

IDAHO BIRD INVENTORY and SURVEY (IBIS)

A plan to implement Coordinated Bird Monitoring in Idaho

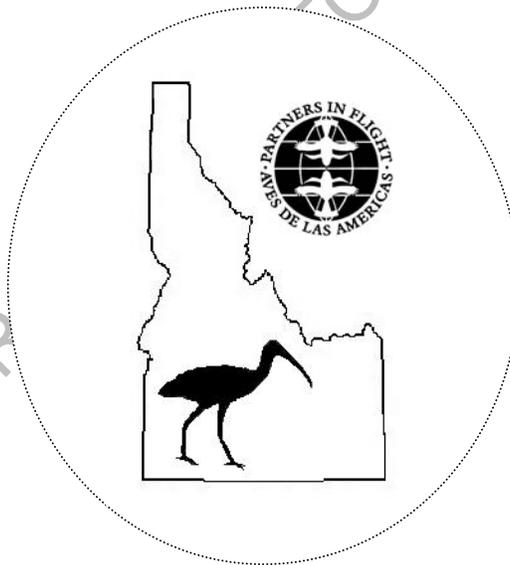
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Version 1.0

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Endorsements

The undersigned endorse the Idaho Bird Inventory and Survey (IBIS) plan and agree to participate in it. Specifically:

1. A representative from each agency or organization listed below will attend the annual meeting to review past work and plan future IBIS projects.
2. The organizations will take reasonable and prudent steps to insure that the program is implemented and remains viable in the long-term and that bird surveys conducted by the partners are coordinated, working through the IBIS steering committee.
3. The undersigned will function as an advisory board that oversees the general direction and goals of the IBIS program in the long-term.

Idaho Department of Fish and Game

Idaho Audubon Council

U.S. Dept. of Interior – Geological Survey

Ducks Unlimited

U.S. Dept. of Interior – Bureau of Land Management

Potlatch Corporation

U.S. Dept. of Interior – Fish and Wildlife Service

Boise Corporation

U.S. Dept. of Agriculture – Forest Service

Teton Regional Land Trust

Nez Perce Tribe

The Nature Conservancy of Idaho

Intermountain West Joint Venture

Idaho Bird Observatory

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Executive Summary

Conservation and management of Idaho's birds depends on adequate monitoring information, which, to a large extent, does not currently exist. Even more basic information on distribution and abundance is poorly understood for many bird species. Monitoring information is required by legislative and land/wildlife management agency mandates as well as a host of forest plans, ecoregional plans, preserve management plans, and state comprehensive wildlife conservation strategies. A statewide all-bird monitoring program was one of the highest priority needs identified in the Idaho Partners in Flight Bird Conservation Plan. It is important to monitor bird populations not only because their conservation is important in its own right, with a high level of legal, scientific, and public concern, but also because birds are useful indicators of environmental health. Birds are one of the best tools for monitoring the effects of current land-use practices; they are the most easily detected and identified vertebrates, simple survey methods can cover many species, and accounting for and maintaining many species with different requirements promotes conservation strategies at the landscape scale.

To meet these monitoring needs, the Idaho Bird Inventory and Survey (IBIS)¹ has been developed to help managers decide which of 306 bird species that regularly occur in Idaho warrant management action due to declines; to identify causes of such declines; and to help managers plan and evaluate land-use practices, conservation, and restoration. In addition, IBIS is designed to address specific habitat-related conservation concerns for birds of Idaho: (1) inventory needs of Idaho Department of Fish and Game Wildlife Management Areas for birds in all seasons (indefinite number of species); (2) effects of human activities on wetlands and the birds that depend on them (119 species); (3) conflicts between piscivorous birds and fish populations (5 species); (4) effects of human activities on riparian areas (141 species); (5) condition of aspen habitat and its importance to birds (34 species); (6) identification of high quality habitat and effects of land-use practices in sagebrush communities (54 species); (7) impacts of forest thinning (including salvage logging) and fuels reductions projects, particularly in Ponderosa Pine habitats (31 species); and (8) effects of management in Pinyon-juniper habitats (48 species). Identifying species at risk and causes of their declines is a permanent need, whereas habitat-specific management issues can be addressed with relatively short-term (e.g., 3–5 year) studies, followed by other short-term priorities as identified. To identify species at risk, population trend information is needed. Habitat-specific management issues can best be addressed by describing spatial patterns in abundance, identifying habitat relationships, followed by studying productivity to determine quality of available habitats in relation to reference sites or other suitable standards. This plan provides quantitative objectives for addressing each of the management issues, identifies the best methods for collecting the needed information, provides estimated sample size requirements, identifies responsibilities for implementation, and makes recommendations on project management and the next steps toward implementation.

¹ Recommended citation: Moulton, C., R. Sallabanks, E. Ammon, and J. Bart. 2004. Idaho Bird Inventory and Survey (IBIS): A plan to implement coordinated bird monitoring in Idaho. Version 1.0. Idaho Department of Fish and Game, Boise, ID. 265 pp.

Introduction

The Idaho Bird Inventory and Survey (IBIS) is a plan to monitor all birds in Idaho that most wildlife- and land-management agencies would contribute to and benefit from. Importantly, IBIS is designed to be part of a new program called "Coordinated Bird Monitoring" (CBM) that is currently being developed at the national level (<http://amap.wr.usgs.gov>). CBM is a joint effort by managers and bird monitoring specialists to improve the success of bird monitoring programs, and make the information available to all partners. Its approach focuses on: (1) providing information on specific land-management issues from reliable monitoring data; (2) describing focal species and quantitative survey objectives for each management issue; (3) choosing survey methods and estimating needed sample sizes; (4) storing all data in permanent, widely available data repositories; (5) analyzing data using methods endorsed by the appropriate professional societies; and (6) using effective methods for communicating results to decision-makers. This all-bird coordination effort is modeled after a long-standing program, implemented by the Flyway Councils, of continent-wide tracking of waterfowl to set management and harvest strategies for game species (e.g., www.pacificflyway.gov). As with the waterfowl model, coordinated all-bird monitoring is intended as a feedback system that can provide a scientific basis for management and conservation planning for birds of management concern.

Coordinated Bird Monitoring plans are being developed at the state, regional, and continental levels. Each plan describes existing monitoring programs, and then identifies needed improvements and new programs using the following approach (Fig. 1):

- (1) Identify large-scale management issues that the program helps address (goals);
- (2) Identify information that is needed (objectives);
- (3) Select the methods that will be used (strategies); and
- (4) Identify the parties that have primary responsibility for implementing each program component (implementation plan).

Several projects are already in progress, at the continental level, that will help implement monitoring recommendations at the state, province, or regional level. For example, a system for conducting peer reviews of survey protocols is currently being developed, data repositories are being constructed, and rapid habitat survey methods are being designed. IBIS is designed to use these resources and to support the continental programs, where appropriate.

Bird Conservation and Management Regions

In 1998, the North American Bird Conservation Initiative (NABCI) was formed as an international forum for coordination of conservation efforts of existing major bird initiatives (i.e., landbirds, waterfowl, waterbirds, shorebirds). One goal of NABCI is to increase the effectiveness of, and coordination between, existing and new bird conservation programs. As a recommended framework for coordinated bird management, NABCI adopted and mapped ecological units called Bird Conservation Regions (BCRs; Fig. 2). BCRs are ecologically distinct regions with similar bird communities, habitats, and resource management issues. Technically speaking, Idaho is covered by three BCRs (Great Basin BCR-9; Northern Rockies, BCR-10; and Southern Rockies/Colorado Plateau, BCR-16). The Great Basin BCR covers most of southern Idaho, the Northern Rockies BCR covers north-central Idaho and the Idaho Panhandle, and a small sliver of the Southern Rockies/Colorado Plateau BCR enters southeastern Idaho.

Although BCRs provide an ecologically meaningful framework for studying bird populations, designing surveys at such a large scale has limitations. For example, in contrast to surveys in upland habitats, which can be designed at large spatial scales, surveys of wetland habitats require detailed local-level

Figure 1. Steps in developing Coordinated Bird Monitoring plans.

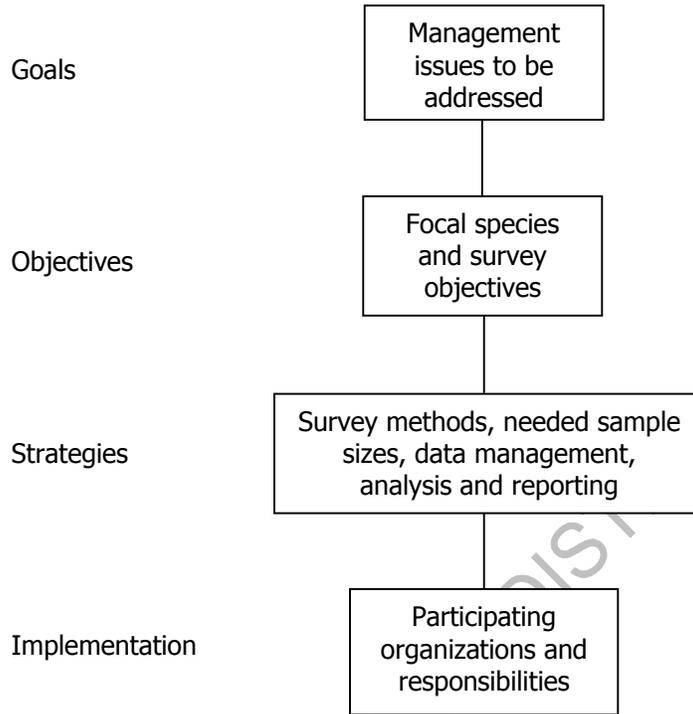
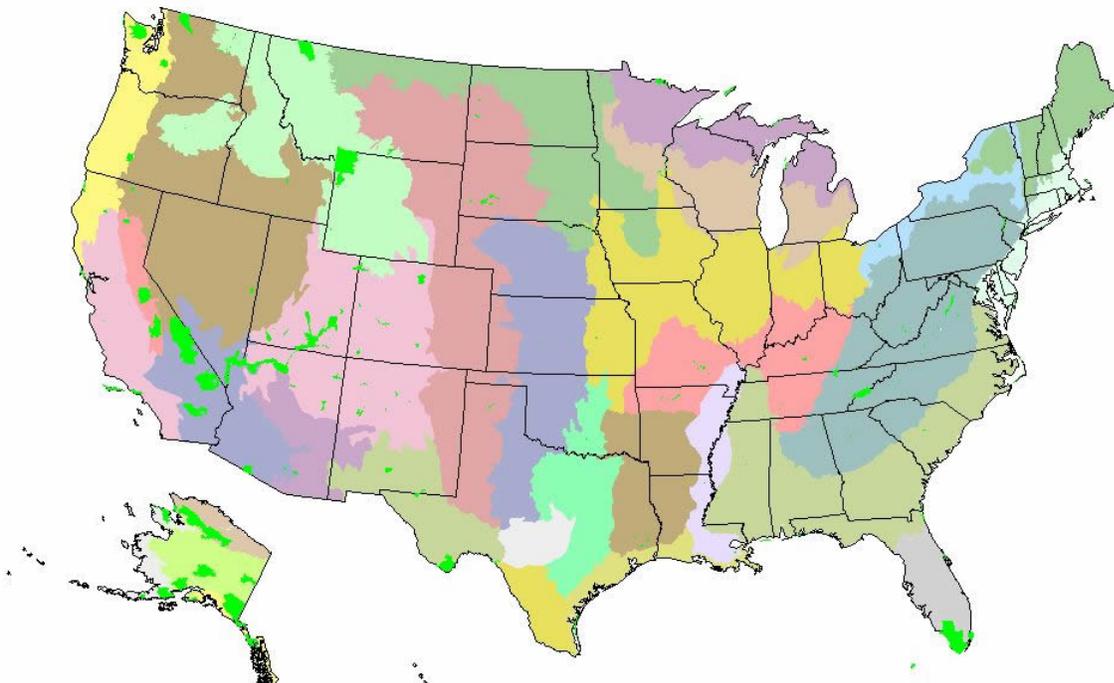


Figure 2. Bird Conservation Regions of the United States.



information to ensure sufficient assessment of aquatic species. Therefore, CBM collaborators formed smaller Bird Monitoring Regions (BMRs), by intersecting the BCR map with a Province and State map, deleting small polygons, and smoothing the borders (Fig. 3). The resulting BMRs allow for individual states to more feasibly develop detailed assessments of bird populations within their designated regions. Idaho consists of two BMRs, BMR-50 and BMR-51 (Fig. 3), which will be used to organize IBIS. However, because they are a functional subset of BCRs and state/provincial boundaries, these BMRs can easily be scaled up to BCR or state levels to assess larger scale monitoring issues, as needed. In Idaho, BMR-50 and BMR-51 roughly correspond with the portions of BCR-10 and BCR-9/BCR-16, respectively, that cover the state.

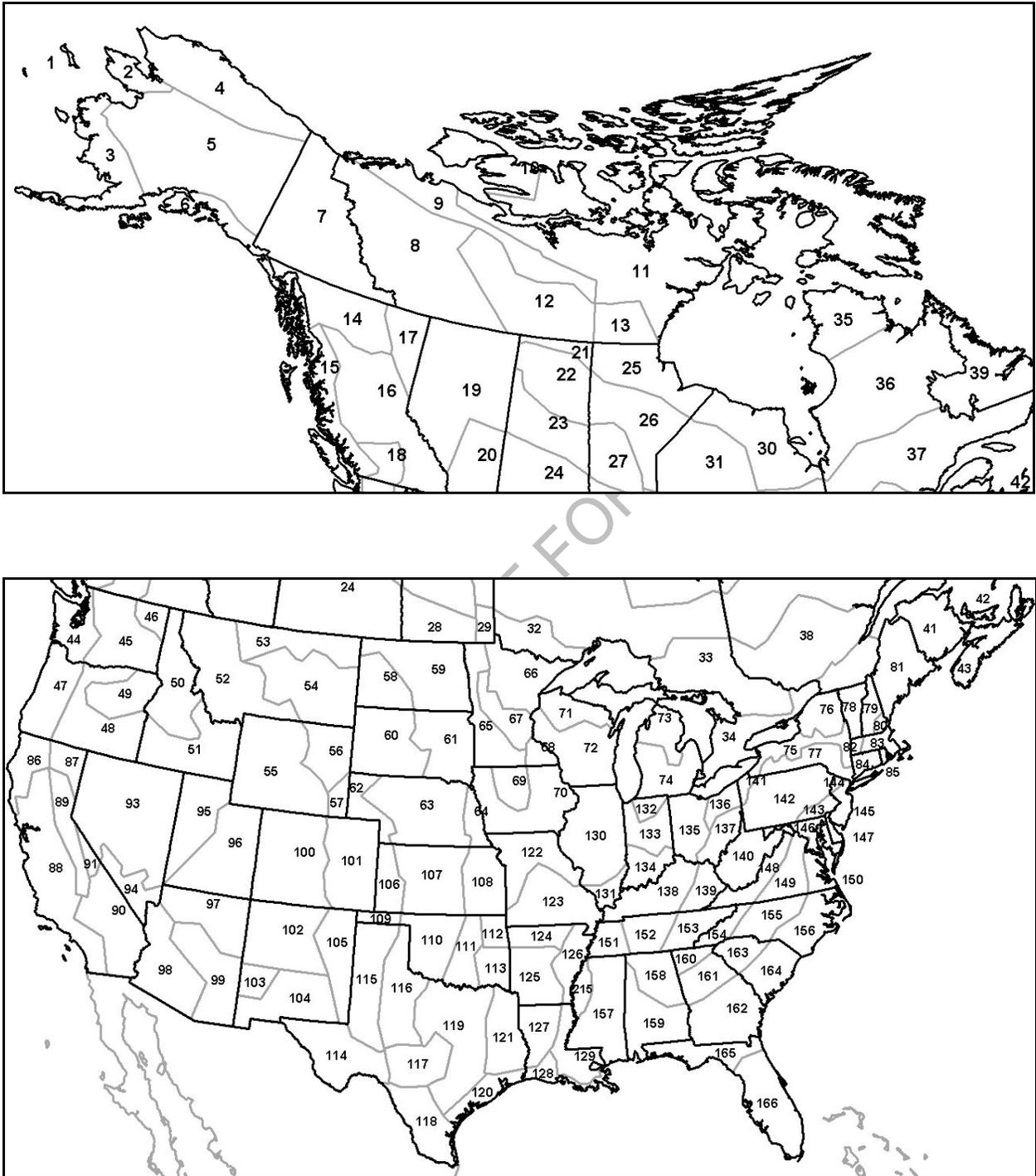
Why is IBIS needed?

Conservation and management of Idaho's birds depends on adequate monitoring information, which, to a large extent, does not currently exist. Even more basic information on distribution and abundance is poorly understood for many bird species. Monitoring information is required by legislative and land/wildlife management agency mandates as well as a host of forest plans, ecoregional plans, preserve management plans, and state comprehensive wildlife conservation strategies. A statewide all-bird monitoring program was one of the highest priority needs identified in the Idaho Partners in Flight (IdPIF) Bird Conservation Plan (BCP) (version 1.0; Idaho Partners in Flight 2000: http://www.blm.gov/wildlife/plan/pl_id_10.pdf). It is important to monitor bird populations not only because their conservation is important in its own right, with a high level of legal, scientific, and public concern, but also because birds are useful indicators of environmental health. Birds are one of the best tools for monitoring the effects of current land-use practices; they are the most easily detected and identified vertebrates, simple survey methods can cover many species, and accounting for and maintaining many species with different requirements promotes conservation strategies at the landscape scale.

Because activities outside the jurisdiction of a given agency may cause declines in the organisms that reside therein, even if local activities may not be affecting organisms negatively, long-term trend monitoring is essential. Populations also may be declining due to interactions among multiple management effects, which could not be predicted based on single-effect studies. The only way to expose such problems is through long-term monitoring of actual population trends. Long-term monitoring of population trends is useful for discovering if populations are in decline, but by itself is not very useful for discovering the reason behind such declines. Nor is it useful for finding out if specific management practices are affecting populations or causing declines. More targeted population monitoring, designed to address specific management issues, is therefore a very significant component of IBIS.

Throughout the state, some bird monitoring programs are already in place, such as the Breeding Bird Survey (BBS). Unfortunately, there are several reasons why the BBS alone is not sufficient to attain all of Idaho's monitoring goals: (1) land managers need monitoring data that are more regional than national in scope, and the resolution of the BBS is too coarse for regional decision-making; (2) BBS routes are roadside counts that have many inherent biases; (3) the BBS does not collect habitat information with sample locations, nor does it use a point-count protocol that is conducive to studying habitat relationships; and (4) BBS, inherently, does not provide information on migrating and wintering bird populations. Of the 244 bird species that are known to breed in Idaho, approximately 60% are not adequately monitored by the BBS. At least 60 additional bird species, which regularly occur in Idaho only during migration and winter, are not monitored by BBS. Of the species that are well monitored by the BBS, there are some whose populations are declining, some that are increasing, and some that are stable. Presumably, better data will detect more species in each of these categories, which is of great concern because there are probably many declines that currently remain undetected.

Figure 3. Bird Monitoring Regions in Canada (upper pane) and the United States (lower pane).



Summary of Existing Bird Monitoring and Assessment Projects in Idaho

Breeding Bird Survey (BBS)

There are currently 58 BBS routes in Idaho, the majority of which (60%) are surveyed on a regular basis. BBS routes are 25 miles long, are located along roads, and consist of three-minute unlimited-distance (technically, only birds within ¼ mile of route observers are recorded) point counts at each of 50 stops (for more details see <http://www.pwrc.usgs.gov/birds>). It is anticipated that BBS coverage in Idaho will increase in future years under the IBIS framework.

Christmas Bird Counts (CBC)

There are currently 38 CBC count circles in Idaho, 60% of which are surveyed annually. CBC count circles are 15 miles in diameter, in which bird counts take place over a 24-hour period between December 14th and January 5th (for more details, see <http://www.audubon.org/bird/cbc>).

Northern Region Landbird Monitoring Program (NRLMP)

The NRLMP (<http://biology.dbs.umd.edu/landbird/landbird.htm>), which is a collaborative effort between the U.S. Forest Service (USFS), other agencies (e.g., Bureau of Land Management [BLM]) and private organizations (e.g., Potlatch Corporation), consists of alternating yearly point counts (1) along 300 permanently-marked transects and (2) in targeted land-use practice areas, within the USFS Northern Region (northern Idaho and western Montana). Permanent transects, which were placed in a geographically stratified random fashion in 1994, are located along USFS roads and trails and consist of 10 equally-spaced point-count stations. Counts are conducted for 10 minutes at each station during one visit in the breeding season. Vegetation data are collected at each point-count station to allow for analysis of habitat associations and effects of different forest management practices. During alternate years, point count efforts are focused on addressing effects of particular land-use practices, such as prescribed fire, timber harvesting, and grazing.

Songbird Migration Monitoring

Monitoring of fall songbird migration occurs at one mist-net station in Idaho. This mist-net station is operated by Idaho Bird Observatory (IBO; <http://www.idbsu.edu/biology/ibo/index.html>) at Lucky Peak (since 1997) in the Boise Foothills. Banding operations at Lucky Peak are standardized, allowing for the use of yearly capture rates of individual species for long-term migration monitoring.

Monitoring Avian Productivity and Survivorship (MAPS)

There are three MAPS stations, which monitor breeding bird populations through mist-netting efforts, in Idaho. These include one station operated by Idaho Bird Observatory (IBO; Lucky Peak: since 2000) in southwestern Idaho, one station operated by the Idaho Department of Fish and Game (IDFG; Vassar Meadows: since 1997), and one station operated collaboratively by IDFG and BLM (Salmon/Pattee Creek: since 1998). Two additional MAPS stations are being started in the Panhandle by IDFG in 2004. Ideally, the number of MAPS stations in Idaho will increase in future years as both funding and demand for MAPS data increase.

Waterfowl

Idaho Department of Fish and Game, in collaboration with other agencies (e.g., U.S. Fish and Wildlife Service [USFWS]), conducts, on average, five standard fixed-wing aerial surveys of the major

waterbodies in Idaho each year. In the second week of January (since the 1950s), a flight is conducted statewide to survey wintering waterfowl. In February, wintering Trumpeter Swans (scientific names in Appendix A unless noted in text) are surveyed in eastern Idaho, in conjunction with surveys of Montana and Wyoming. These surveys include Rocky Mountain Population swans from both the tri-state area (Idaho, Montana, Wyoming) and Canada. The results of this survey are compared with a Trumpeter Swan Productivity survey flight conducted in September, to determine what proportion of wintering swans are from the Canadian population. Also in September, a flight is conducted to survey Sandhill Crane populations of eastern Idaho. A fifth flight is conducted in April for a statewide survey of Canada Goose pairs.

Duck brood surveys are conducted on IDFG Wildlife Management Areas (WMAs) irregularly throughout the state, although nest surveys of Trumpeter Swans are conducted annually. Ground surveys of Trumpeter Swans also are conducted in combination with the fall and winter aerial surveys to count birds in isolated habitats not covered by aerial survey. Duck banding takes place on various National Wildlife Refuges and state-owned lands during the breeding season each year (approx. 2000 birds banded per year). In addition, waterfowl and Sandhill Cranes are monitored by IDFG through a post-season questionnaire that is mailed to approximately 5% of the licensed hunters of a given season. Summary questions included in the request are: which species were hunted, how many (of each species) were harvested, and in which hunting unit did hunting occur. Follow-up phone calls are made to all hunters who did not respond to the mailing. Finally, as part of the nationwide federal parts survey efforts (USFWS), wings of harvested waterfowl are mailed in by hunters to USFWS for assessment at the Pacific Flyway level.

