provide better information for species distribution modeling efforts.

Timing and Logistics—Diversity monitoring surveys are normally completed from early May through late August, due to the wide range of species seasonal activity periods. For the Upper Clark Fork Assessment, most small mammal, bat, reptile, and amphibian surveys will be done during July and August, after the songbird point counts have been completed. Difficult small mammal species (primarily shrews) are given preliminary field identification, and submitted to the University of Montana for identification based on skull measurements. Bat calls will be analyzed in the fall (October-December).

### **Songbird Point Counts**

Many songbird species are heavily dependent upon riparian and wetland vegetation. They can be sensitive indicators of habitat quality because of their ties to specific habitat structure. Injury to songbirds in the UCFRB is tied to habitat degradation from phytotoxic soils, and sublethal effects of contamination in the food chain. Birds represent an important component of vertebrate species diversity, with around 300 species regularly occurring in Montana. Bird watching is one of the fastest-growing wildlife related recreational activities in the US, and it contributes significant revenue to Montana's economy.

FWP has contracted the Avian Science Center (ASC) and MNHP to conduct bird surveys in the Upper Clark Fork River Basin (UCFRB). These surveys will compliment and expand the NRDP funded bird surveys in the Smelter Hill Upland Area, and bird data from both survey efforts will help refine species models developed by CACA. Sampling sites will be selected according to a stratified-random design where strata are formed from spatial layers representing the four habitats of interest: low-mid elevation grasslands, low-mid elevation shrublands and steppe, wetlands and riparian areas, and deciduous woodlands (aspen stands). Diversity monitoring sampling and songbird point counts will use the same sample sites, when practical. Patches will be selected with a minimum size that will accommodate at least three point count stations spaced 250-meters apart and at least 250-meters from the nearest edge (up to ten may be placed in each patch; riparian and wetland points may be closer together and closer to edges). Each observer will survey two to three patches each day for a total of 40 - 80 sites (patches) total.

Technicians will conduct 10-minute songbird point counts at three to ten points/site, and each site will be visited twice between 25 May and 15 July. Technicians will record a distance to all birds seen or

heard within the 10-minute count period, as well as the interval in which the detection occurred, the number of individuals detected, whether the detection was audio or visual, and the general habitat type. Point count data will be analyzed to provide information on the diversity and abundance of bird species at each site.

Technicians will record vegetation measurements at all point count stations in order to compare reference and injured sites. Technicians will estimate shrub and ground cover within four 11.3-meter-radius plots. The ASC and MNHP will work closely with FWP to determine what types of additional vegetation measurements will be valuable for their assessment work.

### **Colonial Waterbird Surveys**

Waterbirds will be surveyed in conjunction with the Montana Colonial Nesting Waterbird Inventory being coordinated by FWP. The Montana program is part of a region-wide nesting inventory coordinated by the US Fish and Wildlife Service.

Focal species for the statewide waterbird surveys that potentially nest in the Upper Clark Fork include western grebe, Clark's grebe, eared grebe, red-necked grebe, horned grebe, black-crowned night-heron, great blue heron, double-crested cormorant, black tern, Forster's tern, common tern, and Caspian tern. These species likely suffered injury because their diet consists primarily of fish and aquatic macroinvertebrates (which are reduced in availability and contaminated with heavy metals), or their nesting habitat in wetland or riparian habitat has been degraded from toxic deposits (cottonwood trees, emergent wetland vegetation).

Volunteer birders, coordinated by Montana Audubon and Montana FWP will conduct most of these surveys. Volunteers will survey wetlands to identify colony locations for targeted species, count active nests in colonies following protocols developed by USFWS, count active nests of other focal species that are occupying the same sites, and collect information on colony locations for focal species, especially great blue herons for future survey. Surveys generally involve ground or boat access in suitable wetland and riparian habitats to locate colonies and count active nests. The US Fish and Wildlife Service has developed detailed survey instructions designed to minimize disturbance to nesting birds. The specific protocol used to count nests will vary depending on site characteristics, species, colony size, and weather. If adults are to be disturbed, there are guidelines on time of day and weather conditions for surveying.

Great blue heron colonies will also be mapped by FWP biologists during aerial surveys for bald eagles and other raptors.

### **Raptor Surveys**

Birds of prey were specifically identified as impacted by the release of hazardous materials in the terrestrial NRDA. Bald eagles and osprey prey on fish, which have reduced populations in the Clark Fork River due to contamination. Both species are absent from large stretches of the Clark Fork River, due to poor fish populations or lack of cottonwoods for nesting. Peregrine falcons feed exclusively on birds and forage heavily over wetlands and riparian habitats where birds are usually abundant. Other birds of prey have been impacted by loss of cottonwood riparian habitat for nesting, and reduced prey populations in contaminated areas. Raptors are especially vulnerable to lethal and sublethal impacts of lead poisoning and other heavy metal contamination.