Streams in northern and north-central Idaho are surveyed for Harlequin Ducks on an annual basis. Streams where harlequins are known to occur are generally given priority over new streams that haven't previously been surveyed. Surveys are conducted primarily by walking in and along streams, and also by rafting or inner tubing and driving on roads adjacent to streams. The harlequin is listed as a Species of Special Concern by IDFG and is classified as a Level II priority species by IdPIF. The purpose of monitoring this important species is therefore to maintain information on population status and continue to document distribution. Additional surveys along new streams within the known range of the harlequin are anticipated to be part of IBIS.

Upland Gamebirds

Greater Sage-Grouse and Sharp-tailed Grouse leks are inventoried annually by IDFG using aerial and ground surveys. These surveys are used to search for new lek locations. In addition, ground crews are deployed to conduct lek counts at known lek locations. The main measure of interest is number of males attending the lek. This information is used in management planning and harvest management. IDFG also collects wings from harvested sage-grouse and Sharp-tailed Grouse by placing wing barrels in areas of local hunter congregation (campgrounds, etc.). Wings are used to estimate demographic parameters of the hunted populations, such as sex and age ratios.

Other upland game birds present in Idaho include Wild Turkey, Blue Grouse, Ruffed Grouse, Spruce Grouse, Grey Partridge, Ring-necked Pheasant, Chukar, Northern Bobwhite, Gambel's Quail, Mountain Quail, California Quail, and Mourning Dove. Spruce Grouse, Blue Grouse, Ruffed Grouse, Mountain Quail (not hunted since 1984), and Mourning Dove are considered native to all or most of their current range in Idaho, while the others have been introduced for hunting through much or all of their range. IDFG collects wings harvested from Ruffed Grouse, Spruce Grouse, Blue Grouse, California Quail, Grey Partridge, and Chukar. Similar to Sage Grouse and Sharp-tailed Grouse, wings are used to estimate demographic parameters of hunted populations. All upland game birds are monitored by IDFG through a post-season questionnaire that is mailed to approximately 5% of the licensed hunters of a given season. Summary questions included in the request are: which species were hunted, how many (of each species) were harvested, and in which hunting unit did hunting occur. Follow-up phone calls are made to all

hunters who did not respond to the mailing. Targeted harvest questionnaires also are sent to those hunting Ring-necked Pheasant on WMA lands, and those hunting Wild Turkey (both spring and fall surveys). Depending on the region, IDFG also conducts population trend monitoring of Ring-necked Pheasant (brood counts and spring crowing counts), Grey Partridge (brood counts), California Quail (brood counts), and Chukar (late-summer/early fall helicopter surveys).

Mountain Quail have recently been surveyed statewide and early results suggest that birds are still present in areas considered by most to be traditional strongholds (e.g., Riggins to Pollock along the Little Salmon River); isolated sightings of birds in other regions suggest that any remaining populations are relatively disjunct. Spring surveys in 2003–2004 were the first attempts in approximately 10 years to document Mountain Quail locations. These surveys will likely continue more frequently in future years, especially as plans are discussed to reintroduce quail to historic sites where habitat appears most suitable.

Raptor Monitoring

Because Idaho boasts an impressive raptor community, particularly along the Snake River floodplain of southern Idaho, multiple monitoring efforts for breeding, migrating, and wintering raptors currently exist. During the breeding season, Bald Eagles, Golden Eagles, Peregrine Falcons, Prairie Falcons, American Kestrels, Northern Goshawks, Ferruginous Hawks, and Burrowing Owls are monitored by various agencies (IDFG, USGS, BLM), non-profit organizations (IBO), universities (Boise State University), and private organizations/individuals (e.g., Potlatch, Merlin Systems, Idaho Power Company). Goshawk productivity has been tracked for more than a decade in both eastern (Caribou-Targhee National Forest) and south-central (Sawtooth National Forest) Idaho. In the fall, raptor migration is monitored annually by IBO at Boise Peak (since 1993) and Lucky Peak (since 1995), where they use a combination of surveys (Lucky Peak only) and raptor banding. Hawkwatch surveys at Lucky Peak are standardized to allow for year-to-year comparisons, with the long-term goal of being able to detect a 50% change in numbers of a given species over a 20-year period. In addition, IBO (Lucky Peak) conducts standardized annual monitoring (since 1999) of the migration of small forest owls, targeting Flammulated and Saw-whet Owls. Finally, wintering populations of Bald Eagles are monitored as part of a national survey effort that includes over 70 survey routes, at least 60 of which are surveyed annually (since 1980), coordinated by USGS, BLM, IDFG, USFS, Idaho Power Company, and the Environmental Science & Research Foundation.

Bald Eagle territory occupancy and nest productivity are monitored annually by IDFG and other agency partners throughout the state. All known territories are checked at least three times during the breeding season and data are submitted for annual reporting requirements. Annual trends show steadily increasing eagle populations with approximately 150 pairs nesting statewide in 2003. Bald Eagle monitoring will continue as normal in future years, even after delisting, which is anticipated to occur during the latter part of 2004. Peregrine Falcons are monitored in a similar way, primarily by IDFG nongame biologists; all known eyries are checked for occupancy and subsequent evidence of breeding success on an annual basis. Surveys are conducted for previously undiscovered territories in areas of suitable habitat when time allows. Idaho's peregrine monitoring is supported by IDFG, BLM, and USFS on an annual basis. Although recently delisted, monitoring of all known peregrine territories will continue annually, with numbers now on the order of 25 pairs statewide.

U.S. Forest Service Management Indicator Species

Roadside transects have recently been established by the USFS to allow for monitoring of two Management Indicator Species (MIS), the White-headed and Pileated Woodpeckers. Surveys began in 2003–2004 for most survey routes and will continue indefinitely. Other forest birds (e.g., owls, songbirds) could be surveyed along the same transects at different times of the year and/or day. Involvement by the USFS as IBIS v2.0 (terrestrial species) is developed will ensure coordinated monitoring of all birds, both on and off public lands across the state. In southern Idaho (USFS Region 4),

collaborative efforts to add surveys on USFS lands are currently being discussed, pilot work on forest owls is being conducted, and songbird monitoring to complement the NRLMP (described above) is under consideration.

Other bird monitoring and surveying projects that have been completed, are in progress, or are proposed include:

- IBO is currently conducting a statewide shrubsteppe study to identify habitat relationships of obligate shrubsteppe bird species. Although not a long-term monitoring project, when completed it will provide a network of approximately 100 sites spread across most major shrubsteppe areas in Idaho. IBO intends to use these sites in the future for studies of demographics and long-term monitoring of both shrubsteppe birds and habitat.
- BLM intends to begin monitoring Yellow-billed Cuckoos along the Snake River Area of Critical Environmental Concern in spring 2004, as the status of this species is a growing concern in the western U.S.; surveys also were conducted throughout eastern Idaho in 2003 to update distribution information for this high priority species.
- Red Willow Research is conducting a survey of bird species in pinyon-juniper habitats of southeastern Idaho. This two-year (2003–2004) study involves spring and summer point counts within pinyon-juniper stands and associated riparian areas. The Idaho Conservation Data Center (IdCDC) also has proposed to study pinyon-juniper habitats of southern Idaho, beginning in 2004. Although the primary focus will be measuring habitat variables, avian surveys also are an integral part of this project.

Important Bird Areas (IBA) Program

Idaho's IBA Program was launched in 1996 as a partnership between IdPIF and the Idaho Audubon Council. An IBA Technical Committee was formed to encourage nominations and review materials for candidate IBAs. From 1997 through 2000, the committee reviewed nominations and voted to accept, reject, or table each nomination. To date, 53 sites have been identified as IBAs in Idaho (<http://www.audubon.org/bird/iba/id.html>). The Idaho IBA program is now beginning phase two of the IBA process. Proponents are being sought to work toward conservation and management of IBAs. These individuals and organizations will be champions for bird conservation at particular sites and will work cooperatively with each site's land manager or landowner. To some degree, additional site nominations are currently being sought, and missing information for accepted sites is being sequestered.

Another important part of the phase two process is monitoring birds at Idaho's IBAs. Monitoring already has been initiated at some sites – conducted either by biologists responsible for the management of the area, or by volunteers. These efforts, intended to collect basic information about the IBAs, at a minimum create an inventory of bird species present at each site, which will lead to further investigations. IBIS will initiate more extensive monitoring at all wetland IBAs and selected upland IBAs across the state. IBIS and Idaho's IBA program are strongly connected initiatives that require coordination and leadership to be fully effective. To this end, IDFG's Nongame Wildlife Program has hired a part-time IBA Coordinator so that IBIS may be implemented on a statewide basis by monitoring birds at IBAs. With a dedicated IBA Coordinator, Idaho's IBA program can continue to grow in the necessary direction and at the required pace to fulfill the objectives of this important state, national, and international bird conservation program.

Integrating Ongoing Surveys into a Coordinated Bird Monitoring Program

Integrating existing monitoring efforts is one of the main motivating factors for CBM at the state, regional, and continental scales. The purposes of integrating ongoing work into widely accessible databases are:

- (1) Management agencies in need of specific bird conservation data can assess whether or not similar work has already been done;
- (2) Resources can be more explicitly allocated to obtain information that is still lacking; and
- (3) Information from local efforts can be utilized beyond the scope of single projects

Existing monitoring programs can contribute to the coordination effort by depositing data sets directly into a data repository, where they can be accessed either by a defined set of users or by the general public, depending on the nature of the data or restrictions set by the provider. Examples of such repositories, and the wealth of information they produce, are the BBS database of USGS' Patuxent Wildlife Research Center and the CBC program of the National Audubon Society. Repositories that can accommodate all types of bird monitoring data at a continental scale are currently being constructed, and the Patuxent Wildlife Research Center is already at a stage where most monitoring data collected in Idaho could potentially be stored.

In addition, IDFG's Nongame and Endangered Wildlife Program is currently working with the CDC to develop an Idaho version of a data bank that is tailored to facilitate access and use by Idaho partners. This version will be focused on Idaho issues, native places, and applications typical to management questions for this region. To contribute data from ongoing efforts, partners will be asked to provide the following information about their monitoring effort:

- Bird groups targeted
- Location data (coordinates and projection information)
- Type of monitoring data collected (presence/absence, abundance, density, demographics, etc.)
- Methods used (point count protocol, specifications for area searches, spot-mapping, nest monitoring, etc.)
- Type of habitat data collected (e.g., vegetation maps, vegetation structure data, floristics, etc.)
- Year(s) and season(s) of data collection
- Any restrictions on data (e.g., protection of location data on threatened and endangered species, expected publication dates at which data can be released to general use, etc.)
- Contact information for project lead

In cases where major restrictions on data exist, a contributor may make arrangements to only provide these metadata to the general public and to handle requests for raw data through the project's contact person.

Products of IBIS and Coordinated Bird Monitoring

Conceptually, coordinated bird monitoring can be divided into long-term and short-term objectives. Long-term programs implemented at the state level can be part of the continental program to obtain population trend estimates. Examples include the national BBS program, the national Breeding Pair survey for waterfowl, and national bird banding programs (e.g., MAPS).

Cooperators in state programs also agree to coordinate in carrying out short-term surveys designed for such goals as clarifying habitat relationships, estimating abundance, and evaluating projects. Thus, future revisions of IBIS involve re-evaluating short-term objectives and developing new ones. Short-term surveys are intended to address specific management issues that need to be resolved at a relatively large geographic scale, often involving multiple species and habitats. Management issues, survey objectives, methods, roles and responsibilities, and recommendations for implementation are developed during plan revisions (Table 1).

Table 1. Recommended steps for developing new short-term Coordinated Bird Monitoring projects.

Background and Description of the Management Issue	
Survey Objectives	Information Needed
	Study Areas
	Focal Species
	Quantitative Objectives
Methods	Bird Survey Methods
	Sample Size Requirements
	Habitat Variables
	Sampling Plans
Roles and Responsibilities	Existing and Needed Information
	Project Management
Recommendations for Implementation	

Key Variables and Management Species in Short-term Coordinated Bird Monitoring Projects

Short-term surveys generally have one or more of three applications: regional models, site-based models, and project evaluation (Table 2). All three applications involve a set of one or more independent (predictor) variables and a dependent (response) variable. Sample size estimation procedures for the three applications are described in Appendix B. In most applications, predictor variables will be habitat descriptors, such as basic habitat type (e.g., derived from GAP or other habitat maps) for regional models, and more specific habitat descriptors (e.g., stand density, understory condition, forb cover) for site-based models. In project evaluation, the independent variable may be as simple as the presence/absence of a habitat implementation project, but also can include habitat characteristics that are a result of the project (e.g., tree densities after revegetation).

The response variable is typically: (1) a descriptor of bird abundance during any period of the year; (2) a variable describing demography; or (3) a fitness indicator, such as productivity or nutritional status. For most short-term products, we recommend using *total abundance of all management species* identified for that habitat type as the standard response variable. Management species include all species that are of greatest concern to the management issue. For the most part, management species lists are a combination of (1) threatened and endangered species, (2) high- and moderate-priority species of the

Table 2. Summary of typical products of short-term Coordinated Bird Monitoring projects.

Regional model

Description

A model that expresses the parameter of interest (e.g., focal species abundance) as a function of independent variables (e.g., habitat type) whose values are known throughout a region

Uses

- Understand large-scale patterns in abundance
- Estimate statewide population
- Identify low- and high-quality areas throughout the region

Methods

- Maps showing distribution of the focal habitat are obtained
- Regionwide bird surveys in the habitat, perhaps using stratification to insure samples are obtained from a variety of conditions
- Independent variables, suspected to be correlated with bird abundance (or other dependent variables), are obtained (usually from GIS layers) throughout the region
- Models are developed using standard regression methods

Site-based model

Description

Similar to the regional model but includes independent variables known only for the surveyed areas (e.g., understory type, tree density, burn history, etc.).

Uses

- Better understand determinants of habitat quality by including specific habitat variables not measurable statewide
- Estimate effects of proposed projects (e.g., habitat conversion/protection/restoration)

Methods

- Same methods as for the regional model
- In addition, stand-specific variables are collected by fieldwork, examination of aerial photos, or other sources

Project evaluation

Description

Estimated value of the parameter¹ (e.g., focal species abundance), within a habitat implementation project area, measured before, during, and after the project.

Uses

- Help evaluate habitat implementation projects, and perhaps revise project plans
- Document effects of the project on birds

Methods

- Surveys on the project area before, during and after the project

¹ The parameter of interest may be bird abundance during any period of the year or a fitness indicator such as productivity or nutritional status.

Partners-in-Flight state chapter's (IdPIF) priority species list, (3) highly imperiled, high concern, and moderate concern (categories 1 – 3) species of the U.S. Shorebird and Waterbird Conservation Plans, and/or (4) obligate breeders in the management issue habitat. Other bird population or community descriptors can also be used in data analyses, focusing for example only on the abundance or fitness of a single species of interest, or on the proportion of habitat obligates present. However, for the first phase of IBIS, we propose to emphasize fairly general analyses before moving into species-specific applications, for which additional statistical considerations will be necessary. One exception to this general focus concerns the Long-billed Curlew, a species of rapid growing concern in the West. A region-wide survey is being designed collaboratively by the USFWS and USGS, with curlew surveys beginning in Spring 2004. As part of the first phase of IBIS, we propose to contribute to this survey effort, even though it is species-specific.

Regional Models

Regional models express the parameter of interest (e.g., the abundance of a set of focal species) as a function of independent variables (usually habitat) whose values are known throughout a region. The model is applied to the entire region or, more typically, to all of a regional habitat type (e.g., aspen or shrub-steppe). The model may predict the abundance of a group of focal species, or it may be species-specific. The results of these analyses provide an estimate of region-wide species abundance, help managers understand large-scale patterns in abundance, and identify high- and low-quality habitats throughout the region. Models are constructed by obtaining field data from a substantial sample of randomly selected sites (usually using stratified sampling), and then identifying broadly-defined habitat variables, which are available in region-wide GIS layers, that are believed to correlate with bird populations.

Site-based Models

Site-based models also express the bird population parameters as a function of independent (usually habitat) variables. But in addition to variables whose values are known throughout the region, site-based models also include variables that were measured for each surveyed site and that are not available region-wide. These variables are usually habitat measurements that are obtained in the field or from detailed vegetation maps, aerial photos, or other supporting data. Results from these models usually make better predictions of bird population parameters for specific sites, and may reveal more about which habitat variables are correlated with bird population data than the region-wide model. Because, by definition, site models include variables whose values are not known region-wide, they cannot be extrapolated statistically to the entire region. However, basic habitat management guidelines derived from site-based models can be applied throughout the region for which habitat characteristics used in the site-based model are relevant. As a hypothetical example, if a site-based model for aspen were to predict a higher abundance of aspen-associated focal species with increased shrub coverage, then this insight can be applied to aspen management throughout the region in which aspen birds are believed to respond to this effect. Accuracy of site-based models is measured in the same way as for the regional models.

Project Evaluation

Project evaluations involve surveys on a habitat implementation project site before, during, and after the project. These surveys help evaluate, and perhaps revise, the project, as well as documenting effects of the project on birds.

Management Issues in Idaho

Discussions were held with habitat managers and wildlife biologists throughout Idaho to identify major bird conservation and management issues that IBIS should address. Nine issues were identified as the most pressing regional concerns at the time of this document's preparation:

1. Identifying species at risk and causes of declines
2. Inventory of IDFG Wildlife Management Areas (WMAs) for all birds in all seasons
3. Effects of wetland loss and degradation
4. Conflicts between piscivorous birds and fish populations
5. Effects of altering riparian habitats
6. Condition of aspen habitat and importance for birds
7. Identification of high quality habitat and effects of land-use practices in sagebrush communities
8. Forest thinning and fuels reduction projects, especially in Ponderosa Pine habitats
9. Effects of management in Pinyon-Juniper habitats

Each of these issues is discussed in more detail below. We describe the management issue and how information collected on bird surveys can help address it, suggest survey goals, assess how well existing programs are providing the needed information, and make recommendations for obtaining any needed additional information.

The discussions below frequently mention the number of species affected by a management program or that need to be investigated. These numbers were derived from a comprehensive list of focal species in Idaho. The list was prepared using the general criterion that we should monitor species we would try to conserve if we knew they were declining. It totals 306 species, which includes all game and nongame species that occur regularly in Idaho at any time of year, but it does not include species that are at the very edge of their range in Idaho. Appendix A provides the full species list, as well as information concerning each species' season of occurrence in Idaho, IdPIF priority level classification, and applicable management issue(s).

1. Identifying Species at Risk and Causes of Declines

Background and Description of the Management Issue

Many bird species are declining, or suspected to be declining, in Idaho and throughout the Intermountain West (Sauer et al. 1997). Unless declines are halted, some species will eventually warrant protection under the Endangered Species Act (ESA), a measure that is generally considered a last resort in species protection. Nearly all natural resource managers therefore recognize the need for a monitoring program designed to serve as an "early-warning" system that identifies declining species and causes of declines.

Identifying species at risk requires statewide collection of information on all 306 species regularly found in Idaho. For most nongame species, estimating trends solely for Idaho with sufficient precision is not feasible (Bart et al., *in press*). Instead, information from Idaho must be combined with information from surrounding states. Therefore, collaboration with other states is essential. Increasing sample sizes on the survey-level within Idaho is inefficient and provides relatively little increase in precision of the region-wide trend estimate for many species. An example from the Pacific Northwest for this phenomenon is provided by Bart et al. (*in press*).

Although information on abundance and productivity in different habitats also will be needed, it is much more expensive to obtain. Therefore, such efforts should focus on species and areas where potential threats or, conversely, opportunities to recover populations are most imminent (see management issues 3–9).

Survey Objectives

Information Needed: Permanent, annual surveys for all birds in all seasons conducted in a coordinated, standardized manner on a statewide basis; this is one of the primary goals of IBIS.

Study Areas: All sites identified in this plan (Appendix C), as well as at additional sites where appropriate opportunities occur.

Focal Species: All species identified in this plan as those that warrant monitoring (Appendix A).

Quantitative Objectives: We used an accuracy target for trends proposed by Bart et al. (*in press*), building on earlier work by Butcher et al. (1993): 80% power to detect a 50% decline, occurring during no more than 20 years, using a significance level of 0.10, a two-tailed test, and incorporating effects of potential bias. Achieving the target for every species is probably not realistic. Bart et al. (*in press*) suggested achieving the target for 80% of the species that occur regularly in North America as a reasonable goal. It is not expected that the target can be achieved within a single state. Bart et al. (*in press*) recommended that the target be achieved for each species' entire range or an area one-third the size of the temperate portion of North America, whichever was smaller. The objective for this management issue is 80% power to detect a 20-year decline of 50%, occurring in an area no larger than one-third of the temperate regions of Canada and the US, among 80% of the species that warrant monitoring.

Methods

Bird Survey Methods: A panel of experts at the continental level has evaluated which survey methods would best estimate long-term trends in population size, describe spatial patterns in abundance, and monitor fitness for all species regularly occurring in Canada and the US. The results for Idaho birds are summarized in Table 3. To the extent possible, these surveys will be conducted indefinitely at selected

Table 3. Number of species and dependent variables that would be monitored by each major survey method.

Survey Program	Season	Trends	Abundance	Fitness
1. Point counts and related programs	Breeding	162	168	0
2. Area surveys for landbirds	Year-round	34	183	0
3. Area surveys for aquatic birds	Year-round	53	69	60
4. Migration monitoring programs	Migration	59	0	147
5. Nest success programs	Breeding	0	0	244
6. Colony counts	Breeding	20	9	8
7. Aerial surveys	Year-round	31	31	0
8. Nocturnal surveys	Breeding	15	15	0
9. Upland gamebird surveys	Breeding	11	11	0
10. Other surveys	Year-round	25	24	18

sites (see Appendix C), many of which are IBAs and/or WMAs. Note that sites may be added or removed as opportunities arise or monitoring priorities change. Standardized protocols for waterbird surveys are described in detail in Appendix F; see also Bibby et al. (2000) for terrestrial birds and additional information.

Sample Size Requirements: To be determined following a more thorough assessment of accuracy targets.

Habitat Variables: Will vary considerably among sites, habitats, species, and management issues. Essentially requires the collection of habitat information necessary to determine reasons for documented population changes, if and where they occur. See management issues 3–9 for more specific details.

Sampling Plans: Sampling should occur indefinitely and on an annual basis at as many monitoring sites (Appendix C) as time and funding levels allow. If necessary, monitoring at sites may occur biannually to accommodate large numbers of samples distributed across an array of habitats (e.g., aquatic sites one year, terrestrial sites the next, and so on). To address this particular management issue, however, it is imperative that monitoring programs be established as long-term, permanent surveys conducted on a regular basis using consistent and standardized survey methods (see Table 3, above).

Roles and Responsibilities

Existing and Needed Information: Much information already exists about the distribution and status of birds in Idaho (e.g., Larrison et al. 1967, Burleigh 1972, Groves et al. 1997, Stephens & Sturts 1998). Although often species-specific, numerous unpublished reports and other gray literature on birds add to this volume of knowledge. Unfortunately, other than a few long-term monitoring programs (e.g., BBS, CBC, NRLBMP; see earlier descriptions), little information exists about the population trends of Idaho's birds, especially for aquatic species. Even for these monitoring programs, sample sizes are insufficient for many trends to be reliably determined, or data are restricted to only parts of Idaho. Moreover, most monitoring projects are conducted independently of other efforts and data are not pooled to examine larger-scale trends. IBIS intends to supplement these efforts by providing a framework for *coordinated statewide* monitoring of *all* birds where trend data from *vastly increased numbers of sites* will be submitted to a *central repository* for *large-scale* analyses.

Raptors are monitored in Idaho through nest monitoring, migration monitoring in the Boise Foothills, and some winter surveys, but statewide coverage is incomplete as of yet. This is also true for colony counts, migration monitoring of landbirds, productivity monitoring of landbirds, and surveys for nocturnal species. Because many of these call for specialized protocols, they are currently done based on local funding opportunities rather than with the intent to achieve comprehensive coverage. The long-term goal of IBIS includes sufficient coverage for these survey types to accommodate regional trend estimates on the parameters measured. Permanent funding on an annual basis is both required and expected.

Surveys that cannot be conducted using multi-species protocols will be constructed around existing survey efforts. For instance, surveys currently exist for the Bald Eagle (scientific names in Appendix A), Peregrine Falcon, Mountain Quail, Yellow-billed Cuckoo, Harlequin Duck, and Sandhill Crane (see above). Single-species surveys are needed, and will be incorporated into IBIS, such as for Black Swifts.

Project Management: Primary oversight is provided by the IBIS steering committee, which is comprised of representative biologists from state and federal agencies, non-governmental organizations (NGOs), universities, Native American tribes, and private industry. The IBIS steering committee is essentially the same as the IdPIF monitoring sub-committee and functions much like a Board of Directors. The primary role of the IBIS steering committee is to secure funding, foster key partnerships, guide the prioritization of monitoring efforts, and provide advice on overall project direction. IBIS is administered by IDFG's Nongame and Endangered Wildlife Program and is coordinated by a Wildlife Research Biologist. As

monitoring seasons come and go, temporary Wildlife Technicians are hired to assist the IBIS Coordinator with data collection. IBIS is part of the IDFG Nongame Bird Program (<http://fishandgame.idaho.gov/wildlife/nongame/birds.cfm>) along with IdPIF, the IBA program, BBS coordination, the Idaho Birding Trails project, and monitoring of special status species like Bald Eagles and Peregrine Falcons.

Annual reports to IBIS project partners will document accomplishments and outline future goals. Information collected as part of IBIS will be submitted to a central data repository currently under development; other components that contribute to larger, national programs (e.g., BBS) will continue to be sent to the appropriate location. Where feasible, existing monitoring efforts will be incorporated into the IBIS framework (e.g., Harlequin Ducks) to improve the spending efficiency of funds received for monitoring birds. The cost effectiveness of monitoring multiple species in a variety of habitats can usually be enhanced if monitoring is conducted in a coordinated manner under the auspices of one central program. Finally, the IBIS Coordinator will work closely with the IdCDC (<http://fishandgame.idaho.gov/tech/CDC>) to ensure that all records of Species of Special Concern and those deemed of "greatest conservation need" are reported for tracking/mapping purposes.

Recommendations for Implementation

- Implement IBIS (version 1.0) – a statewide waterbird/shorebird monitoring plan that estimates year-round bird use of Idaho's most important aquatic sites (primarily wetland IBAs) (Appendix C)
- Implement IBIS (version 2.0) when available – a statewide all-bird monitoring plan (i.e., both aquatic and terrestrial species)
- Increase coverage of Idaho's BBS routes
- Coordinate with IDFG to explore the option of using aerial waterfowl surveys to conduct shorebird counts
- Coordinate with IDFG to determine which, if any, other upland gamebird surveys are needed/desirable
- Increase coverage of raptor surveys, colony counts, and nocturnal species surveys (especially forest owls)
- Develop a general nongame database for existing and new monitoring programs
- Coordinate with other states of the intermountain west to increase effort toward productivity and migrant monitoring in the region

2. Inventory of IDFG Wildlife Management Areas (WMAs) for all birds in all seasons

Background and Description of the Management Issue

In 1940, IDFG purchased 171 ha in southern Idaho for the protection of critical waterfowl habitat and for recreational opportunities for hunters and anglers. This area eventually became known as the Hagerman WMA and the first of a network of areas managed by IDFG for the conservation of Idaho's wildlife and their habitats. The WMA program today operates under four basic goals: (1) to preserve and improve habitat for the production and maintenance of wildlife and fish populations; (2) to provide public hunting and fishing opportunities; (3) to provide non-consumptive wildlife and fish uses; and (4) to provide scientific, educational, and recreational uses not related to wildlife and fish (T. Parker, pers. comm.). Since 1940, IDFG has developed a network of 31 WMAs across the state, most of which constitute a mix of aquatic and upland habitats; many emphasize waterfowl production and are thus comprised of significant wetland complexes.

A variety of management practices occur within WMAs, most of which are geared toward maintenance, restoration, or creation of habitat for a group of target species (most often game species). These may include creation or restoration of wetlands for waterfowl (e.g., Boundary Creek WMA), planting both herbaceous and woody cover for upland game habitat (e.g., Carey Lake WMA), growing grain crops for waterfowl feeding (e.g., Fort Boise WMA), improving big game winter range (e.g., Tex Creek WMA), prescribed burning, thinning and selective green-tree harvest to restore historic forest types (e.g., Craig Mountain WMA), and treatment for noxious weeds (all WMAs). Wildlife Management Areas are part of IDFG's Habitat and Lands program, which is administered by the Wildlife Bureau at IDFG headquarters. Regional and District Habitat Biologists and Wildlife Technicians manage the WMAs.

In 2000, Karl et al. (*in press*) assessed the potential for IDFG's WMAs to contribute to the conservation of Idaho's wildlife. Predicted occurrences of species' habitats using GAP data were used to evaluate the representation of wildlife habitat and other ecological conditions. Karl et al. (*in press*) found 34 of 40 natural land cover types were mapped as occurring in WMAs. Wildlife Management Areas occurred in 10 of 15 of Bailey's ecoregion sections, absent only from 2 sections that occupy >1% of Idaho. Percent area of WMAs by elevation followed a pattern similar to percent area of Idaho; however, mean elevation for WMAs was lower than for the state. Habitat for 98.4% of Idaho's wildlife and all federal and state listed threatened, endangered, or candidate terrestrial vertebrates were predicted to occur in at least one WMA. Of the 372 (out of 379) terrestrial vertebrates predicted to occur in at least one WMA, 237 were birds. Habitat for 40 species (11 birds) was predicted to occur on <6 WMAs, and no habitat was predicted on WMAs for 6 species. In general, Karl et al. (*in press*) found the network of WMAs that was primarily established to protect game species has conserved many other aspects of Idaho's ecological diversity, provided habitat for >98% of Idaho's wildlife, and is complimentary to other protected areas in the state.

Unfortunately, species observation lists for many WMAs are either incomplete or out of date. Karl et al.'s (*in press*) study was based upon species lists from 22 WMAs, although 11 of them had obvious deficiencies (such as excluding a large taxonomic group or focusing on only waterfowl or large mammals). Of the remaining 11 WMA observation lists, biases still existed. For example, while the Craig Mountain WMA observation list was the only one based upon a thorough field inventory, even its bird list was biased toward songbirds and upland gamebirds, and away from waterfowl, waterbirds, and shorebirds. Karl et al. (*in press*) found adequate observation lists to assess accuracy of bird models on only 6 WMAs. To help improve the inventory data for IDFG WMAs, at least for bird species, we intend to conduct thorough surveys for all birds in all seasons. This is a short-term assessment that will likely take 2–3 years to complete and is an initial high priority management issue for IBIS to address. For those WMAs that are also IBAS, longer-term monitoring may continue beyond the initial field inventory; likewise, where opportunities arise to address other management issues on WMAs, additional work will occur as needed.

Survey Objectives

Information Needed: Complete and up-to-date inventories of all IDFG WMAs (all species in all seasons).

Study Areas: All 31 IDFG WMAs (Appendix C).

Focal Species: All species present.

Quantitative Objectives: To be determined on a site by site basis following initial site visits.

Methods

Bird Survey Methods: Will vary by habitat, but should follow protocols endorsed in this plan (see Appendix F for aquatic species). For terrestrial sites, use point counts for forest and shrubsteppe

communities, and line transects for riparian areas where habitat tends to be more linear. Area searches may be appropriate for some locations since the goal is to generate a species list more than it is to estimate trends. Indices of relative abundance would nevertheless be desirable. More intensive survey methods that yield information on density or demographics are not necessary. Protocols that emphasize nongame species are most likely to yield novel data since most WMAs have been well surveyed for gamebirds, especially waterfowl.

Sample Size Requirements: To be determined following a more thorough assessment of accuracy targets.

Habitat Variables: Likely to be minimal although basic assessments might be helpful if time and resources allow; detailed habitat information may already exist for some WMAs.

Sampling Plans: Surveys should cover all of a given site (i.e., there is no sampling in space). When this is not true, stratification is often useful, followed by systematic, or occasionally simple random, selection of plots. 1–2 visits are recommended each year for 1–3 years depending on the size of the WMA. Surveys to be conducted in all seasons to determine year-round inventory; note that different seasons can be sampled in different years. Length of surveys should be sufficient to have a 95% probability of detecting all species present at least once.

Roles and Responsibilities

Existing and Needed Information: Existing inventories vary by WMA, including both completeness (i.e., information on all species) and how recently they were conducted. Even where surveys are complete and up-to-date, they were conducted by different observers using nonstandardized protocols and over variable time periods. One benefit of IBIS addressing this management issue is that once inventories have been completed, it will be possible to comparatively rank all 31 WMAs using birds as an indicator of each WMA's ability to provide suitable habitat for an array of wildlife species. Such an exercise may help guide the need for different management practices on those WMAs found to lack high avian diversity or individual species considered indicative of "good quality" habitat. Only by trained observers with consistent skill levels conducting updated inventories using standardized protocols can such a statewide assessment of the entire WMA program be made. Thoroughly conducted inventories of all species in all seasons are needed.

Project Management: This issue will be managed by the IBIS Coordinator and Nongame Bird Program Coordinator in conjunction with the state Habitat Program Manager, Regional/District Habitat Biologists, and individual WMA managers. Designed to meet internal needs of IDFG, strong collaboration between the Nongame Wildlife and Habitat and Lands Programs will help direct this important component of IBIS.

Recommendations for Implementation

- Coordinate with state Habitat Program Manager to determine interest, necessary course of action, and appropriate procedures for contacting regional biologists and WMA managers
- Send out a letter to all regions explaining the desired project and perceived information need
 - Request information from WMA managers regarding extent of existing inventory data, species lists, and logistical considerations for conducting a survey (e.g., need a canoe, road closures)
 - Begin site visits in spring 2004 with an initial emphasis on aquatic sites
 - Implement this component of IBIS more extensively in 2005–2006 by visiting more sites and conducting surveys in all seasons
 - Enlist the help of regional nongame staff and habitat biologists where interest and time permits
 - Generate species lists in collaboration with WMA managers, making sure to sample representative habitats throughout all WMAs

3. Effects of Wetland Loss and Degradation

Background and Description of the Management Issue

Wetlands are here defined as including lakes, reservoirs, playas, and marshes (i.e., “non-riverine wetlands” in IdPIF BCP). Wetlands of particular importance to birds in Idaho include Lake Lowell, Lake Pend Oreille, Coeur d’Alene Lake, Cascade Reservoir, American Falls Reservoir, and Camas Prairie Centennial Marsh; marshes at Camas, Bear Lake, and Grays Lake NWRs; and marshes at Oxford Slough and Market Lake (WMA) IBAs. Playas in the Great Basin BCR portion of the state (BMR-51), as well as water storage reservoirs, also may be important, especially for migrating birds, but are currently not well investigated.

Like most states in the Intermountain West, Idaho has lost a large portion of its wetlands. Fifty-six percent of the wetlands in Idaho have been lost in the past 200 years (Dahl 1990). Wetlands now comprise only 0.7% (385,700 ac; 156,200 ha) of the surface area of Idaho (Dahl 1990). Conversion to agriculture, drainage, and flooding by reservoirs are the main causes of wetland losses. Wetland loss, overgrazing, urban sprawl, and invasion by non-native plants are the main threats to wetlands today. Shallow wetlands and meadows have suffered the greatest losses.

Open-water wetlands are used for irrigation storage, fishing, and water sports. All of the larger lakes in Idaho and many of the smaller lakes have dams that maintain lake levels. Lake levels may be stabilized or manipulated at any time of the year for recreation, power, and irrigation. Altered hydrological regimes often reduce wetland habitat or convert it to a different type. Fluctuating levels in response to power or irrigation demands on some reservoirs have created steep eroding banks on islands and lake shores with little emergent habitat. Water fluctuations during the nest season can be detrimental, either by flooding nests or by leaving them dry and more exposed to mammalian predators. Fluctuations can cause some birds to abandon their nests. Boating can displace wildlife from open water habitats. Disturbance problems can be alleviated to some degree by providing refuge areas and by limiting human use during sensitive periods.

Open water habitat also is threatened by non-native plants, such as Eurasian watermilfoil (*Myriophyllum spicatum*), drainage, pollution, and sedimentation. Land use in emergent wetlands adjacent to open water habitat is limited due to accessibility. The main threats to these habitats include sedimentation, non-native species such as purple loosestrife, drainage, and pollution. These wetlands are difficult to use for agriculture unless they are drained. Some of the habitats in Idaho are also susceptible to flooding and drying, because water storage rights are owned by irrigation or power companies. Seasonally or semi-permanently flooded wetlands are used for grazing and are often drained to be used for farming and haying. Filling has resulted in the loss of these wetlands also. The non-native reedcanary grass (*Phalaris arundinacea*) often creates large monocultures in seasonally flooded wetlands that have been drained or have had high sediment inputs.

Each year, managers make decisions about how to allocate water among competing uses. In making these decisions, they need better information about how birds will be affected by alternative strategies. Surveying birds, recording water levels and assessing their effects on habitat availability for different foraging needs can provide this much needed information. This data collection process, at least for the waterbird and shorebird component, is not organized throughout the state at present. Therefore, one of the main recommendations will be to assess existing habitat information for aquatic birds in Idaho, and to coordinate collection of additional data as needed. Wildlife biologists, whom we consulted in preparing this plan, emphasized that models showing habitat relationships of wetland birds will be useful for optimizing water delivery for these groups with limited water available for these purposes. Therefore, the primary need is for site-specific models that predict bird use, at times of year that are most important to avian populations, as a function of water level. The development of site-specific models also will greatly

facilitate coordinated regional wetland management called for in both the Intermountain West Shorebird Plan and the Intermountain West Waterbird Plan.

Survey Objectives

Information Needed: Abundance data for all species groups throughout the year is needed. Although waterfowl abundance data may already be sufficient with existing IDFG survey efforts, additional data on waterbirds and shorebirds is needed. Surveys during migration are particularly important at many sites. Fitness indicators such as productivity and foraging success also are desirable.

Study Areas: This management issue can be addressed at any site included in this plan (see Appendix C) that has experienced loss and degradation of wetlands. More likely, however, since many of the sites at which we propose to conduct long-term population trend monitoring enjoy some level of protection (i.e., they are an IBA, a NWR, and/or a WMA), the best opportunities for addressing this issue may be elsewhere. Areas with documented information on loss and degradation should be a priority, as should sites where active restoration of degraded conditions is ongoing or planned. As with many of the management issues addressed by IBIS, the need to remain flexible, work collaboratively with willing partners, and take advantage of new situations is key.

Focal Species: Wetlands in Idaho are used regularly by 119 bird species including 68 management species (Table 4, Appendix A). Providing migration stop-over habitat is probably the most important function of Great Basin wetlands for many species of waterfowl, waterbirds and shorebirds. Lake Lowell of Deer Flat NWR, for example, is a site of regional importance for shorebirds. American Falls Reservoir is a major stop-over site for most aquatic species, and especially for shorebirds. Major breeding colonies of Western Grebes and Franklin's Gulls also depend on these habitats, and Grays Lake NWR supports the largest breeding concentration of Sandhill Cranes in the world. Many permanent wetlands serve as wintering habitat for waterfowl, such as Harriman State Park and Bear River NWR for Trumpeter Swans.

Table 4. List of management species and additional species that use wetland habitats as their primary breeding habitat. Management species for this management issue are in bold.

Common Loon	Lesser Scaup	Semipalmated Sandpiper
Pied-billed Grebe	American Wigeon	Least Sandpiper
Horned Grebe	Northern Pintail	Baird's Sandpiper
Red-necked Grebe	Northern Shoveler	Pectoral Sandpiper
Eared Grebe	Blue-winged Teal	Long-billed Dowitcher
Western Grebe	Barrow's Goldeneye	Wilson's Snipe
Clark's Grebe	Ruddy Duck	Wilson's Phalarope
American White Pelican	Northern Harrier	Red-necked Phalarope
Double-crested Cormorant	Bald Eagle	Sandhill Crane
American Bittern	Peregrine Falcon	Franklin's Gull
Great Egret	Virginia Rail	Ring-billed Gull
Snowy Egret	Sora	California Gull
Cattle Egret	American Coot	Caspian Tern
Black-crowned Night Heron	Black-bellied Plover	Common Tern
White-faced Ibis	Snowy Plover	Forster's Tern
Tundra Swan	Semipalmated Plover	Black Tern
Trumpeter Swan	Killdeer	Short-eared Owl
Canada Goose	American Avocet	Great Gray Owl

Mallard	Black-necked Stilt	White-throated Swift
Gadwall	Greater Yellowlegs	Northern Rough-winged Swallow
Green-winged Teal	Lesser Yellowlegs	Tree Swallow
Cinnamon Teal	Willet	Marsh Wren
Canvasback	Spotted Sandpiper	Common Yellowthroat
Redhead	Upland Sandpiper	Yellow-headed Blackbird
Ring-necked Duck	Long-billed Curlew	Red-winged Blackbird

Quantitative Objectives: Because most aquatic sites can be covered thoroughly by surveys, obtaining species-specific estimates of numbers present is probably feasible. More experience is needed in developing these models, but we believe that a reasonable initial target is that the CV of the predicted abundance for a single site should be ≤ 0.25 .

Methods

Bird Survey Methods: Abundance of aquatic birds is usually determined using area searches by foot, boat, or plane across all of the site or in a series of randomly selected plots. Because vegetation may change between years, which could result in substantial changes in numbers recorded even if the number of birds present does not change, careful attention must be paid to estimating detection rates where birds are obscured by vegetation. Site descriptions, including survey protocols, are provided for all major aquatic sites in Idaho (Appendices D, E).

Sample Size Requirements: Because we lack information on the number of models required, and data have yet to be collected, sample size requirements are difficult to estimate at present. We believe a reasonable approach, given this uncertainty, is to suggest that monthly surveys be made on as many aquatic sites as possible. During 2004, an analysis of existing data should be conducted to determine how large a sample is needed to construct models that will achieve the accuracy target above.

Habitat Variables: Initially, the following habitat variables should be included in models: (1) water level data from staff gauges (or water delivery data in managed wetlands) obtained for each bird survey period; (2) topographic data that allow relating water level to water depth; and (3) vegetation maps that reveal wetland vegetation types.

Sampling Plans: Surveys usually cover all of a given site (i.e., there is no sampling in space). When this is not true, stratification is often useful, followed by systematic, or occasionally simple random, selection of plots. Survey times should be selected without regard to number of birds present (i.e., surveyors must avoid the tendency to do a survey *because* large numbers of birds are present).

Roles and Responsibilities

Existing and Needed Information: Idaho's waterbirds (and shorebirds) have not been previously monitored in any sort of statewide, coordinated manner. Surveys by Chuck Trost in the early 1990's provide the best information on status and distribution of colonial nesting waterbirds in southern Idaho. Other site-specific work (e.g., at Gray's Lake NWR and American Falls Reservoir) contribute to our understanding of how wetland loss and degradation might potentially impact some aquatic species. Basic information for much of the state and the majority of species is still lacking, however. Population trend estimates and specific effects of habitat loss are unknown. Filling this vital information gap is one of the priorities for the IBIS program and is the reason why initial implementation and v1.0 focuses on aquatic species.

In addition to the waterbird and shorebird surveys that we outline here, research to refine grazing guidelines in meadows and emergent wetlands is needed. The historical importance of fire in wetlands is not well understood, and many land-managing agencies are using prescribed fire with increasing frequency. Also, assessing the impacts of non-native plants and animals that are invading wetlands and reducing their value for native species is needed. In general, addressing these issues and initiating more long-term monitoring of waterbirds at wetland sites (both degraded and otherwise) will significantly improve our ability to protect Idaho's rich aquatic resources and their associated birdlife.

Project Management: The IdIBA program of the National Audubon Society has gathered information for key Idaho aquatic sites, including inventory data, conservation objectives and management issues that are being addressed by NWRs, WMAs and other entities managing large sites. Additional site information has been summarized in site descriptions for all wetland IBAs and WMAs in Idaho (Appendices D, E). In collaboration with IdIBA, IDFG and USGS are willing to compile and disseminate monitoring data that are already available and that are obtained in additional survey efforts. Regional analyses and data will be made available online, through reports to management agencies, and through peer-reviewed publications. This issue will continue to be directed primarily by the IdIBA program and its coordinator.

Recommendations for Implementation

- Complete the Idaho aquatic site assessment that has been drafted for the purpose of identifying wetland bird monitoring needs (Appendices D, E)
- Coordinate with IDFG, FWS, and IdIBA to determine which additional information on habitat use of aquatic birds would be most useful, given ongoing efforts
- Assess existing bird survey data, and implement new surveys, at focal sites for the modeling effort
Assess existing supporting data (aerial photos, topographic maps, staff gauge data, etc.) that can be used in an analyses of geo-referenced count data
- Prepare prototype models from the most important sites, estimate the accuracy of predictions they make, and develop guidelines describing additional data needed
- Recruit volunteers (such as Audubon members) to conduct surveys at all wetlands as frequently as possible; use the results to improve the predictive power of the models, both at the focal sites (listed in Appendix C) and at others

4. Conflicts Between Piscivorous Birds and Fish Populations

Background and Description of the Management Issue

Increasing numbers of some species of fish-eating (piscivorous) birds in Idaho has led to increased concerns by anglers, fish culturists, and fisheries managers about possible negative impacts on populations of game fish. Bird-fish conflicts in Idaho can be generalized as one of two main issues: (1) impacts of piscivorous birds (especially Double-crested Cormorants and American White Pelicans) on trout (especially cutthroat trout, *Oncorhynchus clarki*) in the southeastern region of the state; and (2) bird predation on juvenile salmonids at Columbia and Snake River dams (especially by Caspian Terns). While other birds certainly eat fish (e.g., Belted Kingfisher, Osprey, Bald Eagle, Common Merganser, herons, grebes, and egrets), their impacts appear less significant and more dispersed throughout the state. Because cormorants, pelicans, and terns are colonially-nesting species that often concentrate in large numbers, and because they have increasing population trends in Idaho, concerns about impacts on fish by these species are the most serious. Internationally, interactions between piscivorous birds and fish, as well as implications for management, have recently been reviewed in Cowx (2003).

The Snake River and tributaries from the head of Walcott Reservoir near Burley to the Dam of Gem Lake Reservoir near Idaho Falls lie within IDFG's Southeast Region. From the early 1990s to the present there has been considerable concern by anglers about the possible impact of piscivorous birds on game fish populations. Fisheries most likely affected are 18,000 acre Blackfoot Reservoir, 48,000 acre American Falls Reservoir, 66 acre Springfield Reservoir, 25 acre McTucker ponds, 20 acre Rose pond, the Snake River above and below American Falls Reservoir and the Blackfoot River above Blackfoot Reservoir.