Riparian habitats will be surveyed by ground and fixed-wing aircraft during May and June to locate and map nest sites for bald eagle, osprey, and other raptor species. Suitable grassland and shrubland habitats will be surveyed to determine if ferruginous hawks nest in the area. Peregrine falcon nests will be surveyed during 2009 as part of the USFWS post-delisting monitoring effort by the Montana Peregrine Institute. Known bald eagle territories and any new territories located will be monitored for production. Production will be recorded from as many osprey nests as possible. Incidental observations of other raptor nests, including owls will be recorded.

All nest locations and incidental observations will be entered into the MNHP/FWP Point of Observation database, and will contribute towards refining distribution models for those species. Production data gathered from bald eagles, peregrine falcons, and osprey will provide baseline information to monitor impacts of restoration efforts over the long-term.

### **Otter and Aquatic Furbearers**

Surveys will be conducted by the University of Montana in cooperation with FWP to document the distribution and abundance of otter in the UCFRB. Likely sites of otter use will be identified by examining aerial photos using Google Earth to locate logjams, and by floating the river and its tributaries. Hair snares will be placed at latrine sites and feeding areas to collect genetic material. Subsequent analysis of nuclear DNA from hairs will be used to identify individuals and specify a minimum number of otters in the Basin. Incidental observations of other aquatic furbearers (beaver lodges, muskrat houses, mink observations, scat, willow cuttings) will be recorded.

### **Targeted Species Surveys**

Some species of concern are not likely to be detected during other sampling protocols, due to specialized habitat requirements, limited populations, or nocturnal activity. Targeted surveys may be needed to obtain better data for distribution models and identify important areas for these species. Species include long-billed curlew, American bittern, and Columbian sharp-tailed grouse. Habitats for these species were impacted by shelter emissions (long-billed curlew, Columbian sharp-tailed grouse) and degradation of wetland and riparian habitats from contaminants in the Clark Fork River (American bittern).

**Long-billed curlew:** Long-billed curlews are a species of concern, a Tier 1 species for the Deerlodge Valley in the Comprehensive Fish and Wildlife Conservation Strategy, and an indicator species of high-quality shortgrass prairie. They are present in the UCFRB, but insufficient data points exist to accurately model their distribution. Incidental observations of curlews will be recorded and mapped in the course of other survey efforts, to supplement observations from the songbird point counts. Long-billed curlews depend on grassland habitats, some of which were injured by toxic releases from the smelter. They feed on soil invertebrates, which can bioaccumulate heavy metals in contaminated areas.

**Columbian sharp-tailed grouse:** Columbian sharp-tailed grouse occurred in recent historical times in the UCFRB, but recent sightings are lacking. Areas with historical sightings need to be targeted for surveys. Landowners and biologists will be interviewed to identify areas where remnant populations may exist. These areas will be searched in the fall to help detect the presence of broods, male groups near lek sites, and droppings. Columbian sharp-tailed grouse have disappeared from most of the UCFRB from unknown causes. Although toxic releases are not considered to be the primary reason for their disappearance, contamination of grasslands and associated plants and invertebrates

(grasshoppers) have eliminated habitat for this species, reducing the habitat available for future reintroduction and recovery efforts for this species.

**American bittern:** American bitterns tend to be secretive and nocturnal. They nest singly in wetlands. Suitable wetlands in the UCFRB will be surveyed at night using recorded bittern calls, to elicit responses from breeding birds. American bitterns feed primarily on fish and amphibians, which were impacted by toxic releases into the Clark Fork River. They nest in wetlands with thick emergent aquatic vegetation. Wetlands eliminated by the footprint of the Opportunity Ponds likely provided habitat for this species.

## **Expected Products and Reports from this Assessment**

Expected products include GIS layers, databases, and a final report that summarizes the information collected during this assessment. All wildlife point data will be deposited into the joint MNHP/FWP Point Observation Database (POD). GIS layers will be maintained by MNHP or FWP as appropriate.

GIS layers representing land-cover, habitat quality, species diversity, injured species distribution, wildlife corridors, land ownership, present or potential wildlife recreational access, human developments, and other factors will be overlaid to help identify and delineate areas of high, medium, and low restoration potential relative to the resources in need of restoration. This information will be used to develop the prioritization document. It will also be available to provide a baseline for evaluation of restoration effectiveness in the future.