At Blackfoot Reservoir anglers see flocks in excess of 100 cormorants that follow newly released hatchery rainbow trout (*Oncorhynchus mykiss*). Biologists have documented pelican abundance near stocking sites increase from less than 1% of the total adult population prior to stocking to 13% immediately after stocking. To address anglers concerns, IDFG now stocks fingerlings in early spring before the pelicans and cormorants arrive at the reservoir and catchable size trout in the fall after the birds leave the area. IDFG fisheries biologists also are concerned about the impacts of large numbers of American White Pelicans on migrating native Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*). Because of very low water levels, the migration pathway for trout in Blackfoot Reservoir is currently extremely narrow and shallow. Notably, pelicans gather in large numbers along this pathway during trout migration. Numbers of trout trapped immediately upstream of the reservoir have decreased markedly in recent years, and the majority of trout trapped exhibit scars and wounds from bird strikes. Several deterrence methods have been implemented with varying success. There is an estimated 5-acre island in Blackfoot Reservoir where over 800 active pelican and over 300 active cormorant nests were recorded in 2004. Other birds nesting on the island include hundreds of ring-billed gulls and California gull and a small heron rookery. The number of nesting piscivorous birds increased during the 1990s (R. Scully, pers. comm.). The upper end of American Falls Reservoir, especially that portion within the Fort Hall Indian Reservation, contains large cormorant, heron and egret rookeries. Birds from these rookeries swarm when hatchery trout are stocked and result in calls from anglers for IDFG to protect the fish. Cormorants from this area also feed at McTucker Ponds, Springfield Reservoir, and on the Snake River above and below American Falls Reservoir.

Bird predation of juvenile salmonids was reviewed for 14 of the 18 mainstem dams on the Columbia and Snake Rivers by Bayer (2003). California Gulls, Ring-billed Gulls, Caspian Terns, Double-crested Cormorants, American White Pelicans, and several other bird species have been reported as predators of juvenile salmon and steelhead at these dams. Most estimates of the amount of this predation have been 2% or less of salmonids passing a dam. This is less than the percentage of juvenile salmonids killed during dam passage, and it has not been determined what proportion of salmonids taken by birds were already dead or mortally injured from dam passage. Thus, it is not clear what portion of bird predation is of viable salmonids that would have otherwise survived. Further, it appears that most juvenile salmonids in the Columbia Basin are not federally listed as threatened or endangered, so it is not known what impact bird predation at dams may have on listed salmonids. Nevertheless, predation may significantly affect certain salmon stocks, so it cannot be dismissed as unimportant (Bayer 2003).

The issue of bird predation on Columbia and Snake River smolts may not be as significant in Idaho as it is in Washington and Oregon (i.e., along the lower reaches of these rivers). For example, investigations by the Columbia Bird Research Group (<http://www.columbiabirdresearch.org>) indicated that Caspian Terns nesting on Rice Island, a dredged material disposal island in the Columbia River estuary, were the most significant avian predator of juvenile salmonids on the lower Columbia River. The Rice Island tern colony consisted of about 17,000 breeding adults in 1998, the largest known colony of Caspian Terns in the world. Diet analysis indicated that Caspian terns nesting on Rice Island consumed more juvenile salmonids than any other prey type (73% of prey items in 1997 and 1998). Using bioenergetics modeling, it was estimated that in 1998 Caspian Terns nesting on Rice Island consumed about 12.4 million juvenile salmonids (95% confidence interval = 9.1–15.7 million), or approximately 13% (95% c.i. = 9%–16%) of the estimated 97 million out-migrating smolts that reached the estuary during the 1998 migration year. Analysis of over 36,000 smolt Passive Integrated Transponder (PIT) tags recovered from

the Caspian Tern breeding colony on Rice Island revealed that over 13.3% of all PIT-tagged steelhead smolts that reached the estuary were consumed by terns in 1998 (D. Roby and K. Collis, unpubl. data).

One scenario that may increase the significance of this management issue in Idaho is the possible relocation of Caspian Terns from the Columbia River estuary to other breeding sites along the Columbia and Snake Rivers (Seto et al. 2003). If this occurs, and Idaho is selected to be a recipient of Columbia River birds, then knowing where these sites should be located and assessing the potential impacts on local fish populations are important steps to take.

Survey Objectives

Information Needed: Abundance and distribution data are needed throughout the year for all piscivorous bird species. Surveys during migration may be particularly important at many sites. Fitness indicators such as productivity and foraging success also are desirable. Behavioral data on diet choice and energy budgets (i.e., time spent foraging and in which habitats) are especially critical. Collaborative studies with fish biologists are essential to link bird use with fish presence and behavior.

Study Areas: Sites where there are known breeding colonies of Caspian Tern, Double-crested Cormorant, and American White Pelican (currently these are American Falls Reservoir, Bear Lake NWR, Blackfoot Reservoir, Deer Flat NWR, Island Park Reservoir, Minidoka NWR, Mud Lake WMA). In particular, Blackfoot Reservoir (at Gull Island), American Falls Reservoir, and Henry's Lake (are all known to have existing bird-fish conflicts related to unknown rates of fish depredation by birds. To address the impact of birds on smolts, study areas include the Snake River and its major tributaries throughout BMR-51.

Focal Species: There are 27 species of piscivorous birds that breed regularly in Idaho, including 5 species (American White Pelican, Double-crested Cormorant, Ring-billed Gull, California Gull, Caspian Tern) that have been frequently involved in bird-fish conflicts, and are therefore listed below as management species for this issue. An additional 10 species of piscivorous birds are present in Idaho during migration and/or winter.

Table 5. List of piscivorous bird species of Idaho (primary piscine biomass consumers, not all species that have been documented to eat fish). Management species for this management issue are in bold.

Red-throated Loon	Great Egret	Mew Gull
Pacific Loon	Snowy Egret	Ring-billed Gull
Common Loon	Green Heron	California Gull
Pied-billed Grebe	Cattle Egret	Herring Gull
Horned Grebe	Black-crowned Night Heron	Glaucous-winged Gull
Red-necked Grebe	Hooded Merganser	Glaucous Gull
Eared Grebe	Common Merganser	Sabine's Gull
Western Grebe	Red-breasted Merganser	Caspian Tern
Clark's Grebe	Osprey	Common Tern
American White Pelican	Bald Eagle	Forster's Tern
Double-crested Cormorant	Franklin's Gull	Black Tern
American Bittern	Bonaparte's Gull	Belted Kingfisher
Great Blue Heron		

Quantitative Objectives: Because most aquatic sites can be covered thoroughly by surveys, obtaining species-specific estimates of numbers present is probably feasible. More experience is needed in developing these models, but we believe that a reasonable initial target is that the CV of the predicted abundance for a single site should be ≤ 0.25 .

Methods

Bird Survey Methods: Abundance of aquatic birds is usually determined using area searches by foot, boat, or plane across all of the site or in a series of randomly selected plots. Because vegetation may change between years, which could result in substantial changes in numbers recorded even if the number of birds present does not change, careful attention must be paid to estimating detection rates where birds are obscured by vegetation. Site descriptions, including survey protocols, are provided for all major aquatic sites in Idaho (Appendices D, E).

Sample Size Requirements: Because we lack information on the number of models required, and data have yet to be collected, sample size requirements are difficult to estimate at present. We believe a reasonable approach, given this uncertainty, is to suggest that monthly surveys be made on as many aquatic sites as possible. During 2005, an analysis of existing data should be conducted to determine how large a sample is needed to construct models that will achieve the accuracy target above.

Habitat Variables: Initially, the following habitat variables should be included in models: (1) water level data from staff gauges (or water delivery data in managed wetlands) obtained for each bird survey period; (2) topographic data that allow relating water level to water depth; and (3) vegetation maps that reveal wetland vegetation types.

Sampling Plans: Surveys usually cover all of a given site (i.e., there is no sampling in space). When this is not true, stratification is often useful, followed by systematic, or occasionally simple random, selection of plots. Survey times should be selected without regard to number of birds present (i.e., surveyors must avoid the tendency to do a survey *because* large numbers of birds are present).

Roles and Responsibilities

Existing and Needed Information: There have been no studies to document the impact of piscivorous birds on Idaho's fisheries. In 1991, fish culturists operating a trap on the Blackfoot River one mile above Blackfoot Reservoir found that 10% of the adult Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*) trapped had scars that appeared to have come from birds (R. Scully, pers. comm.). This presents the question of what percent of pre-spawning cutthroat that are caught by birds manage to escape. If the escapees are a small percent, then the predation impact is large, if not then the impact is small. Anglers and landowners along the Blackfoot River frequently tell IDFG personnel of the pelicans and cormorants that they see and of their concern for the cutthroat trout. The spring run of cutthroat trout and Utah sucker (*Catostomus ardens*) are mostly temporally separated, with trout migrating before water reaches 50°F and suckers coming when water is warmer. Many of the piscivorous bird observations come when only cutthroat are migrating.

The best quantitative information from IDFG's Southeast Region is from 66-acre Springfield Reservoir. In 1994, IDFG reported that although the reservoir was stocked with 129 catchable size (9-inches) rainbow trout per acre the first week of May, almost none of these fish were observed in a subsequent creel survey (R. Scully, pers. comm.). Angry Memorial Day weekend anglers accused IDFG of lying and not stocking any trout. An additional 8,500 trout were stocked and daily observations on bird activities were made at the reservoir. It was found that on the day of stocking few piscivorous birds were present. However by the fourth day after stocking over 200 cormorants were observed at a given time. A week later, gillnet and electrofishing surveys found very few trout, but did catch large numbers of Utah chubs (*Gila atraria*) of the same size as the stocked trout. It appears that the naïve newly stocked trout had

been quickly removed whereas the cautious chubs survived; alternatively, there was a preference by the birds for the trout.

Quantitative studies are needed on the impacts to sport fisheries of avian piscivory in selected Southeast Idaho waters. Fisheries that would likely benefit most from such a study are Blackfoot Reservoir and the upper Blackfoot River. The study should address what impact birds are having on IDFG's efforts to recover wild Yellowstone cutthroat trout in the reservoir and river, as well as determine what impact birds have on the hatchery rainbow trout stocked into Blackfoot Reservoir. A possible outcome of the study might be that birds mainly eat the abundant nongame Utah chub, Utah sucker, and common carp (*Cyprinus carpio*). Should this be case it would answer the question of whether or not birds are limiting the fisheries and end the frequent complaints by anglers that birds are destroying the fisheries and that IDFG does nothing about it.

Project Management: Monitoring to address this management issue requires strong coordination between wildlife and fisheries biologists; within IDFG, collaborative studies between regional Nongame and fisheries biologists are recommended. IBIS is provided as a framework for monitoring birds, potentially providing technical assistance and/or personnel to conduct field surveys where necessary. Information on the distribution and abundance of colonial-nesting waterbirds will be maintained by IDFG as part of IBIS and the IdIBA program.

Recommendations for Implementation

- Assess existing bird survey data, and implement new surveys, at focal sites for the modeling effort
- Review current knowledge about perceived conflicts between piscivorous birds and fish
- Work with research and fisheries biologists involved in ongoing assessments to determine the role that IBIS could play in addressing this management issue
- Conduct intensive behavioral observations of management species to determine food habits and time budgets related to foraging
- Recruit volunteers (such as Audubon members) to conduct surveys at proposed study areas as frequently as possible; use the results to improve the predictive power of the models, both at the focal sites (listed in Appendix C) and at others

5. Effects of Altering Riparian Habitats

Background and Description of the Management Issue

Riparian habitats are here defined to include rivers, lowland springs and streams, and montane streams. Major rivers include the Kootenai, Palouse, St. Joe, Clearwater, Lochsa, Selway, Salmon, Lemhi, Pahsimeroi, Snake, Owyhee, Bigwood, Payette, and Blackfoot. Lowland springs and streams occur throughout southern Idaho, with the exception of the eastern portion of PIF Planning Unit 89, which is noticeably lacking waterways. Montane streams are found primarily in the northern half of Idaho, corresponding with the boundaries of BMR-50.

Riparian areas are among the most heavily impacted environments in Idaho. The natural hydrographs of nearly all major rivers have been altered by channelization, dams/reservoirs, and water diversions. Prior to Euro-American settlement, most large rivers throughout Idaho spread across wide valley bottoms and supported forested and shrub wetlands, ponds, wet meadows, and marshes. Throughout the last century, dikes or levees were constructed in many of these systems to contain spring floods. Cottonwood forests were removed and wetlands were drained or filled for agricultural development.

Regulating flows for irrigation, power production, and flood control have altered the natural regeneration process.

The impacts of the widespread removal of beaver during the 1800s from riverine systems throughout the West have not been well-studied (Knopf & Scott 1990). However, based on our current understanding of the effects of beaver activity on riverine systems, the impacts of their removal can be surmised. The more obvious impacts include lower water tables, release of sediments and nutrients from impounded systems, a decrease in forest canopy resulting from tree cutting, less diversity of successional stages often resulting from dam breakage/abandonment and subsequent exposure of mudflats, and a preponderance of riverine systems less resistant to disturbance events. Clearly, beaver were an integral component of the broad valley bottom riparian complex in Idaho under historical conditions. Additional studies are needed to better understand the implications of beaver removal on the plant and animal communities and disturbance processes of the broad valley bottom riparian complex.

Pasture development and the elimination of willows has converted large portions of the broad valley bottoms of the Caribou and Preuss ranges from dominance by scrub-shrub vegetation to dominance by emergent vegetation. Seeding with nonnative grasses and ditching has altered the structure of meadows. Grazing also suppresses cottonwood and willow regeneration. Cottonwood communities have been degraded, sometimes severely, from cattle or domestic sheep in many areas. Grazing can eliminate cottonwoods or reduce age-class diversity. Grazing decreases the vigor and biomass of riparian shrubs, and alters species composition and diversity in riparian communities (Bryant et al. 1972; Ames 1977).

Establishment of noxious weeds in riparian habitats may simplify the vegetation structure. Leafy spurge (*Euphorbia esula*) and spotted knapweed (*Centaurea biebersteinii*) are noxious weeds that are well established on riparian terraces and benches in portions of Idaho. Purple loosestrife (*Lythrum salicaria*) may become established in backwater sloughs and other moist swales. Other noxious weed species that may be problematic within, and adjacent to, riparian habitats include pepperweed whitetop (*Cardaria draba*), Russian knapweed (*Acroptilon repens*), Canada thistle (*Cirsium arvense*), poison hemlock (*Conium maculatum*), black henbane (*Hyoscyamus niger*), and dalmatian toadflax (*Linaria genistifolia*).

Improper timber harvest removes woody materials that are needed by riparian systems for nutrients, and for coarse debris to slow water run-off and create habitat for fish and invertebrates. Improper timber harvest also has increased run-off and sediment-loading in streams. Adjacent timber provides shade, preventing water temperature fluctuations that can harm aquatic life (Mehan et al. 1977).

Development of second homes and ranchettes is common along most rivers in Idaho. Riparian corridors are popular for development and create areas that restrict wildlife migration from uplands to wetlands, restrict migration along riparian corridors, and create the need for flood control measures to protect properties. Impacts due to road construction and home building will likely surpass agricultural impacts as population increases and economies switch from agricultural-based to service-based.

A number of riparian/wetland restoration projects are ongoing around the state with some of the best examples coming from eastern Idaho. For example, the Teton Regional Land Trust (TRLT) and various private landowners are actively engaged in restoring/creating/enhancing high quality riparian, wetland and associated upland habitat on conservation easement properties. Most projects to date are designed to create productive waterbird habitat to maintain population viability of high priority wildlife species in the face of accelerated commercial/residential development and the subsequent loss of wetlands in Teton County, Idaho. Target species for habitat restoration efforts include Trumpeter Swan, Long-billed Curlew, Willet, Sandhill Crane, Wilson's Phalarope, migrating shorebirds, migrating and breeding waterfowl, herptiles, and native trout. TRLT has received three North American Wetland Conservation Act (NAWCA) grants totaling 2.6 million dollars for wetland protection and restoration in Teton Basin. Additional funding partners include the USFWS, IDFG, Ducks Unlimited, and numerous private donors. Full-scale restoration has been completed, or is in progress, on 12 conservation easement properties.

These properties are in various stages of project maturity and will include approximately 2,500-acres of restored/enhanced wetlands and associated upland habitat in Teton Basin. In 2003 the USFWS presented TRLT with the National Wetlands Conservation Award to the Private Sector for excellence in developing, restoring, and enhancing wetlands. TRLT is currently working to expand its habitat restoration efforts to include selected areas along the Henry's Fork River.

Managers working in riparian areas primarily need two kinds of information: predicted effects of proposed habitat implementation projects on birds, and actual effects of implemented projects. A site-based model is needed to provide the first kind of information; project evaluations are needed to produce the second kind of information. See "Products of IBIS and Coordinated Bird Monitoring" section (above) and Appendix B for more information about site-based models.

Survey Objectives

Information Needed: Although project evaluations should, at a minimum, document breeding abundance of management species, management species abundance throughout the year and measures of fitness, including productivity during the breeding season and foraging success during migration, also would be highly desirable. Proper Functioning Condition (PFC) may also be assessed using relatively simple bird survey techniques (e.g., Rich 2002).

A site-based model should predict management species abundance relative to a continuum in habitat conditions influenced by fire, grazing, and restoration treatments. Models should be generated for both breeding and migration. As projects are implemented, short-term trends in abundance also may be of interest, particularly in large projects.

Study Areas: This management issue can be addressed at any number of riparian sites throughout the state. Given the wide array of disturbances that regularly alter riparian habitats (reviewed above), and as with many of the other management issues addressed by IBIS, opportunities will be varied and often unpredictable in space and time. Some of the best opportunities will occur at sites where riparian bird monitoring has been ongoing in the past, thereby providing baseline data prior to habitat alterations taking place. Note also that monitoring the effects of changing riparian habitat should not necessarily always focus on negative changes; assessing the response of birds to riparian restoration efforts (such as the work of the Teton Regional Land Trust in the Teton Valley of eastern Idaho) is extremely valuable.

Focal Species: Of the 242 naturally occurring bird species breeding in Idaho, 112 (46%) use riparian habitat for nesting. Many of the other 54% also use riparian habitat as a source of water, as migratory corridors, or for other purposes. Compared with all other habitats that occur in Idaho, and even though it covers <1% of the landscape, riparian habitat is used disproportionately by breeding birds. Of the 119 Neotropical migrants that breed in Idaho, 68 (57%) use riparian habitat, and some are considered specialists, only being found in this habitat (e.g., Yellow-billed Cuckoo, Willow Flycatcher, Yellow Warbler). In total, riparian areas in Idaho are used by 141 bird species, including 30 management species for this objective (Table 6, Appendix A).

Table 6. List of management species and an additional 57 species that use riparian habitats as their primary breeding habitat. Management species for this management issue are in bold.

Great Blue Heron	Black-chinned Hummingbird	Gray Catbird
Wood Duck	Calliope Hummingbird	Northern Mockingbird
Harlequin Duck	Broad-tailed Hummingbird	Bohemian Waxwing
Bufflehead	Rufous Hummingbird	Orange-crowned Warbler
Common Goldeneye	Belted Kingfisher	Nashville Warbler

Barrow's Goldeneye	Downy Woodpecker	Yellow Warbler
Hooded Merganser	Lewis's Woodpecker	Yellow-rumped Warbler
Common Merganser	Red-naped Sapsucker	American Redstart
Osprey	Northern Flicker	Northern Waterthrush
Bald Eagle	Western Wood-Pewee	MacGillivray's Warbler
Sharp-shinned Hawk	Willow Flycatcher	Common Yellowthroat
Cooper's Hawk	Dusky Flycatcher	Wilson's Warbler
Northern Goshawk	Western Kingbird	Yellow-breasted Chat
Swainson's Hawk	Eastern Kingbird	Western Tanager
Red-tailed Hawk	Plumbeous Vireo	Song Sparrow
Merlin	Warbling Vireo	Lincoln's Sparrow
Ruffed Grouse	Red-eyed Vireo	White-crowned Sparrow
Blue Grouse	Black-billed Magpie	Black-headed Grosbeak
Mountain Quail	American Crow	Blue Grosbeak
Sandhill Crane	Northern Rough-winged Swallow	Lazuli Bunting
Killdeer	Black-capped Chickadee	Brewer's Blackbird
Spotted Sandpiper	Bushtit	Common Grackle
Caspian Tern	Bewick's Wren	Great-tailed Grackle
Yellow-billed Cuckoo	House Wren	Bullock's Oriole
Western Screech-Owl	Marsh Wren	Scott's Oriole
Long-eared Owl	American Dipper	House Finch
Northern Saw-whet Owl	Blue-gray Gnatcatcher	Lesser Goldfinch
Black Swift	Veery	American Goldfinch
White-throated Swift	American Robin	House Sparrow

Quantitative Objectives: Although species-specific estimates of abundance are desirable, they often cannot be obtained with sufficient precision to be useful. As an alternative, we define the primary parameter of interest as the mean number of individuals of all riparian management species recorded with a large sample.

The desired accuracy of models to predict abundance, should a proposed project be implemented, must be established independently of specific projects. More experience is needed in developing these models for riparian habitats in Idaho, but we believe that a reasonable initial target is that the CV of the predicted abundance for a single project area should be ≤ 0.25 .

Because projects affecting riparian habitat often cause major changes in habitat, and therefore bird abundance, surveys can be designed to detect large, rather than small, changes. As an approximate guideline, it seems reasonable that power to detect a 2–3 - fold change should be at least 80%. Whereas detecting a 2-fold change (lower precision than 3-fold) may be appropriate for smaller projects, detecting a 3-fold change may be more appropriate for larger projects.

Methods

Bird Survey Methods: Abundance of landbirds during the breeding season is usually determined using point count or line transect surveys; the latter are especially appropriate for linear habitats typical of riparian areas. Point counts were used by Rich (2002) to assess riparian health and provide a simple tool with which to address PFC of western riparian systems in general. Demographic data collected using constant-effort mist-netting stations or nest monitoring programs also are encouraged where possible.

Sample Size Requirements: To be determined following a more thorough assessment of accuracy targets.

Habitat Variables: Habitat data already exist for several projects and may be supplemented with data from additional sites to increase our knowledge of habitat associations. This information is essential in developing the predictive model since the predictions are based on habitat variables (defined broadly). Habitat variables may include predictors such as width of riparian woodland corridor, total woodland cover, cover by exotic shrubs and trees, measures of foliage height diversity, cover by native understory species, cover by floodplain wetlands, and emergent vegetation cover.

Sampling Plans: Project evaluation surveys probably should employ one-stage systematic sampling, perhaps preceded by stratification, when project areas are small enough for this to be feasible, and should use multi-stage sampling when the strata are too large for this approach. Precision will generally be higher, for a fixed number of stations, with the first approach.

The same general approach will probably work to gather data for development of the site-based predictive model, although in most cases strata will be large enough that clusters of point count stations will be used. Strata should be delineated to insure that a wide range of habitat types is included. Analysis should acknowledge the stratification and multi-stage nature of the sampling plan.

Finding high-quality sites may be especially difficult. The St. Joe or Kootenai River may provide the best site for developing the model for northern rivers. Lower Henry's Fork or Big Lost River may be most useful in developing the model for southern rivers and springs. For montane streams, several enclosure sites could be used as reference sites, such as The Nature Conservancy's Silver Creek Preserve. However, other areas may also provide useful information on reference conditions.

Roles and Responsibilities

Existing and Needed Information: Few examples of long-term monitoring of riparian birds in Idaho exist. Near Salmon, in east-central Idaho, H. Ulmschneider (unpubl. data) monitored changes in riparian bird communities in response to altered grazing regimes for 8 years. Point-count transects (9–22 points/transect) were visited once per year on each of 7–15 creeks; points were 125–250 m apart, counts lasted 6 min, and all species detected, regardless of distance from observers, were recorded. Cattle were excluded by the BLM from some creeks permanently and from others temporarily (e.g., during several weeks in the spring). Increases in numbers of birds, but not numbers of species, were documented, especially for some riparian-obligates such as the Willow Flycatcher (H. Ulmschneider, unpubl. data).

Breeding birds in cottonwood gallery forests along the South Fork of the Snake River in eastern Idaho were studied by Saab (1998); the distributions of several species were found to be influenced by livestock grazing, recreational activities, and cottonwood patch sizes. Ground-nesting species, the Veery and Fox Sparrow, were most susceptible to disturbances created by livestock grazing and also were most sensitive to fragmentation of riparian habitats. Five species, the American Goldfinch, Yellow Warbler, Veery, Black-headed Grosbeak, and Gray Catbird, were unaffected by patch size in unmanaged areas, but showed significant area effects (increases in probability of occurrence with increases in forest area) in grazed and/or recreation sites. These results suggest that conservation of large patches is particularly important where riparian forests are managed for grazing and recreation (Saab 1998).

Of greatest need are data that document responses of bird communities to the major disturbances that continue to threaten Idaho's riparian habitats. Information should be on species composition and indices of abundance at a minimum, and population health and viability whenever possible. Using key indicator species (e.g., Yellow Warbler or Song Sparrow; see Rich 2002) to assess the quality of riparian habitat is an area in need of further investigation. Moreover, understanding the relationship between abundance

and productivity would be helpful in knowing whether or not habitat quality could be reliably inferred from simple bird survey data. In general, however, long-term population monitoring in both degraded and improved (actively restored) riparian habitats will greatly increase our ability to help land managers make informed decisions about how to maintain, create, and preserve important riparian habitats for birds.

Project Management: With primary project oversight coming from the IBIS steering committee, this issue will be managed through the collaborative efforts of the IDFG Nongame Bird Program, IdPIF, agency biologists, NGOs, and concerned citizens. Cooperative projects with the IdCDC to track birds at high quality sites is recommended.

Recommendations for Implementation

- Continue project monitoring that is ongoing until scientific evaluation is possible
- Fill gaps in survey coverage sufficiently to develop riparian site-based models
- Evaluate restoration and other habitat modification projects that are not sufficiently monitored at present
- Provide an information network among managers and scientists that identifies upcoming projects for pre- and post-project bird monitoring

6. Condition of Aspen Habitat and Importance for Birds

Background and Description of the Management Issue

Quaking aspen (*Populus tremuloides*) mostly occurs in eastern and south-central Idaho (Mueggler 1988; Steele undated). However, it also occurs in northern Idaho, occurring over broad elevations and in many habitat types, most frequently occurring in stands of mixed hardwoods (including birch and cottonwood) and mixed conifers (S. Jacobson, pers. comm.). Aspen is a seral species in habitat types where conifer trees are climax, but also occurs as a stable type (de facto climax), and as a grazing disclimax (Mueggler 1988). In the Northern Rocky Mountains, which include central and northern Idaho, aspen communities are relatively infrequent and small, the size of individual stands seldom exceeding 5 ac (2 ha; Mueggler 1985). In eastern Idaho, northern Utah, and western Wyoming, aspen communities can be either small patches or large stands. Aspen make up only a minor component of the Idaho landscape but support a significant number of priority and management species.

A gradual loss of aspen appears to be occurring in Idaho and elsewhere in the Intermountain West (e.g., Wall et al. 2001). The immediate cause appears to be regeneration failure within stands leading to stand loss, and a failure of new stands to develop. Recreational activities, improper grazing practices within stands, and climate change have been identified as possible causes of the decline. Managers need better information on the importance of aspen stands to birds in Idaho. Specific topics of interest include identifying bird species that depend on aspen to reach their highest abundance and/or fitness, and describing the characteristics of aspen stands (e.g., patch size, understory development, tree size) that determine habitat quality for aspen birds. This information will help managers determine the importance of research on aspen, which habitat elements matter most to birds, and will help identify stands which should be protected.

The greatest need is for a statewide model that describes the overall importance of aspen to birds and that identifies habitat features most strongly correlated with bird abundance and fitness. A few areas, however, are of particular concern and may warrant site-based models and project evaluation. For instance, the US Forest Service is particularly interested in the value of aspen in eastern Idaho, since concerns for aspen loss have been identified as a primary land management issue of these areas.

Survey Objectives

Information Needed: Models are needed to predict abundance and productivity of birds in aspen during the breeding season, as well as abundance and fitness of birds in aspen during migration. Abundance is here defined as the mean number of birds detected in a 10-minute point count in a circle with 50-m radius. A more biologically relevant definition (e.g., density of territorial males and their mates) may be used in future studies.

Study Areas: Wherever aspen occurs in Idaho, as both a seral and climax species. Eastern Idaho provides the best opportunities to address this management issue given the amount of aspen that occurs in this part of the state. Both public and private lands should be considered when designing projects to allow for a range of management activities and habitat conditions to be examined. IDFG WMAs Tex Creek and Sand Creek both contain significant amounts of aspen and therefore provide opportunities to study birds and address effects of habitat condition and management activities.

Focal Species: Aspen habitats are used by at least 34 bird species; 4 of them are Idaho species of special concern including Northern Goshawk, Flammulated Owl, Northern Pygmy-Owl, and Boreal Owl (Table 7, Appendix A). An additional 4 species (Blue Grouse, Williamson's Sapsucker, Red-naped Sapsucker, and Hammond's Flycatcher) are considered "high priority species" by Idaho Partners in Flight. Aspen are heavily used in the breeding season and may be important for migrants, although this issue is not well-studied.

Table 7. List of species that regularly use aspen habitats of Idaho. Management species for this management issue are in bold.

Sharp-shinned Hawk	Broad-tailed Hummingbird	Black-capped Chickadee
Cooper's Hawk	Rufous Hummingbird	Mountain Chickadee
Northern Goshawk	Northern Flicker	House Wren
Red-tailed Hawk	Williamson's Sapsucker	Golden-crowned Kinglet
Ruffed Grouse	Red-naped Sapsucker	Swainson's Thrush
Blue Grouse	Downy Woodpecker	European Starling
Flammulated Owl	Western Wood-Pewee	Orange-crowned Warbler
Western Screech-Owl	Hammond's Flycatcher	Yellow-rumped Warbler
Great Horned Owl	Dusky Flycatcher	Northern Waterthrush
Northern Pygmy-Owl	Cordilleran Flycatcher	Western Tanager
Long-eared Owl	Warbling Vireo	
Boreal Owl	Tree Swallow	

Quantitative Objectives: Statewide (regional) and site-based models are needed. Although no specific projects have been identified at the time of this draft, project evaluations also will likely be needed. The regional model will permit a statewide evaluation of the importance of aspen to birds and identification of large-scale patterns in aspen use. The site-based model will help reveal which traits of aspen stands (including landscape variables) are most highly correlated with bird abundance in aspen. See "Products of IBIS and Coordinated Bird Monitoring" and Appendix B for more information about regional and site-based models. We suggest that species-specific and multi-species versions of each model be constructed. More work is needed on reasonable accuracy targets for these models. Interim targets are $CV < 0.5$ for the species-specific models and $CV < 0.25$ for the multi-species models.

Methods

Bird Survey Methods: The standard point-count survey sampling protocol (Ralph et al. 1993) will be used to estimate relative avian abundance. Demographic work to assess the health and viability of breeding bird communities should include nest searches and nest monitoring. The study design and sampling regime used by Sallabanks et al. (*in press*) provide an appropriate framework for generating baseline information for birds breeding in aspen habitats of Idaho.

Sample Size Requirements: To be determined following a more thorough assessment of accuracy targets.

Habitat Variables: Habitat variables for the regional model should include stand size and elevation, and may also include measures from geo-referenced data sources, such as soil type, slope, and aspect. Habitat variables for the site-based model should include measures of dominant plant taxa, stand density, and height of (1) grass-forbs, (2) shrubs and saplings, (3) understory trees, and (4) overstory trees. Average diameter-at-breast-height of overstory trees and overstory canopy cover also should be assessed.

Sampling Plans: Surveys probably should employ one-stage systematic sampling, perhaps preceded by stratification, when project areas are small enough for this to be feasible, and should use multi-stage sampling when the strata are too large for this approach. Precision will generally be higher, for a fixed number of stations, with the first approach. The same general approach will probably work to gather data for development of the site-based predictive model, although in most cases strata will be large enough that clusters of point-count stations will be used. Stratification should be considered to insure that high-quality stands are included in the sampling; habitat assessment may need to precede bird surveys to determine which sites are high quality – collaborative projects with the IdCDC may prove beneficial in this regard. Analysis should acknowledge the stratification and multi-stage nature of the sampling plan.

Roles and Responsibilities

Existing and Needed Surveys: Few data exist on relationships between the condition of aspen stands and bird communities in Idaho; information on avian population health in this important habitat also are lacking. Basic descriptions of aspen bird community composition, relative abundance of species, and stand condition are needed. Secondly, more intensive monitoring of demographic parameters across an array of stand conditions is desirable. To address the management issues that relate to aspen, surveys in both degraded and protected (restored) stands are necessary. Initial surveys (2005–2006) should focus on establishing baseline (reference) conditions, locating areas for long-term population trend monitoring, and identifying potential target species and study sites for more intensive assessments of highest priority management issues.

Project Management: With primary project oversight coming from the IBIS steering committee, this issue will be managed through the collaborative efforts of the IDFG Nongame Bird Program, IdPIF, agency biologists, NGOs, and concerned citizens. Cooperative projects with the IdCDC to track birds at high quality sites is recommended.

Recommendations for Implementation

- Obtain available information from existing aspen stand assessments
- Decide on final list of additional habitat variables and how they will be measured for both models
- Obtain additional habitat variables for existing surveys, as needed
- Carry out preliminary analyses for the statewide model (before the 2006 field season)
- Locate aspen stands for baseline monitoring

- Initiate point-count surveys in selected areas
- Identify future management issue projects and target species/study sites

7. Identification of Quality Habitat and Effects of Land-Use Practices in Sagebrush Communities

Background and Description of the Management Issue

Shrubsteppe is widely recognized as one of the most imperiled ecosystems in the United States (e.g., Noss et al. 1995). Sagebrush shrub habitat is a fairly xeric type with shrubs and grasses co-dominant or shrubs dominant. The vegetation types included, the total number of acres (hectares) in Idaho, and the percentage of Idaho are (from Caicco et al. 1995):

- montane sagebrush and antelope bitterbrush (*Purshia tridentata*) mosaic; 359,071 ac (145,373 ha); 0.7%
- threetip (*Artemisia tripartita*) and mountain big sagebrush (*A. tridentata. vaseyana*) mosaic; 205,531 ac (83,211 ha); 0.4%
- mountain and low sagebrush (*A. arbuscula*) mosaic; 3,298,406 ac (1,335,387 ha); 6.2%
- low and mountain sagebrush mosaic; 334,176 ac (135,294 ha); 0.6%
- low and black sagebrush (*A. nova*) mosaic; 360,822 ac (146,082 ha); 0.7%
- low and fringed sagebrush (*A. frigida*) mosaic; 31,974 ac (12,945 ha); 0.1%
- low and big sagebrush (*A. tridentata*)* mosaic; 1,020,120 ac (413,004 ha); 1.9%
- early low sagebrush; 239,716 ac (97,051 ha); 0.4%
- black sagebrush/western (or Utah) juniper mosaic; 107,314 ac (43,447 ha); 0.2%
- big sagebrush* on lava fields; 546,927 ac (221,428 ha); 1.0%
- big* and low sagebrush mosaic; 5,622,649 ac (2,276,376 ha); 10.5%
- canyon shrub; 291,413 ac (117,981 ha); 0.5%

* big sagebrush is predominantly the Wyoming subspecies, with small amounts of the Great Basin subspecies.

Total area in this habitat is 12,418,120 ac (5,027,579 ha), which is 23% of the state (Caicco et al. 1995). A little over 45% of this type is in the big and low sagebrush mosaic. The next biggest component is the mountain and low sagebrush mosaic (27%). Most of the Sagebrush Shrub habitat type occurs in the southern half of Idaho (Great Basin BCR – BMR-51).

Sagebrush communities have suffered severe degradation and loss, and the future for the remaining sagebrush steppe in particular is bleak. The ecology, natural disturbance patterns, and vegetation communities have been altered by agricultural conversion, invasion of non-native plants, extensive grazing, development, sagebrush eradication programs, and changes in fire regimes (Paige & Ritter 1999). Within the Interior Columbia River Basin, for example, sagebrush and bunchgrass cover types experienced greater losses (30.5% decrease in area) than any other habitat and will probably continue to decline with the cumulative impacts of present land uses (Saab & Rich 1997).

Noss et al. (1995), citing others, reported that 4.9–5.7 million ac (2–2.3 million ha) of sagebrush-grass steppe in the western Snake River basin has been converted to exotic annual vegetation, primarily cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum caput-medusae*). Hironaka et al. (1983) reported that more than 99% of the subspecies basin big sagebrush type in the Snake River Plain has been converted to agriculture. Noss et al. (1995) listed the subspecies basin big sagebrush type and ungrazed sagebrush steppe in the Intermountain West as critically endangered ecosystem types in the United States.

Reclaiming degraded sagebrush habitat may not be possible with current technology and funding. What has been lost may be gone forever, making preservation of remaining habitat more crucial. Restoring areas infested with exotic annual grasses is exceedingly difficult. There is no good way to control sprouting of the exotic grasses; viable seed may survive in the soil for many years. New chemical control methods are now being tested, but the technique is still experimental. Even if it were an effective control method, the cost may be prohibitive. Seeds of native grasses and forbs are scarce and very expensive, making it unlikely that large areas could be restored at a time. Germination and survival of native plant seedlings is dependent on precipitation, something that is highly unpredictable in the Intermountain West. Perhaps new developments will make restoration more effective and cheaper in the future. But in the meantime, it is usually more practical and less expensive to protect and improve existing sagebrush habitats.

Large wildfires have recently become a concern in Idaho and much of the west. Fire was probably infrequent in Idaho prior to settlement (Paige & Ritter 1999), especially in the Great Basin sagebrush zone due to the poorly developed grass-forb understory. In the past few decades, fires have increased in frequency in concert with the spread of cheatgrass throughout the region. Managers are concerned about the large-scale loss of sagebrush habitat and, specifically, about the loss of tall stands of sagebrush, which are important for several species and may take as much as 30 years to recover.

In response to these concerns, reseeding programs have been initiated in burned sagebrush areas throughout Idaho. Guidelines for these programs have been generated for Greater Sage-Grouse (Barrett et al. 2000), but effects on other birds are largely unknown and guidelines have yet to be developed. Therefore, resource managers need information on short-term and long-term effects of fire and of post-fire restoration efforts on bird communities. More information is also needed about causes of the long-term declines in shrubsteppe species described above.

Survey Objectives

Information Needed: Estimates are needed of abundance and productivity of sagebrush birds in (1) burned and unburned areas, (2) in restoration projects and untreated areas, and (3) in a variety of untreated sites thought to vary in habitat quality. Abundance is here defined as the mean number of all management species detections in a 10-minute point count in a circle with 100-m radius. A more biologically relevant definition (e.g., density of territorial males and their mates) may be used in future studies. This information can best be obtained by developing a site-based, sagebrush model. See "Products of IBIS and Coordinated Bird Monitoring" and Appendix B for more information about site-based models.

Study Areas: Primarily located throughout southern Idaho in BMR-51. Specific sites will depend on study objectives and always should be coordinated with existing monitoring efforts (see below). Before selecting study areas, we recommend that contacts be made with local resource managers and area biologists to determine the nature and whereabouts of any ongoing work with shrubsteppe birds.

Focal Species: As a result of population declines and subsequent proposals that the species should be protected under the Endangered Species Act, the Greater Sage-Grouse has received recent widespread attention. Sharp-tailed Grouse have also sustained a long-term decline. Declines likely are not restricted to these species, as Great Basin-wide trends for most shrubsteppe obligate species are negative (Knick et al. 2003). Sagebrush habitats in Idaho are used by at least 54 bird species, primarily during the breeding season, 25 of which are management species for this habitat type (Table 8). Several species, including Greater Sage-Grouse, Sage Thrasher, Brewer's Sparrow, and Sage Sparrow are sagebrush obligates and Idaho has a major area responsibility for many of the management species (Carter et al. 2000).

Table 8. List of sagebrush birds of Idaho. Management species for this management issue are in bold.

Turkey Vulture	Gambel's Quail	Common Raven
Northern Harrier	Long-billed Curlew	Horned Lark
Swainson's Hawk	Rock Pigeon	Northern Rough-winged Swallow
Red-tailed Hawk	Mourning Dove	Cliff Swallow
Ferruginous Hawk	Burrowing Owl	Rock Wren
Rough-legged Hawk	Short-eared Owl	Mountain Bluebird
Golden Eagle	Common Nighthawk	Northern Mockingbird
American Kestrel	Common Poorwill	Sage Thrasher
Merlin	White-throated Swift	Chipping Sparrow
Peregrine Falcon	Black-chinned Hummingbird	Brewer's Sparrow
Prairie Falcon	Gray Flycatcher	Lark Sparrow
Chukar	Say's Phoebe	Black-throated Sparrow
Gray Partridge	Ash-throated Flycatcher	Sage Sparrow
Ring-necked Pheasant	Western Kingbird	Vesper Sparrow
Greater Sage-Grouse	Eastern Kingbird	Lark Bunting
Sharp-tailed Grouse	Loggerhead Shrike	Western Meadowlark
Mountain Quail	Northern Shrike	Brewer's Blackbird
California Quail	Black-billed Magpie	Brown-headed Cowbird

Quantitative Objectives: We suspect that changes in sagebrush bird density resulting from seeding or other treatments may often be modest and therefore suggest that the objective in project evaluations should be 80% power to detect a 2-fold change. We suggest that species-specific models be constructed for single species (the most abundant ones) and for multiple species that include all management species. The single-species models will be useful at a large spatial scale where total abundance will be large. The multi-species model will be more useful in predicting effects of treatments on small areas where only a few individuals of many species of interest may be present. More work is needed on reasonable accuracy targets for these models. Interim targets are $CV < 0.5$ for the species-specific models and $CV < 0.25$ for the multi-species models.

Methods

Bird Survey Methods: The standard point-count survey sampling protocol (Ralph et al. 1993) will be used to estimate relative avian abundance. Demographic work to assess the health and viability of breeding bird communities should include nest searches and nest monitoring. These protocols will primarily be geared toward songbirds since other sagebrush obligates, such as Greater Sage-Grouse, are already well monitored under other IDFG programs (e.g., Connelly et al. 2003).

Sample Size Requirements: To be determined following a more thorough assessment of accuracy targets. Knowing what is an adequate sample size to accurately and reliably assess changes in population trends of shrubsteppe-obligate birds rangewide is of particular interest to the BLM (J. Augsburger, pers. comm.).

Habitat Variables: Habitat variables for the site-based models should include a description of the dominant plant taxa, stand density, and height of (1) grass-forb layer, (2) shrub layer, and (c) sapling and tree layer if one is present (which will be rare). Also, landscape level data should be collected, including presence of cliffs, surrounding habitat types, and patch size, where applicable. Other project-specific variables may also be needed (e.g., burn history, presence of reseeding efforts).

Sampling Plans: Surveys probably should employ one-stage systematic sampling, perhaps preceded by stratification, when project areas are small enough for this to be feasible, and should use multi-stage sampling when the strata are too large for this approach. Precision will generally be higher, for a fixed number of stations, with the first approach. The same general approach will probably work to gather data for development of the site-based predictive model, although in most cases strata will be large enough that clusters of point-count stations will be used. Stratification should be considered to insure that high-quality stands are included in the sampling; habitat assessment may need to precede bird surveys to determine which sites are high quality – collaborative projects with the BLM, IDFG (Idaho Sage Grouse Task Force), IBO, and the IdCDC may prove beneficial in this regard. Analysis should acknowledge the stratification and multi-stage nature of the sampling plan.

Roles and Responsibilities

Existing and Needed Information: Much work regarding shrubsteppe birds has occurred in recent years as a result of increased concerns over habitat loss and degradation throughout the Great Basin BCR. Previous monitoring and research efforts in Idaho are summarized in the IdPIF BCP (Idaho Partners in Flight 2000; http://www.blm.gov/wildlife/plan/pl_id_10.pdf). More recently, Rideout (2001) examined the effects of habitat fragmentation on shrubsteppe birds in southeast Idaho; Sauder (2002) described bird-habitat relationships in the same region. Fragmentation also was studied recently by Schoeberl (2003) in southwest Idaho. Other recently completed work includes an assessment of the effects of fire on breeding bird species composition and abundance in the Boise Foothills by Greg Kaltenecker of IBO. Though that study is now completed, the sites could still be used in the future for monitoring of birds on a local scale like the foothills. IBO now conducts surveys across a network of monitoring sites in BMR-51, primarily looking at habitat relationships of shrubsteppe-obligate birds across a range of habitat conditions. This work is being conducted in conjunction with the BLM to address the broader question of whether Greater Sage-Grouse function as an umbrella species for other shrubsteppe birds. Ongoing rangewide (including Idaho) assessments of sagebrush habitat and associated bird assemblages are being coordinated by Steve Knick at the USGS-Snake River Field Station in Boise (see the SageMap website for more details: <http://sagemap.wr.usgs.gov>).

Immediate needs are to address the short-term management issue of whether sage-grouse function effectively as umbrella species. This requires that IBIS support ongoing work by IBO, either by providing funding and/or technical assistance with survey work; expanding the monitoring network to include demographic sites would be beneficial. Long-term needs are related to the first management issue discussed in this plan – long-term population trend monitoring of shrubsteppe birds. Again, IBO is a likely project partner to take the lead on this work. Another potential IBIS project would be to document the value to shrubsteppe-obligate passerines of BLM lands *not* currently considered to be sage-grouse strongholds. This information would be of value to the BLM, as would a better understanding of how changes in bird populations are linked to management practices (i.e., documentation of mechanistic, or cause and effect, relationships). One rangewide issue in need of assessment is the effect of fire (both wild and prescribed) on avian communities.

Project Management: With primary project oversight coming from the IBIS steering committee, this issue will be managed through the collaborative efforts of the IDFG Nongame Bird Program, IdPIF, agency biologists, NGOs, and concerned citizens. Cooperative projects with the IdCDC to track birds at high quality sites is recommended.

Recommendations for Implementation

- Decide on final list of habitat variables and how they will be measured for both models
- Obtain habitat variables for existing survey transects
- Summarize existing data from sagebrush communities

- Collaborate with ongoing efforts (e.g., SageMap, IBO's sagebrush surveys for the BLM, Point Reyes Bird Observatory's demographic monitoring network) to provide technical assistance and additional field work
- Use IBIS as a vehicle to secure long-term funding for ongoing shrubsteppe bird monitoring in Idaho

8. Forest Thinning and Fuels Reduction Projects, Especially in Ponderosa Pine Habitats

Background and Description of the Management Issue

In Idaho, dry forest communities are represented by the dry ponderosa pine/Douglas-fir/grand fir potential vegetation group, which incorporates 19 habitat types known to occur within the state. For a more detailed description of the individual habitat types encompassed in this group, refer to Steele et al. (1981) and Cooper et al. (1991). This group of potential vegetation types encompasses those sites that were historically characterized by old-growth ponderosa pine forests but are poorly represented on the landscape today. While the dry ponderosa pine/Douglas-fir/grand fir group is characterized by similar forest conditions under historical disturbance regimes, under current conditions they are very different in both overstory and understory characteristics. Understanding those differences will be important for developing appropriate restoration programs, and assessing the impacts of restoration efforts on existing bird communities.

The dry ponderosa pine/Douglas-fir/grand fir forest group is most commonly associated with the west-central Idaho landscape (Steele et al. 1981), but is also a minor component of the northern Idaho landscape (Cooper et al. 1991). These low elevation forests represent the warm, dry end of the forest environmental gradient. Typically, ponderosa pine types represent the transition zone between the sagebrush/grassland vegetation and forests. In west-central Idaho, ponderosa pine forests may occur as low as 3,000 ft (900 m) in elevation and extend to about 6,500 ft (2,000 m) on steep, dry, southerly aspects.

Current estimates indicate that greater than 75% of the historical old growth ponderosa pine ecosystems have been lost across the Interior Columbia River Basin landscape (USFS & USBLM 1997). Noss et al. (1995) listed old-growth ponderosa pine forests as endangered (85–95% decline) in the northern Rocky Mountains, Intermountain West, and eastside Cascade Mountains. Specific numbers for the loss of this forest group in Idaho are not available at this time. However, it is important to note that the types of dry ponderosa pine forest in Idaho represent a significant component of their worldwide distribution.

The primary effect of past forest management activities on overall acres of ponderosa pine has been the significant change in the historical fire regime. Three types of management activities have had the most influence on changing the historical fire regime: 1) fire exclusion policies; 2) grazing of livestock; and 3) harvesting of trees (Covington & Moore 1994).

The most common result of fire exclusion in these forests has been the development of an increasingly homogeneous landscape characterized by large, stand-replacing fire regimes. For nearly 100 years, the combined influence of fire exclusion and grazing has altered the forest structure and species composition of this forest group in Idaho (Crane & Fischer 1986). Since the early 1900s, efforts to exclude fire, among other influences, have lengthened the fire return interval in these forests. Today, forests of the dry ponderosa pine/Douglas-fir/grand fir group no longer exhibit conditions that would support a low intensity understory fire. Many of these forests have not burned since the 1800s and contain a considerable amount of fuel in the understory. The Douglas-fir and grand fir potential vegetation types have progressed to a late successional condition of Douglas-fir and Douglas-fir/grand fir, respectively

(Steele 1994). All potential vegetation types are experiencing tree densities far outside the historical range of conditions for these sites (Covington & Moore 1994, Sloan 1998*a* and *b*), with different species composition. Dense understory conditions provide a "ladder" for fire to reach the overstory, which in turn increases the severity of the fire. Intense, stand-replacing fires are abnormal disturbance events in this forest group and have resulted in severe modifications of the historical forest ecosystem and to biodiversity. Prior to 1900, the high fuel conditions typical of today's forest were limited to forests growing in and around protective topographic features such as north aspects, moist draws, and canyon bottoms.

Grazing impacts began in the late 1800s and early 1900s when enormous herds of domestic sheep and cattle were allowed to graze freely throughout these low elevation forests. The result was substantial damage to soils and vegetation, especially where herds were concentrated. Perennial bunchgrasses, in particular, are still recovering from the severe overgrazing of the early days (Steele et al. 1981). This level of grazing also functioned to suppress fires by reducing the continuity of the understory vegetation and preventing low intensity fires from spreading in their normal pattern across the landscape (Covington & Moore 1994). Today, grazing continues but at much lower densities. Localized damage to vegetation and soils may still occur where animals concentrate, particularly in riparian areas and forest openings. Similarly, grazing still appears to affect the forest ecology of these sites in terms of forest structure and species composition. Specific observed influences on forest structure are increased tree numbers, decreased native grasses, increased accumulation of downed woody material, increased spread of exotic and noxious weeds, and increased forest floor duff. These influences, in combination with fire suppression, enhance conditions for high intensity, stand-replacing fires and reduce conditions that would support the low intensity fires that historically occurred in these forests (Zimmerman & Neuenschwander 1984).

The effects of timber harvest on this forest group have changed over the years. Early timber harvests usually targeted the largest trees, which in most instances were ponderosa pine, and to a much lesser extent Douglas-fir and western larch. This form of harvest, coupled with fire suppression, has allowed smaller, shade-tolerant, late-successional species such as Douglas-fir to capture the growing space (Sampson et al. 1994). The result has been a rapid shift on many sites from forests dominated by seral species to forests dominated by late successional species, and from open stands of old growth trees to dense stands of young trees. This changes the habitat available to birds associated with the open stands found under a historical understory fire regime. More recently, timber management programs have used more intensive harvest practices such as clearcutting. Clearcut areas tend to recover slowly from logging disturbance and efforts to reforest clearcuts have been, on average, less than successful (Steele et al. 1981). Today, selective harvest with natural regeneration is considered the more ecologically responsible harvest method in these forests. Although fire exclusion, grazing, and timber harvest, alone or in combination, have resulted in and continue to cause the loss of the old-growth ponderosa pine forests, the most immediate threats to the future viability of these forests are stand-replacing fire occurrences and within-stand dynamics.

Very little area representing historical old-growth ponderosa pine forest conditions, where old-growth is generally defined as trees older than 200 years, remains today (Hamilton 1993). Many stands still contain old-growth ponderosa pine; however, tree densities and fuel accumulations present a significant risk to their long-term survival and future restoration. Lightning-caused and accidental fires have the potential to burn with unprecedented and uncontrollable intensity and magnitude. Allowing these forests to burn under a stand-replacing fire regime to "reset the balance" is not a viable alternative for restoration of these forests (Steele 1994). The remaining old-growth ponderosa pine would be lost from the landscape and cannot be replaced for more than 200 years. With each stand-replacing fire in these low elevation forests, restoration options are lost. To complicate things further, the intensity of stand-replacing fires on these sites often damages the soil or allows understory species better adapted to intense fire regimes to take hold. The result is generally delayed recolonization by all species where the soil is damaged, or recolonization by shrubs that outcompete seral tree species and prevent or delay their

establishment for many years to come. The impact is the same, however, with the extended loss of the old growth ponderosa pine ecosystem from the landscape.

Within dry forests, managers seek to restore open, park-like stands of mature ponderosa pine using a combination of prescribed burning and selective vegetation management (Covington et al. 1999). Returning this habitat to a more historical condition likely will benefit several high priority bird species, such as the White-headed Woodpecker, White-breasted Nuthatch, and Flammulated Owl. Other species that regularly use pine for nesting and foraging include Hammond's Flycatcher, Chipping Sparrow, and Pygmy Nuthatch. Restoration efforts in this forest group must target saving any existing old-growth or large ponderosa pines where they occur and improving survival and growth rates of ponderosa pine where they can reestablish. Whereas restoration efforts are complicated and will not be addressed in detail here, restoration should primarily consist of reducing the density of trees in many stands by removing small trees, and reintroducing fire where possible. For this habitat, gentle slopes with remnant large ponderosa pine are almost nonexistent, but such sites serve as potential locations for primary restoration efforts. We caution that most areas with large ponderosa pine are currently on very steep slopes and/or are in inaccessible areas and are therefore not suitable for primary restoration efforts.

Kay (1995) concludes that, historically, Native Americans commonly determined the structure of entire plant and animal communities by hunting and by setting fires (also see papers cited in Knowles & Knowles 1993), and that a current "natural regulation" approach to management does not recognize and thus probably would not replicate such historical conditions (Marcot et al. 1998). Perhaps with careful thinning and logging of many lower elevation forests, along with prudent reintroduction of fire into these ecosystems, old-growth ponderosa pine forests eventually can be encouraged to return.

Survey Objectives

Information Needed: Although project evaluations should, at a minimum, document breeding abundance of management species, management species abundance throughout the year and measures of fitness, including productivity during the breeding season and foraging success during migration, also would be highly desirable. Information on prescribed burning is especially needed, including an evaluation of spring burning to assess potential direct mortality on early-nesting birds.

A site-based model should predict management species abundance relative to a continuum in habitat conditions influenced by fire, grazing, and restoration treatments. Models should be generated for both breeding and migration. As projects are implemented, short-term trends in abundance also may be of interest, particularly in large projects. In particular, assessments of how closely "fuels reduction" treatments truly constitute "restoration" of ponderosa pine are needed; monitoring the composition of forest avifauna to evaluate if treatments ultimately result in desired changes in bird species' composition and abundance is essential.

Study Areas: Could be anywhere in Idaho where thinning and/or fuels reduction treatments are being conducted; emphasis should be on dry forest types where possible, especially management actions considered to be restoration of ponderosa pine. Stands of old-growth ponderosa pine have recently been mapped by Mehl and Haufler (2003) for the entire state and their potential for restoration evaluated. Clusters of stands were identified and provide a logical starting place with which to address this management issue. Other study areas should also be used as opportunities for collaborative projects arise (e.g., at Craig Mountain WMA). Coordination with USFS and timber industry biologists and managers to identify potential study sites where future treatments are planned is critical.

Focal Species: Ponderosa Pine habitats are used by at least 31 bird species; 4 of which are Idaho species of special concern including Flammulated Owl, Northern Pygmy-Owl, Lewis's Woodpecker, and White-headed Woodpecker (Table 9, Appendix A).

Table 9. List of ponderosa pine birds of Idaho. Management species for this management issue are in bold.

Merlin	Black-backed Woodpecker	Red-breasted Nuthatch
Wild Turkey	Northern Flicker	White-breasted Nuthatch
Mountain Quail	Pileated Woodpecker	Pygmy Nuthatch
Flammulated Owl	Western Wood-Pewee	Brown Creeper
Great Horned Owl	Cassin's Vireo	Hermit Thrush
Northern Pygmy-Owl	Steller's Jay	Nashville Warbler
Rufous Hummingbird	Clark's Nutcracker	Western Tanager
Lewis's Woodpecker	Common Raven	House Finch
Downy Woodpecker	Black-capped Chickadee	Pine Siskin
Hairy Woodpecker	Mountain Chickadee	
White-headed Woodpecker	Chestnut-backed Chickadee	

Quantitative Objectives: Although species-specific estimates of abundance are desirable, they often cannot be obtained with sufficient precision to be useful. As an alternative, we define the primary parameter of interest as the mean number of individuals of all forest management species recorded with a large sample.

The desired accuracy of models to predict abundance, should a proposed project be implemented, must be established independently of specific projects. More experience is needed in developing these models for forest habitats in Idaho, but we believe that a reasonable initial target is that the CV of the predicted abundance for a single project area should be ≤ 0.25 .

Because projects affecting forest habitat often cause major changes in stand structure and species composition, and therefore bird abundance, surveys can be designed to detect large, rather than small, changes. As an approximate guideline, it seems reasonable that power to detect a 2–3 - fold change should be at least 80%. Whereas detecting a 2-fold change (lower precision than 3-fold) may be appropriate for smaller projects, detecting a 3-fold change may be more appropriate for larger projects.

Methods

Bird Survey Methods: The standard point-count survey sampling protocol (Ralph et al. 1993) will be used to estimate relative avian abundance. Demographic work to assess the health and viability of breeding bird communities should include nest searches and nest monitoring. These protocols will primarily be geared toward songbirds although more specific techniques developed for nocturnal species (forest owls and nightjars) and cavity nesters (woodpeckers) also are encouraged. Standardized guidelines have recently been adopted for nocturnal owl monitoring in North America (Takats et al. 2001) and are the method of choice for owls surveys conducted under the IBIS framework; for a copy of the protocols and more detailed information, visit <http://www.bsc-eoc.org/regional/owlguide.html>.

Sample Size Requirements: To be determined following a more thorough assessment of accuracy targets.

Habitat Variables: Habitat variables for the regional model should include stand size and elevation, and may also include measures from geo-referenced data sources, such as soil type, slope, and aspect. Habitat variables for the site-based model should include measures of dominant plant taxa, stand density, and height of (1) grass-forbs, (2) shrubs and saplings, (3) understory trees, and (4) overstory trees. Average diameter-at-breast-height of overstory trees, canopy cover, volume of down and standing

(snags) dead wood, species composition, and plant association (forest habitat type) should also be assessed.

Sampling Plans: Project evaluation surveys probably should employ one-stage systematic sampling, perhaps preceded by stratification, when project areas are small enough for this to be feasible, and should use multi-stage sampling when the strata are too large for this approach. Precision will generally be higher, for a fixed number of stations, with the first approach. The same general approach will probably work to gather data for development of the site-based predictive model, although in most cases strata will be large enough that clusters of point-count stations will be used. Strata should be delineated to insure that a wide range of habitat types is included. Analysis should acknowledge the stratification and multi-stage nature of the sampling plan.

Mehl and Haufler (2003) could be used to locate high quality sites with high restoration potential. Where sampling is intended to be more extensive, a combination of road-side and off-road counts would probably be most effective. In BMR-51 (i.e., USFS Region 4 in Idaho), establishing a network of forest transect routes similar to that of the Northern Region Landbird Monitoring Program (NRLMP) (<http://biology.umt.edu/landbird/mbc/perspectives.htm>) is desirable. These could initially follow existing USFS survey routes for Management Indicator Species (MIS) whereby birds other than woodpeckers (i.e., owls and songbirds) could be surveyed at the same points but at different times of the season.

Roles and Responsibilities

Existing and Needed Surveys: Current surveys include woodpecker response to fall prescribed burning on the Payette National Forest, and woodpecker response to wildfire on the Boise National Forest by Vicki Saab (USFS Rocky Mountain Research Station). Previous research on songbirds has focused primarily on describing habitat relationships, response to thinning treatments, landscape fragmentation (R. Sallabanks, unpubl. data). Northern goshawk monitoring continues to occur on the Sawtooth and Caribou-Targhee National Forests in BMR-51, but also on private timberlands operated by Potlatch Corporation in BMR-50. Also in the north, the NRLMP has been in place for a decade. Earlier species-specific work includes assessments for great gray, boreal, and flammulated owls on several national forests throughout the state.

Surveys specifically designed to address this management issue are however lacking. What is needed are more coordinated standardized surveys across broad geographic landscapes designed to address the same management issue. A network of sites that would allow data to be pooled for "meta-analysis" is desirable; information on the demographic responses of songbirds to thinning and fuels reduction treatments are especially needed.

Project Management: Design of coordinated forest bird surveys should be administered by an IBIS monitoring sub-committee comprised of agency biologists and managers with expertise and interest in this management issue. Existing members of the IdPIF Pine Task Force would be an ideal group to assume leadership on setting project objectives, building collaborative partnerships, and serving as an "advisory board" for overall project direction.

Recommendations for Implementation

- Coordinate with existing work to effectively fill gaps and void redundancy
- Look for opportunities to collect pre-treatment data where future projects are being planned
- Continue to work with USFS biologists and regional program leaders to establish a coordinated network of monitoring sites in BMR-51
- Initiate surveys for nocturnal species in 2004–2005 where possible; test protocols and communicate results to others

- Engage IdPIF Pine Task Force to help with project oversight and identify monitoring opportunities

9. Effects of Management in Pinyon-Juniper Habitats

Background and Description of the Management Issue

Juniper and Pinyon Woodlands include western (*Juniperus occidentalis*), Utah (*Juniperus osteosperma*), and Rocky Mountain (*Juniperus scopulorum*) juniper, and singleleaf pinyon (*Pinus monophylla*) woodlands, with some of these species being co-dominant with others. The singleleaf pinyon is co-dominant with curl-leaf mountain mahogany (*Cercocarpus ledifolius*) or Utah juniper (Rust 1999). Pinyon-juniper and juniper woodland vegetation occurs at the northern extent of its range in Idaho (Cronquist et al. 1972). Western juniper in Idaho occurs in the Owyhee Plateau of the southwest corner. About six percent of the total area in the West covered by western juniper occurs in Idaho. Utah juniper-dominated woodlands in Idaho occur in the South Hills, east to the Malad and Bannock ranges, and north across the Snake River Plain to the southern end of the Lost River and Lemhi ranges (Rust 1999). Upland Rocky Mountain juniper-dominated woodlands occur on the Wapi Flow within the Snake River Plain, south on lower-slope positions in the Goose Creek drainage, east on the lower-and upper-slope positions in the Bannock, Portneuf, and Bear River Ranges, and on basalt flows of the Portneuf River valley of southeastern Idaho (Rust 1999). Singleleaf pinyon occurs in the Albion, Jim Sage, and Black Pine Mountains of the center part of southern Idaho. The most land-locked singleleaf pinyon are in southern Idaho, where they form woodlands with Utah juniper at several locations, including City of Rocks (Lanner 1975).

During the past 150 years, western juniper has expanded its range into adjacent grasslands and shrublands (Burkhardt and Tisdale 1976), and aspen and riparian areas (Hann et al. 1997). All of these other types are priority habitats for birds; they have all decreased in quantity and quality from historic times (Hann et al. 1997), and expansion of junipers into these types is an important issue. Much of the Utah juniper in southern Idaho is relatively young (<120 years), having become established after about 1880, based on recent studies (P. Makela, pers. comm.). The post-settlement increase of juniper came about at least partly due to a reduction in fine fuels as a result of heavy livestock grazing near the turn of the century. Lack of fine fuels hinders the spread of wildfires (U.S. Bureau of Land Management 1991). Current conditions of juniper dominance have been maintained in many areas due to aggressive wildfire suppression (P. Makela, pers. comm.). Lack of wildfire also has allowed young junipers to fill in the interspaces within old-growth stands, resulting in a closer canopy than probably occurred pre-European settlement. This likely has reduced the quality of oldgrowth habitat for old-growth dependent species. West et al. (1998) state, "We are currently dealing with a vastly greater amount of juniper and pinyon-dominated lands than any humans have encountered over the last 5,000 years."

Managers have requested guidance on how bird conservation strategies might be included in pinyon-juniper management, especially for the use of prescribed fire and other methods of tree removal used for preserving sagebrush habitats and for managing stand susceptibility to wildfires. Information also is needed to help identify high-quality stands (e.g., that agencies would try to protect during a wildfire) and to evaluate bird responses to management programs such as thinning or partial removal of a stand. Effects of landscape mosaics will be particularly valuable, since it is assumed that birds associated with pinyon-juniper respond to fires at a landscape scale. For example, managers intending to remove part of a large stand need to know whether the remainder of the stand, and other stands nearby, will continue to provide adequate habitat for birds. Guidelines for managers, along with species accounts for pinyon-juniper birds of conservation concern, have recently been developed by Gillihan (2004).

Survey Objectives

Information Needed: Models are needed to predict abundance and productivity of birds in pinyon-juniper during the breeding season, as well as abundance and fitness of birds in pinyon-juniper during migration. Abundance is here defined as the mean number of birds of all management species detected in a 10-minute point count in a circle with 50-m radius. A more biologically relevant definition (e.g., density of territorial males and their mates) may be used in future studies. Surveys also are needed that will allow for long-term population trend monitoring of pinyon-juniper birds, better information on bird-habitat relationships, and baseline data on avian community composition. To begin to meet these needs, the IdCDC is planning to initiate a project in the South Hills and City of Rocks National Monument (Cassia Co.) of southern Idaho in 2004.

Study Areas: Initial work should focus on areas of Utah Juniper and mixed Utah Juniper-Pinyon Pine in southern Idaho. Baseline data on birds in relatively pristine habitats (i.e., old-growth pinyon-juniper) are recommended, especially in areas where Utah Juniper occurs within its natural range.

Focal Species: Pinyon-juniper habitats in Idaho are used by at least 56 bird species including 15 management species (Table 10).

Table 10. List of pinyon-juniper birds of Idaho. Management species for this management issue are in bold.

Turkey Vulture	Pinyon Jay	Orange-crowned Warbler
Cooper's Hawk	Clark's Nutcracker	Virginia's Warbler
Red-tailed Hawk	Black-billed Magpie	Black-throated Gray Warbler
Ferruginous Hawk	Common Raven	Yellow-breasted Chat
Mourning Dove	Juniper Titmouse	Western Tanager
Great-horned Owl	Black-capped Chickadee	Green-tailed Towhee
Common Nighthawk	Mountain Chickadee	Spotted Towhee
Common Poorwill	Bushtit	Chipping Sparrow
Red-naped Sapsucker	Rock Wren	Brewer's Sparrow
Hairy Woodpecker	Canyon Wren	Vesper Sparrow
Northern Flicker	Ruby-crowned Kinglet	Lark Sparrow
Gray Flycatcher	Golden-crowned Kinglet	Black-throated Sparrow
Cordilleran Flycatcher	Blue-gray Gnatcatcher	Dark-eyed Junco
Ash-throated Flycatcher	Mountain Bluebird	Lazuli Bunting
Loggerhead Shrike	Western Bluebird	Brown-headed Cowbird
Northern Shrike	Townsend's Solitaire	Scott's Oriole
Plumbeous Vireo	American Robin	Pine Siskin
Steller's Jay	Sage Thrasher	Cassin's Finch
Western Scrub-Jay	Cedar Waxwing	

Quantitative Objectives: Both statewide (regional) and site-based models are needed. The statewide model will permit a regional evaluation of the importance of pinyon-juniper habitats to birds, as well as identification of large-scale patterns in pinyon-juniper use. The site-based model will help elucidate which traits of pinyon-juniper stands (including landscape variables) are most highly correlated with bird abundance. See "Products of IBIS and Coordinated Bird Monitoring" and Appendix B for more information about statewide and site-based models. We suggest that species-specific and multi-species

versions of each model be constructed. More work is needed on reasonable accuracy targets for these models. Interim targets are $CV < 0.5$ for the species-specific models and $CV < 0.25$ for the multi-species models.

Methods

Bird Survey Methods: The standard point-count survey sampling protocol (Ralph et al. 1993) will be used to estimate relative avian abundance. Transects should be off-road where possible and permanently marked for relocation in future years to allow for long-term trend monitoring.

Sample Size Requirements: To be determined following a more thorough assessment of accuracy targets. Preliminary data collected by the IdCDC in 2004 can be used to make these assessments and estimate necessary sample sizes for future work.

Habitat Variables: Habitat variables for the regional model should include stand size and elevation, and may also include measures from geo-referenced data sources, such as soil type, slope, and aspect. Habitat variables for the site-based model should include dominant plant taxa, canopy coverage, and height of (a) grass-forbs, (b) shrubs and saplings, (c) understory trees, and (d) overstory trees. Average diameter-at-breast-height of overstory trees should also be recorded. Landscape variables may be generated from available supporting data, such as recent aerial photography or vegetation maps that provide data on surrounding habitat types. Burn history, prescribed fire treatments, or other fire prevention treatments, need to be included as well. These will likely be available from the BLM and Forest Service as geo-referenced maps. Vegetation plots to characterize community stand structure will be developed by the IdCDC in 2004 and could serve as a model for assessments made elsewhere.

Sampling Plans: Project evaluation surveys probably should employ one-stage systematic sampling, perhaps preceded by stratification, when project areas are small enough for this to be feasible, and should use multi-stage sampling when the strata are too large for this approach. Precision will generally be higher, for a fixed number of stations, with the first approach. The same general approach will probably work to gather data for development of the site-based predictive model, although in most cases strata will be large enough that clusters of point-count stations will be used. Strata should be delineated to insure that a wide range of habitat types is included. Analysis should acknowledge the stratification and multi-stage nature of the sampling plan.

Roles and Responsibilities

Existing and Needed Surveys: Few data exist on pinyon-juniper bird communities in Idaho. In recent years (2003–2004), M. Austin (unpubl. data) has conducted two seasons of breeding bird surveys in pinyon-juniper habitats of southeast Idaho. Although focusing on documenting locations of two focal species, Virginia's Warbler and Pinyon Jay, Austin collected data on all birds seen or heard during census periods. Six permanent point-count transects and their monument routes were developed, and three repeat visits were performed for each route in 2003; plans are to repeat counts again in 2004. All transects were mapped using GPS coordinates for relocation in subsequent years. In part as an extension of this work, the IdCDC will initiate bird surveys in pinyon-juniper in 2004 (see above). Following collection of baseline data, threats to critical pinyon-juniper habitat should be evaluated with short-term assessments of specific management issues. Demographic data to document population viability in a range of habitat conditions (to begin to address the question of what constitutes high quality habitat) are encouraged in subsequent years.

Project Management: With primary project oversight coming from the IBIS steering committee, this issue will be managed through the collaborative efforts of the IDFG Nongame Bird Program, IdPIF, agency biologists, NGOs, and concerned citizens. Cooperative projects with the IdCDC to track birds at high

quality sites is recommended; the IdCDC's new pinyon-juniper bird-habitat study will be closely coordinated with IBIS.

Recommendations for Implementation

- Coordinate with other investigators who have assessed pinyon-juniper birds and their habitats to determine which additional information is still needed
- Decide on a final list of habitat variables and how they will be measured for both models
- Obtain these habitat variables for existing survey transects
- Coordinate bird monitoring efforts with habitat assessments made by IdCDC
- Build on existing surveys by adding more permanent transects for long-term population monitoring
- Identify priority areas, management issues, and target bird species for future work

Summary of Recommendations

The purpose of CBM plans, such as IBIS, is to network existing surveys with each other, to identify important gaps, and to cover these gaps using scientifically-sound methods. One desired result of CBM is that projects that are part of the network will have already undergone significant scientific scrutiny through a peer-review process by the time they may be challenged. Another desired outcome is that access by resource managers to relevant bird data will be improved, thus allowing them to efficiently use limited funds for inventory and monitoring. Such access to data (or metadata) will ultimately be provided through data repositories within Idaho (i.e., IdCDC) and at national data banks (i.e., Patuxent Wildlife Research Center). In addition, dissemination of results from analyses of monitoring data can occur quickly to Idaho partners through the IDFG Nongame Bird Program.

As a first step toward implementing IBIS, we recommend completing the assessment of ongoing monitoring efforts that may be included in a statewide network. Specifically, we ask our partners to review the list of existing surveys (see "Summary of Existing Bird Monitoring and Assessment Projects in Idaho" section above) to determine if all surveys are appropriately listed. For this, we emphasize efforts that are either already designed for longer-term monitoring (>4 years) or that should be made part of a longer-term effort, and efforts that are relevant to a short-term objective (management issue) of this document. Most research projects will likely fall outside the purview of CBM and IBIS; we recommend including only those that address a short-term objective named in this draft document (e.g., site inventories that use standardized methods, habitat-quality studies for single species, etc.).

Secondly, preliminary bird and habitat data already exist for all management issues discussed in this document. We thus recommend completing preliminary analyses on these data sets to: (1) determine how much more sampling needs to be done to adequately address the issues raised; and (2) provide preliminary results from regional and site-based models on those management issues where somewhat comprehensive data sets are already available.

Finally, we recommend implementing the short set of actions listed under each of the management issues (see above) to move forward on each of the short-term goals of the program.

Implementation Steps and Timetable

- Spring 2004
 - ✓ Hire IBIS Coordinator and assistant wildlife technician
 - ✓ Secure funding for initial (3 year) implementation phase
 - ✓ Complete first draft of IBIS (v1.0) and submit for review to Great Basin Bird Observatory, USGS, and the IdPIF Steering Committee
- Summer 2004
 - ✓ Begin testing phase of aquatic site descriptions and survey protocols at a subset (3-5) of sites
 - ✓ The IBIS Coordinator will attempt to visit each discrete aquatic site proposed in the plan to verify information in site descriptions, and amend as needed
- Fall 2004
 - ✓ Revise IBIS according to results of trial field season, as well as expand IBIS to include survey goals and methods for terrestrial sites and species
 - ✓ Identify parties interested in assisting with monitoring at aquatic sites proposed by IBIS
- Winter 2004
 - ✓ Complete IBIS plan (v2.0 – all-bird)
 - ✓ Prepare for expanded 2005 field season

Proposed Action Plan

To implement IBIS, we propose a division-in-labor approach that shares the burden of implementation among the program partners. To facilitate further discussion of the implementation process, we provide here a preliminary list of both long-term (Table 11A) and short-term (Table 11B) program elements, the lead agency/organization for each element, potential funding mechanisms, and current status of element implementation. Note: IBIS partners are asked to fill in and modify these tables during their review of the draft monitoring plan, v1.0.

Coordination between the plan elements will need to be centralized, and we recommend that this is done through IDFG. The role of IDFG would be to provide a data network that accommodates queries from partners, to help partners identify gaps in monitoring coverage, and where possible, provide additional labor to implement the monitoring work. IBIS is not intended to create more work for existing IDFG biologists unless they are given the appropriate authority and have the time and desire to become involved themselves. Rather, monitoring activities by IDFG will be accomplished through the hiring of temporary wildlife technicians on a seasonal basis. These staff will be supervised by the IBIS Coordinator and are likely to be regionally-based, being responsible for monitoring activities throughout geographically distinct portions of the state. Technical oversight on IDFG's work will be provided through Idaho's All-Bird Working Group, the IBIS steering committee, and the USGS – Snake River Field Station through the formal peer-review process involved in scientific publications.

Long-term Monitoring

Table 11A. Summary of IBIS plan elements, agency/organization responsibilities, funding mechanisms, and current status of implementation: long-term monitoring elements.

IBIS Plan Element	Responsible Agency/Organization	Funding Mechanism(s)	Current Status of Implementation
Waterbird Monitoring	IDFG, USFWS, Audubon, volunteers, Teton Regional Land Trust (TRLT), The Nature Conservancy (TNC)	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), federal funds, in-kind contributions	Miscellaneous efforts at NWRs and WMAs; improved coverage anticipated with IBIS v1.0.
Colony Counts	IDFG, USFWS, Audubon, volunteers	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), in-kind contributions	Miscellaneous efforts in BMR-51; improved coverage anticipated with IBIS v1.0.
Shorebird Monitoring	IDFG, USFWS, USGS – Snake River Field Station, Audubon, volunteers	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), federal funds, in-kind contributions	Negligible in past; improved coverage anticipated with IBIS v1.0.
Waterfowl Monitoring	IDFG, USFWS	State and federal funds, hunting licenses	Conducted annually since 1950; continue without changes.
Upland Gamebird Monitoring	IDFG, BLM	State and federal funds, hunting licenses	Conducted annually since 1950; continue without changes.
Landbird Monitoring	IDFG, USFS, BLM, USGS – Snake River Field Station, Potlatch Corporation	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), Challenge Cost Share Agreements, private industry funds	BBS and USFS Northern Region Landbird Monitoring Programs well-established; additional BBS routes and USFS monitoring in BMR-51 anticipated with IBIS v2.0.
Shrubsteppe Bird Monitoring	Idaho Bird Observatory, USGS – Snake River Field Station, BLM	Challenge Cost Share Agreements, federal funds	Existing surveys conducted by IBO anticipated to be expanded with IBIS v2.0.
Nocturnal Bird Monitoring	IDFG, USFS, Idaho Bird Observatory, Potlatch Corporation, Boise State University	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), Challenge Cost Share Agreements, private industry funds, in-kind contributions	Miscellaneous efforts statewide conducted sporadically in the past. Pilot surveys implemented in 2004 at select locations; significant expansion anticipated with IBIS v2.0.
Breeding Raptor Monitoring	Idaho Bird Observatory, Potlatch Corporation, IDFG, USGS – Snake River Field Station, Idaho Power	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), private industry, federal funds	Conducted annually for approximately previous decade; may need to be expanded as time and resources allow.
Winter Raptor Monitoring	IDFG, BLM, USFS, USGS – Snake River Field Station, Boise State University, Idaho Power	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), private industry, federal funds	Conducted annually since 1979; continue without changes.
Migrant Raptor Monitoring	Idaho Bird Observatory, Boise State University, Audubon, volunteers	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), federal funds, non-governmental, in-kind contributions	Conducted annually for approximately previous decade; may need to be expanded as time and resources allow.
Migrant Songbird Monitoring	Idaho Bird Observatory, Boise State University, Audubon, volunteers	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), federal funds, non-governmental, in-kind contributions	Conducted annually for approximately previous 5 years; may need to be expanded as time and resources allow.
Black Swift Surveys	IDFG, Audubon, volunteers	Nongame Wildlife Program (IDFG), in-kind contributions	None prior to 2004; improved coverage with IBIS v2.0.
Harlequin Duck Surveys	IDFG, USFS	Nongame Wildlife Program (IDFG), federal funds	Conducted annually since 1987; additional surveys are needed in new areas in future years.
Bald Eagle Territory Monitoring	IDFG, USFS, BLM, TRLT	Nongame Wildlife Program (IDFG), federal funds, non-governmental, in-kind contributions	Conducted annually since 1979; continue without changes.
Peregrine Falcon Territory Monitoring	IDFG, USFS	Nongame Wildlife Program (IDFG), federal funds	Conducted annually since 1985; continue without changes.

Short-term Monitoring

Table 11B. Summary of IBIS plan elements, agency/organization responsibilities, funding mechanisms, and current status of implementation: short-term monitoring elements.

IBIS Plan Element	Responsible Agency/Organization	Funding Mechanism(s)	Current Status of Implementation
Inventory of IDFG Wildlife Management Areas (WMAs) for birds in all seasons	IDFG	Nongame Wildlife Program (IDFG) and State Wildlife Grants (USFWS)	Existing inventories vary by WMA, including both completeness (i.e., information on all species) and how recently they were conducted. Pilot work under IBIS v1.0 initiated in 2004; significant improvements anticipated in future years.
Effects of wetland loss and degradation	IDFG, USFWS, BLM, USFS, private industry, non-governmental organizations (e.g., TNC, DU, TRLT)	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), federal funds, Challenge Cost Share Agreements, private industry	Idaho's waterbirds (and shorebirds) have not been previously monitored in any sort of statewide, coordinated manner. This element is one of the highest priorities for implementation with IBIS v1.0.
Conflicts between piscivorous birds and fish populations	IDFG, USFWS, Audubon, volunteers	Nongame Wildlife and Fisheries Programs (IDFG), State Wildlife Grants (USFWS), federal funds, in-kind contributions	There have been no comprehensive studies to document the impact of piscivorous birds on Idaho's fisheries. Some ongoing work at Blackfoot Reservoir involves cormorants and pelicans. Additional information is needed.
Effects of altering riparian habitats	IDFG, BLM, USFS, private industry, TNC, DU	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), federal funds, Challenge Cost Share Agreements, private industry	Few examples of long-term monitoring of riparian birds in Idaho exist. Studies have been conducted sporadically, especially in eastern Idaho. Improved coverage anticipated with IBIS v2.0.
Condition of aspen habitat and importance for birds	IDFG, BLM, USFS, private industry	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), federal funds, Challenge Cost Share Agreements, private industry	Few data exist on relationships between the condition of aspen stands and bird communities in Idaho. Basic descriptions of aspen bird community composition, relative abundance of species, and stand condition are anticipated with IBIS v2.0 in the near future.
Identification of high quality habitat and effects of land-use practices in sagebrush communities	IDFG, BLM, USGS – Snake River Field Station, Idaho Bird Observatory	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), Challenge Cost Share Agreements, federal funds	Immediate needs are to address the short-term management issue of whether sage-grouse function effectively as umbrella species. This requires that IBIS support ongoing work by IBO, either by providing funding and/or technical assistance with survey work.
Forest thinning and fuels reduction projects, especially in Ponderosa Pine habitats	USFS, Potlatch Corporation, IDFG, IdPIF Pine Task Force	Federal funds, National Forest Foundation, private industry, Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS)	Surveys specifically designed to address this management issue are lacking. A network of sites that would allow data to be pooled for "meta-analysis" is desirable; IBIS v2.0 will provide a framework under which this could be achieved.
Effects of management in Pinyon-Juniper habitats	IDFG, USFS, BLM, Red Willow Research (RWR)	Nongame Wildlife Program (IDFG), State Wildlife Grants (USFWS), Challenge Cost Share Agreements, in-kind contributions	Few data exist on pinyon-juniper bird communities in Idaho. RWR conducted two seasons of breeding bird surveys in southeastern Idaho in 2003–2004. IdCDC also will initiate bird surveys in 2004 in south-central Idaho. IBIS v2.0 will outline protocols to support these efforts, although proposed future monitoring under IBIS is limited.

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Appendix A. Avian Species in Idaho that Warrant Monitoring

Listed are all avian species that regularly occur in Idaho during at least one season

Classification Levels (according to BCR assessment scores adjusted for Idaho by IdPIF):

- 1 – Highest Priority
- 2 – Moderate Priority
- 3 – Low Priority
- 4 – No Priority
- NB – Non-breeder

Management Issues:

- a = Aspen Habitat Condition
- f = Bird-fish Conflicts
- j = Pinyon-juniper Management
- p = Forest Thinning, Particularly in Ponderosa Pine
- r = Riparian Alteration
- s = Sagebrush Fires and Post-fire Restoration
- w = Wetland Loss and Degradation

Survey Techniques:

- 1 = BBS & Similar Point Count Surveys
- 2 = Area Searches for Landbirds
- 3 = Area Searches for Waterbirds
- 4 = Migration Monitoring Programs
- 5 = Nest Success Programs
- 6 = Colony Counts
- 7 = Aerial Surveys
- 8 = Nocturnal Surveys
- 9 = Upland Gamebird Surveys
- 10 = Other Surveys

Species:	Initiative	Classification Level:		Season(s) of occurrence	Mgmt Issue	Survey Techn.
		BCR-9	BCR-10			
Red-throated Loon - <i>Gavia stellata</i>	Waterbird	NB	NB	M	w,f	3
Pacific Loon - <i>Gavia pacifica</i>	Waterbird	NB	NB	M	w,f	3
Common Loon - <i>Gavia immer</i>	Waterbird		2	BMW	w,f	3,5,7
Pied-billed Grebe - <i>Podilymbus podiceps</i>	Waterbird	4	3	BW	w,f	3,5
Horned Grebe - <i>Podiceps auritus</i>	Waterbird		4	BMW	w,f	3,5,7
Red-necked Grebe - <i>Podiceps grisegena</i>	Waterbird		3	BW	w,f	3,5,7
Eared Grebe - <i>Podiceps nigricollis</i>	Waterbird	2	4	BMW	w,f	3,5
Western Grebe - <i>Aechmophorus occidentalis</i>	Waterbird	3	3	BW	w,f	3,5,7
Clark's Grebe - <i>Aechmophorus clarkii</i>	Waterbird	3	3	BW	w,f	3,5,7
American White Pelican - <i>Pelecanus erythrorhynchos</i>	Waterbird	2	2	BMW	w,f	5,6,7
Double-crested Cormorant - <i>Phalacrocorax auritus</i>	Waterbird	4	4	BMW	w,f	3,5,6
American Bittern - <i>Botaurus lentiginosus</i>	Waterbird	3	3	B	w,f	1,3,5
Great Blue Heron - <i>Ardea herodias</i>	Waterbird	4	4	BW	r,w,f	3,5,6
Great Egret - <i>Ardea alba</i> **	Waterbird	2	NB	BW	r,w,f	3,5,6
Snowy Egret - <i>Egretta thula</i> **	Waterbird	4	4	BM	r,w,f	3,5,6
Cattle Egret - <i>Bubulcus ibis</i>	Waterbird	4	4	BM	w,f	3,5,6
Green Heron - <i>Butorides virescens</i>	Waterbird	4		BMW	r,w,f	1,3
Black-crowned Night-Heron - <i>Nycticorax nycticorax</i>	Waterbird	3	4	BMW	r,w,f	3,5,6
White-faced Ibis - <i>Plegadis chihi</i> **	Waterbird	2	4	B	w	3,5,6
Turkey Vulture - <i>Cathartes aura</i>	Landbird	4	4	BM	j,s	1,2,3
Tundra Swan - <i>Cygnus columbianus</i>	Waterfowl	NB	NB	BM	w	3,7
Trumpeter Swan - <i>Cygnus buccinator</i>	Waterfowl		1	BMW	w	3,7,10
Greater White-fronted Goose - <i>Anser albifrons</i>	Waterfowl	NB	NB	M	w	3,7
Snow Goose - <i>Chen caerulescens</i>	Waterfowl	NB	NB	M	w	3,7
Ross' Goose - <i>Chen rossii</i>	Waterfowl	NB	NB	MW	w	3,7
Canada Goose - <i>Branta canadensis</i>	Waterfowl	4	4	BW	r,w	3,7,10
Wood Duck - <i>Aix sponsa</i>	Waterfowl	3	3	BW	r,w	3,5
Green-winged Teal - <i>Anas crecca</i>	Waterfowl	4	4	BW	w	3,7,10
Mallard - <i>Anas platyrhynchos</i>	Waterfowl	4	4	BW	w	3,5,7
Northern Pintail - <i>Anas acuta</i>	Waterfowl	3	4	BW	w	3,7,10
Blue-winged Teal - <i>Anas discors</i>	Waterfowl	3	4	B	w	3,5,7
Cinnamon Teal - <i>Anas cyanoptera</i>	Waterfowl	2	4	BW	w	3,5,7
Northern Shoveler - <i>Anas clypeata</i>	Waterfowl	4	4	BW	w	3,7,10
Gadwall - <i>Anas strepera</i>	Waterfowl	2	4	BW	w	3,5,7
Eurasian Wigeon - <i>Anas penelope</i>	Waterfowl	NB	NB	MW	w	3
American Wigeon - <i>Anas americana</i>	Waterfowl	4	4	BW	w	3,7,10
Canvasback - <i>Aythya valisineria</i>	Waterfowl	3	3	BMW	w	3,7,10
Redhead - <i>Aythya americana</i>	Waterfowl	2	3	BW	w	3,7,10
Ring-necked Duck - <i>Aythya collaris</i>	Waterfowl	3	3	BMW	w	3,7,10
Greater Scaup - <i>Aythya marila</i>	Waterfowl	NB	NB	MW	w	7,10
Lesser Scaup - <i>Aythya affinis</i>	Waterfowl	4	4	BW	w	5,7,10
Harlequin Duck - <i>Histrionicus histrionicus</i>	Waterfowl		2	B	r,w	3,5,7
Long-tailed Duck - <i>Clangula hyemalis</i>	Waterfowl	NB	NB	MW	w	7
Surf Scoter - <i>Melanitta perspicillata</i>	Waterfowl	NB	NB	MW	w	3,7,10

Species:	Initiative	Classification		Season(s) of occurrence	Mgmt Issue	Survey Techn.
		Level: BCR-9	BCR-10			
White-winged Scoter - <i>Melanitta fusca</i>	Waterfowl	NB	NB	MW	w	3,7,10
Common Goldeneye - <i>Bucephala clangula</i>	Waterfowl		3	BW	r,w	3,5,10
Barrow's Goldeneye - <i>Bucephala islandica</i>	Waterfowl		2	BW	r,w	3,5,10
Bufflehead - <i>Bucephala albeola</i>	Waterfowl	3	3	BW	r,w	3,5,10
Hooded Merganser - <i>Lophodytes cucullatus</i>	Waterfowl		3	BW	r,w,f	3,5
Common Merganser - <i>Mergus merganser</i>	Waterfowl	4	3	BW	r,w,f	3,10
Red-breasted Merganser - <i>Mergus serrator</i>	Waterfowl	NB	NB	MW	w,f	3,10
Ruddy Duck - <i>Oxyura jamaicensis</i>	Waterfowl	2	3	BW	w	3,5,7
Osprey - <i>Pandion haliaetus</i>	Landbird	3	4	B	r,w,f	1,2,4,5
Bald Eagle - <i>Haliaeetus leucocephalus</i>	Landbird	1	1	BW	r,w,f	2,4,5,10
Northern Harrier - <i>Circus cyaneus</i>	Landbird	2	3	BW	r,s,w	1,2,4,5
Sharp-shinned Hawk - <i>Accipiter striatus</i>	Landbird	3	3	BW	a,r	1,2,4,5,10
Cooper's Hawk - <i>Accipiter cooperii</i>	Landbird	3	3	BW	a,r	2,4,5,10
Northern Goshawk - <i>Accipiter gentilis</i>	Landbird	2	2	BW	a,r	2,4,5,10
Broad-winged Hawk - <i>Buteo platypterus</i> **	Landbird	NB	NB	M		2,4
Swainson's Hawk - <i>Buteo swainsoni</i>	Landbird	2	2	B	r,s	1,2,4,5
Red-tailed Hawk - <i>Buteo jamaicensis</i>	Landbird	4	4	BW	a,r,s	1,2,4,5
Ferruginous Hawk - <i>Buteo regalis</i>	Landbird	1	1	BMW	j,s	2,4,5,10
Rough-legged Hawk - <i>Buteo lagopus</i>	Landbird	NB	NB	MW	s	2,4
Golden Eagle - <i>Aquila chrysaetos</i>	Landbird	2	3	BW	s	2,4,5,10
American Kestrel - <i>Falco sparverius</i>	Landbird	3	3	BW	s	1,2,4,5
Merlin - <i>Falco columbarius</i>	Landbird		4	BMW	p,r,s	2,4,5
Peregrine Falcon - <i>Falco peregrinus</i>	Landbird	1	1	BMW	s,w	2,4,5,10
Gyrfalcon - <i>Falco rusticolus</i>	Landbird	NB	NB	MW		
Prairie Falcon - <i>Falco mexicanus</i>	Landbird	1	2	BW	s	2,5,10
Gray Partridge - <i>Perdix perdix</i>	Landbird		4	BW	s	1,5,9
Chukar - <i>Alectoris chukar</i>	Landbird	2	4	BW	s	5,9
Ring-necked Pheasant - <i>Phasianus colchicus</i>	Landbird	4	4	BW	s,w	1,5,9
Spruce Grouse - <i>Falcipennis canadensis</i>	Landbird		2	BW		5
Blue Grouse - <i>Dendragapus obscurus</i>	Landbird	1	2	BW	a,r	5,9
Ruffed Grouse - <i>Bonasa umbellus</i>	Landbird		2	BW	a,r	1,5,9
Greater Sage-Grouse - <i>Centrocercus urophasianus</i>	Landbird	1	1	BW	s	5,9
Sharp-tailed Grouse - <i>Tympanuchus phasianellus</i>	Landbird	2	3	BW	s	5,9
Wild Turkey - <i>Meleagris gallopavo</i>	Landbird		3	BW	p,r	1,5,9
Gambel's Quail - <i>Callipepla gambelii</i> *	Landbird	NB		BW	r,s	1,5,9
California Quail - <i>Callipepla californica</i>	Landbird	2	3	BW	r,s	1,5,9
Mountain Quail - <i>Oreortyx pictus</i>	Landbird	2	2	BW	p,r,s	5,9
Virginia Rail - <i>Rallus limicola</i>	Waterbird	3	3	BMW	w	5,8
Sora - <i>Porzana carolina</i>	Waterbird	4	4	B	w	1,5,8
American Coot - <i>Fulica americana</i>	Waterbird	4	4	BW	w	3,5,10
Sandhill Crane - <i>Grus canadensis</i>	Waterbird	3	3	BM	r,w	3,5,7
Black-bellied Plover - <i>Pluvialis squatarola</i>	Shorebird	NB	NB	M	w	3
American Golden-Plover - <i>Pluvialis dominica</i>	Shorebird	NB	NB	M	w	3
Snowy Plover - <i>Charadrius alexandrinus</i>	Shorebird	3	3	BM	w	3,5,10
Semipalmated Plover - <i>Charadrius semipalmatus</i>	Shorebird	NB	NB	M	w	3
Killdeer - <i>Charadrius vociferus</i>	Shorebird	3	4	BMW	r,w	1,3,5

Species:	Initiative	Classification		Season(s) of occurrence	Mgmt Issue	Survey Techn.
		Level: BCR-9	BCR-10			
Black-necked Stilt - <i>Himantopus mexicanus</i> *	Shorebird	2	4	BM	w	3,5,10
American Avocet - <i>Recurvirostra americana</i>	Shorebird	3	3	BM	w	3,5,10
Greater Yellowlegs - <i>Tringa melanoleuca</i>	Shorebird	NB	NB	MW	w	3
Lesser Yellowlegs - <i>Tringa flavipes</i>	Shorebird	NB	NB	MW	w	3
Solitary Sandpiper - <i>Tringa solitaria</i>	Shorebird	NB	NB	M	w	3
Willet - <i>Catoptrophorus semipalmatus</i>	Shorebird	2	3	BM	w	1,3,5,10
Spotted Sandpiper - <i>Actitis macularia</i>	Shorebird	4	3	BM	r,w	3,5,10
Upland Sandpiper - <i>Bartramia longicauda</i> **	Shorebird	NB	2	B	w	1,5,10
Whimbrel - <i>Numenius phaeopus</i>	Shorebird	NB	NB	M	w	3
Long-billed Curlew - <i>Numenius americanus</i>	Shorebird	2	3	B	s,w	1,3,5,10
Marbled Godwit - <i>Limosa fedoa</i>	Shorebird	NB	NB	M	w	1,3,10
Sanderling - <i>Calidris alba</i>	Shorebird	NB	NB	M	w	3
Semipalmated Sandpiper - <i>Calidris pusilla</i>	Shorebird	NB	NB	M	w	3
Western Sandpiper - <i>Calidris mauri</i>	Shorebird	NB	NB	M	w	3
Least Sandpiper - <i>Calidris minutilla</i>	Shorebird	NB	NB	M	w	3
Baird's Sandpiper - <i>Calidris bairdii</i>	Shorebird	NB	NB	M	w	3
Pectoral Sandpiper - <i>Calidris melanotos</i>	Shorebird	NB	NB	M	w	3
Dunlin - <i>Calidris alpina</i>	Shorebird	NB	NB	M	w	3
Stilt Sandpiper - <i>Calidris himantopus</i>	Shorebird	NB	NB	M	w	3
Long-billed Dowitcher - <i>Limnodromus scolopaceus</i>	Shorebird	NB	NB	M	w	3
Short-billed Dowitcher - <i>Limnodromus griseus</i>	Shorebird	NB	NB	M	w	3
Wilson's Snipe - <i>Gallinago delicata</i>	Shorebird	3	4	BMW	w	1,3,5,10
Wilson's Phalarope - <i>Phalaropus tricolor</i>	Shorebird	1	1	BM	w	3,10
Red-necked phalarope - <i>Phalaropus lobatus</i>	Shorebird	NB	NB	M	w	3
Franklin's Gull - <i>Larus pipixcan</i>	Waterbird	3	3	B	w,f	3,5,6
Bonaparte's Gull - <i>Larus philadelphia</i>	Waterbird	NB	NB	M	w,f	3
Mew Gull - <i>Larus canus</i> *	Waterbird	NB	NB	MW	w,f	3
Ring-billed Gull - <i>Larus delawarensis</i>	Waterbird	4	4	BW	w,f	3,5,6
California Gull - <i>Larus californicus</i>	Waterbird	2	3	BMW	w,f	3,5,6
Herring Gull - <i>Larus argentatus</i>	Waterbird	NB	NB	MW	w,f	3,6
Thayer's Gull - <i>Larus thayeri</i>	Waterbird	NB	NB	MW	w	3
Glaucous-winged Gull - <i>Larus glaucescens</i>	Waterbird	NB	NB	MW	w,f	3,6
Glaucous Gull - <i>Larus hyperboreus</i>	Waterbird	NB	NB	MW	w,f	3
Sabine's Gull - <i>Xema sabini</i>	Waterbird	NB	NB	M	w,f	3
Caspian Tern - <i>Sterna caspia</i>	Waterbird	4	4	B	r,w,f	3,5,6
Common Tern - <i>Sterna hirundo</i>	Waterbird		4	B	w,f	3,5,6
Arctic Tern - <i>Sterna paradisaea</i>	Waterbird	NB	NB	M	w,f	3,6
Forster's Tern - <i>Sterna forsteri</i>	Waterbird	3	3	B	w,f	3,6,10
Black Tern - <i>Chlidonias niger</i>	Waterbird	2	2	B	w,f	3,6,10
Rock Pigeon - <i>Columba livia</i>	Landbird	4	4	BW	s	1,2,5
Band-tailed Pigeon - <i>Patagioenas fasciata</i>	Landbird	3	NB	M		1,2,4,5,10
Mourning Dove - <i>Zenaidura macroura</i>	Landbird	4	4	BW	j,r,s	1,2,4,5,10
Yellow-billed Cuckoo - <i>Coccyzus americanus</i> *	Landbird	2	2	B	r	1,2,4,5,10
Barn Owl - <i>Tyto alba</i>	Landbird	3	3	BW	r,w	2,4,5,8
Flammulated Owl - <i>Otus flammeolus</i>	Landbird	1	1	BM	a,p	4,5,8
Western Screech-Owl - <i>Megascops kennicottii</i>	Landbird	3	3	BW	a,r	1,2,5,8

Species:	Initiative	Classification		Season(s) of occurrence	Mgmt Issue	Survey Techn.
		Level: BCR-9	BCR-10			
Great Horned Owl - <i>Bubo virginianus</i>	Landbird	4	4	BW	a,p,r	1,2,5,8
Snowy Owl - <i>Bubo scandiacus</i>	Landbird	NB	NB	MW		2,4,10
Northern Pygmy-Owl - <i>Glaucidium gnoma</i>	Landbird	2	2	BW	a,p,r	1,2,5,8
Burrowing Owl - <i>Athene cunicularia</i>	Landbird	3	3	B	s	1,4,5
Barred Owl - <i>Strix varia</i>	Landbird	4	4	BW	r	1,2,5,8
Great Gray Owl - <i>Strix nebulosa</i>	Landbird		2	BW	r,w	2,5,8,10
Long-eared Owl - <i>Asio otus</i>	Landbird	3	3	BW	a,r	2,4,5,8,10
Short-eared Owl - <i>Asio flammeus</i>	Landbird	2	3	BW	r,s,w	1,2,4,5,8
Boreal Owl - <i>Aegolius funereus</i>	Landbird	NB	2	BW	a	5,8
Northern Saw-whet Owl - <i>Aegolius acadicus</i>	Landbird	3	3	BW	r	2,4,5,8
Common Nighthawk - <i>Chordeiles minor</i>	Landbird	4	4	B	r,s,w	1,2,4,5,8
Common Poorwill - <i>Phalaenoptilus nuttallii</i>	Landbird	3	3	B	j,s	1,5,8
Black Swift - <i>Cypseloides niger</i> *	Landbird	1	1	B	r,w	1,5,6,10
Vaux's Swift - <i>Chaetura vauxi</i>	Landbird	3	2	B	w	1,2,4,5
White-throated Swift - <i>Aeronautes saxatalis</i>	Landbird	3	3	B	r,s,w	1,2,5,6
Black-chinned Hummingbird - <i>Archilochus alexandri</i>	Landbird	3	3	BM	r,s	1,2,4,5,10
Anna's Hummingbird - <i>Calypte anna</i>	Landbird	3		M		1,2,10
Calliope Hummingbird - <i>Stellula calliope</i>	Landbird	1	1	B	r	1,2,4,5,10
Broad-tailed Hummingbird - <i>Selasphorus platycercus</i>	Landbird	3	3	B	a,r	1,2,4,5,10
Rufous Hummingbird - <i>Selasphorus rufus</i>	Landbird		3	BM	a,p,r	1,2,4,5,10
Belted Kingfisher - <i>Ceryle alcyon</i>	Landbird	3	3	BW	r,f	1,2,4,5
Lewis' Woodpecker - <i>Melanerpes lewis</i>	Landbird	1	1	BM	r,p	1,2,5
Red-naped Sapsucker - <i>Sphyrapicus nuchalis</i>	Landbird	3	1	BM	a,r	1,2,4,5
Williamson's Sapsucker - <i>Sphyrapicus thyroideus</i>	Landbird	1	1	BM	a,r	1,2,5
Downy Woodpecker - <i>Picoides pubescens</i>	Landbird	4	4	BW	a,p,r	1,2,5
Hairy Woodpecker - <i>Picoides villosus</i>	Landbird	3	4	BW	p,r	1,2,5
White-headed Woodpecker - <i>Picoides albolarvatus</i>	Landbird	1	1	BW	p,r	1,2,5
American Three-toed Woodpecker - <i>Picoides dorsalis</i>	Landbird	2	2	BW		1,2,5
Black-backed Woodpecker - <i>Picoides arcticus</i>	Landbird	2	2	BW	p	1,2,5
Northern Flicker - <i>Colaptes auratus</i>	Landbird	4	4	BW	a,p,r	1,2,4,5
Pileated Woodpecker - <i>Dryocopus pileatus</i>	Landbird	4	4	BW	p	1,2,5
Olive-sided Flycatcher - <i>Contopus cooperi</i>	Landbird	2	2	B		1,2,4,5
Western Wood-Pewee - <i>Contopus sordidulus</i>	Landbird	3	3	B	a,p,r	1,2,4,5
Willow Flycatcher - <i>Empidonax traillii</i>	Landbird	1	3	B	r	1,2,4,5
Least Flycatcher - <i>Empidonax minimus</i>	Landbird	4		B		1,2,4,5
Hammond's Flycatcher - <i>Empidonax hammondii</i>	Landbird	1	1	B	a	1,2,4,5
Dusky Flycatcher - <i>Empidonax oberholseri</i>	Landbird	2	2	B	a,r	1,2,4,5
Gray Flycatcher - <i>Empidonax wrightii</i> **	Landbird	2	3	B	j,s	1,2,4,5
Cordilleran Flycatcher - <i>Empidonax occidentalis</i>	Landbird	3	3	B	a	1,2,5
Say's Phoebe - <i>Sayornis saya</i>	Landbird	3	3	BM	s	1,2,4,5
Ash-throated Flycatcher - <i>Myiarchus cinerascens</i> **	Landbird	4	4	B	j,s	1,2,4,5
Western Kingbird - <i>Tyrannus verticalis</i>	Landbird	3	4	B	r,s	1,2,4,5
Eastern Kingbird - <i>Tyrannus tyrannus</i>	Landbird	4	4	B	r,s	1,2,4,5
Northern Shrike - <i>Lanius excubitor</i>	Landbird	NB	NB	MW	j,s	2,4
Loggerhead Shrike - <i>Lanius ludovicianus</i>	Landbird	2	2	BMW	j,s	1,2,4,5
Cassin's Vireo - <i>Vireo cassinii</i>	Landbird	2	2	BM	p	1,2,4,5

Species:	Initiative	Classification		Season(s) of occurrence	Mgmt Issue	Survey Techn.
		Level: BCR-9	BCR-10			
Plumbeous Vireo - <i>Vireo plumbeus</i>	Landbird	3	3	B	j,r	1,2,5
Warbling Vireo - <i>Vireo gilvus</i>	Landbird	3	3	B	a,r	1,2,4,5
Red-eyed Vireo - <i>Vireo olivaceus</i>	Landbird		3	B	r	1,2,4,5
Gray Jay - <i>Perisoreus canadensis</i>	Landbird	4	4	BW		1,2,5
Steller's Jay - <i>Cyanocitta stelleri</i>	Landbird	4	4	BW	j,p	1,2,5
Blue Jay - <i>Cyanocitta cristata</i>	Landbird	NB	NB	MW		2
Western Scrub-Jay - <i>Aphelocoma californica</i> **	Landbird	4		BW	j	1,2,5
Pinyon Jay - <i>Gymnorhinus cyanocephalus</i> **	Landbird	2	3	BW	j	1,2,5
Clark's Nutcracker - <i>Nucifraga columbiana</i>	Landbird	3	2	BW	j,p	1,2,5
Black-billed Magpie - <i>Pica hudsonia</i>	Landbird	3	3	BW	j,r,s	1,2,5
American Crow - <i>Corvus brachyrhynchos</i>	Landbird	4	4	BW	r	1,2,4,5
Common Raven - <i>Corvus corax</i>	Landbird	4	4	BW	p,s	1,2,5
Horned Lark - <i>Eremophila alpestris</i>	Landbird	4	4	BW	s	1,2,4,5
Tree Swallow - <i>Tachycineta bicolor</i>	Landbird	4	3	B	a,r,w	1,2,3,4,5
Violet-green Swallow - <i>Tachycineta thalassina</i>	Landbird	4	4	B	r	1,2,3,4,5
N. Rough-winged Swallow - <i>Stelgidopteryx serripennis</i>	Landbird	2	3	B	r,s,w	1,2,4,5
Bank Swallow - <i>Riparia riparia</i>	Landbird	4	4	B	r,w	1,2,4,5,6
Cliff Swallow - <i>Petrochelidon pyrrhonota</i>	Landbird	4	4	B	r,s	1,2,4,5,6
Barn Swallow - <i>Hirundo rustica</i>	Landbird	4	4	B	r,w	1,2,4,5
Black-capped Chickadee - <i>Poecile atricapillus</i>	Landbird		4	BW	a,p,r	1,2,5
Mountain Chickadee - <i>Poecile gambeli</i>	Landbird	3	2	BW	a,p	1,2,5
Boreal Chickadee - <i>Poecile hudsonica</i> *	Landbird	NB	4	BW		5
Chestnut-backed Chickadee - <i>Poecile rufescens</i>	Landbird	NB	3	BW	p	1,2,5
Juniper Titmouse - <i>Baeolophus ridgwayi</i> **	Landbird	3	3	BW	j	1,2,5
Bushtit - <i>Psaltriparus minimus</i> **	Landbird	4	NB	BW	j,r	1,2,5
Red-breasted Nuthatch - <i>Sitta canadensis</i>	Landbird	4	2	BW	p	1,2,4,5
White-breasted Nuthatch - <i>Sitta carolinensis</i>	Landbird	4	4	BW	p,r	1,2,5
Pygmy Nuthatch - <i>Sitta pygmaea</i> *	Landbird	2	2	BW	p	1,2,5
Brown Creeper - <i>Certhia americana</i>	Landbird	3	4	BW	p	1,2,4,5
Rock Wren - <i>Salpinctes obsoletus</i>	Landbird	2	3	BMW	s	1,3,5
Canyon Wren - <i>Catherpes mexicanus</i>	Landbird	3	3	BMW		1,2,5
Bewick's Wren - <i>Thryomanes bewickii</i>	Landbird	4	3	BMW	r	1,25
House Wren - <i>Troglodytes aedon</i>	Landbird	4	4	BMW	a,r	1,2,4,5
Winter Wren - <i>Troglodytes troglodytes</i>	Landbird	4	4	BW	r	1,2,4,5
Marsh Wren - <i>Cistothorus palustris</i>	Landbird	2	3	BMW	r	1,2,3,4,5
American Dipper - <i>Cinclus mexicanus</i>	Landbird	3	2	BW	r	1,2,5
Golden-crowned Kinglet - <i>Regulus satrapa</i>	Landbird	3	3	BW	a,j,r	1,2,4,5
Ruby-crowned Kinglet - <i>Regulus calendula</i>	Landbird	3	3	BMW	j,r	1,2,4,5
Blue-gray Gnatcatcher - <i>Polioptila caerulea</i> **	Landbird	4	4	B	j,r	1,2,4,5
Western Bluebird - <i>Sialia mexicana</i>	Landbird	4	4	BM	j,r	1,2,4,5
Mountain Bluebird - <i>Sialia currucoides</i>	Landbird	3	2	BMW	j,r,s	1,2,4,5
Townsend's Solitaire - <i>Myadestes townsendi</i>	Landbird	3	2	BW	j	1,2,4,5
Veery - <i>Catharus fuscescens</i>	Landbird		3	B	r	1,2,4,5
Swainson's Thrush - <i>Catharus ustulatus</i>	Landbird	4	3	B	a,r	1,2,4,5
Hermit Thrush - <i>Catharus guttatus</i>	Landbird	4	4	BMW	p	1,2,4,5

Species:	Initiative	Classification		Season(s) of occurrence	Mgmt Issue	Survey Techn.
		Level: BCR-9	BCR-10			
American Robin - <i>Turdus migratorius</i>	Landbird	4	4	BW	j,r	1,2,4,5
Varied Thrush - <i>Ixoreus naevius</i>	Landbird	NB	3	BW		1,2,4,5
Gray Catbird - <i>Dumetella carolinensis</i>	Landbird		4	B	r	1,2,4,5
Northern Mockingbird - <i>Mimus polyglottos</i>	Landbird	4	4	B	r,s	1,2,4,5
Sage Thrasher - <i>Oreoscoptes montanus</i>	Landbird	2	2	B	s	1,2,4,5
European Starling - <i>Sturnus vulgaris</i>	Landbird	4	4	BW	a,r,w	1,2,5
American Pipit - <i>Anthus rubescens</i>	Landbird		4	BMW		1,2,4,5
Bohemian Waxwing - <i>Bombycilla garrulus</i>	Landbird	NB	4	BMW	r	2,4,5
Cedar Waxwing - <i>Bombycilla cedrorum</i>	Landbird	4	4	BW	j,r	1,2,4,5
Orange-crowned Warbler - <i>Vermivora celata</i>	Landbird	4	4	BMW	a,r	1,2,4,5
Nashville Warbler - <i>Vermivora ruficapilla</i>	Landbird	3	3	BM	p,r	1,2,4,5
Virginia's Warbler - <i>Vermivora virginiae</i> **	Landbird	3	1	B	j	1,2,4,5
Yellow Warbler - <i>Dendroica petechia</i>	Landbird	4	4	B	r	1,2,4,5
Chestnut-sided Warbler - <i>Dendroica pensylvanica</i>	Landbird	NB	NB	M		2,4
Magnolia Warbler - <i>Dendroica magnolia</i> **	Landbird	NB	NB	M		2,4
Yellow-rumped Warbler - <i>Dendroica coronata</i>	Landbird	4	4	BMW	a,r	1,2,4,5
Black-throated Gry. Warbler - <i>Dendroica nigrescens</i> **	Landbird	3	3	B	j	1,2,4,5
Townsend's Warbler - <i>Dendroica townsendi</i>	Landbird		2	BM		1,2,4,5
Blackpoll Warbler - <i>Dendroica striata</i>	Landbird	NB	NB	M		2,4
Black-and-white Warbler - <i>Mniotilta varia</i>	Landbird	NB	NB	M		2,4
American Redstart - <i>Setophaga ruticilla</i>	Landbird	4	4	BM	r	1,2,4,5
Ovenbird - <i>Seiurus aurocapilla</i>	Landbird	NB	NB	M		2,4
Northern Waterthrush - <i>Seiurus noveboracensis</i>	Landbird	NB	4	B	a,r	1,2,4,5
MacGillivray's Warbler - <i>Oporornis tolmiei</i>	Landbird	2	2	B	r	1,2,4,5
Common Yellowthroat - <i>Geothlypis trichas</i>	Landbird	4	4	B	r,w	1,2,4,5
Wilson's Warbler - <i>Wilsonia pusilla</i>	Landbird	3	3	BM	r	1,2,4,5
Yellow-breasted Chat - <i>Icteria virens</i>	Landbird	3	3	B	r	1,2,4,5
Western Tanager - <i>Piranga ludoviciana</i>	Landbird	3	2	B	a,j,p,r	1,2,4,5
Black-headed Grosbeak - <i>Pheucticus melanocephalus</i>	Landbird	3	3	B	r	1,2,4,5
Rose-breasted Grosbeak - <i>Pheucticus ludovicianus</i>	Landbird	NB	NB	M		2,4
Blue Grosbeak - <i>Passerina caerulea</i> **	Landbird	4	4	B	r	1,2,4,5
Lazuli Bunting - <i>Passerina amoena</i>	Landbird	2	2	B	j,r	1,2,4,5
Indigo Bunting - <i>Passerina cyanea</i>	Landbird	NB	NB	M	r	2,4
Green-tailed Towhee - <i>Pipilo chlorurus</i>	Landbird	3	2	B	j	1,2,4,5
Spotted Towhee - <i>Pipilo maculatus</i>	Landbird	4	3	BMW	r	1,2,4,5
American Tree Sparrow - <i>Spizella arborea</i>	Landbird	NB	NB	MW		2,4
Chipping Sparrow - <i>Spizella passerina</i>	Landbird	4	3	BM	j,r,s	1,2,4,5
Brewer's Sparrow - <i>Spizella breweri</i>	Landbird	1	2	B	j,s	1,2,4,5
Vesper Sparrow - <i>Poocetes gramineus</i>	Landbird	4	4	B	s	1,2,4,5
Lark Sparrow - <i>Chondestes grammacus</i>	Landbird	3	3	BM	j,s	1,2,5
Black-throated Sparrow - <i>Amphispiza bilineata</i> **	Landbird	2	3	B	j,s	1,4,5
Sage Sparrow - <i>Amphispiza belli</i> **	Landbird	2	2	B	s	1,4,5
Lark Bunting - <i>Calamospiza melanocorys</i>	Landbird		2	BM	s	1,2,5
Savannah Sparrow - <i>Passerculus sandwichensis</i>	Landbird	4	4	BM	r,w	1,2,4,5
Grasshopper Sparrow - <i>Ammodramus savannarum</i>	Landbird	3	3	B		1,4,5
Fox Sparrow - <i>Passerella iliaca</i>	Landbird	4	4	BM	r	1,2,4,5

Species:	Initiative	Classification Level:		Season(s) of occurrence	Mgmt Issue	Survey Techn.
		BCR-9	BCR-10			
Song Sparrow - <i>Melospiza melodia</i>	Landbird	4	4	BW	r,w	1,2,4,5
Lincoln's Sparrow - <i>Melospiza lincolni</i>	Landbird	4	4	BMW	r	1,2,4,5
Swamp Sparrow - <i>Melospiza georgiana</i>	Landbird	NB	NB	MW	r,w	2,4
White-throated Sparrow - <i>Zonotrichia albicollis</i>	Landbird	NB	NB	MW		2,4
Golden-crowned Sparrow - <i>Zonotrichia atricapilla</i>	Landbird	NB	NB	MW	r	2,4
White-crowned Sparrow - <i>Zonotrichia leucophrys</i>	Landbird	4	4	BW	r	1,2,4,5
Harris' Sparrow - <i>Zonotrichia querula</i>	Landbird	NB	NB	MW		2,4
Dark-eyed Junco - <i>Junco hyemalis</i>	Landbird	4	4	BW	j,r	1,2,4,5
Lapland Longspur - <i>Calcarius lapponicus</i>	Landbird	NB	NB	MW	w	2,4
Snow Bunting - <i>Plectrophenax nivalis</i>	Landbird	NB	NB	MW		2,4
Bobolink - <i>Dolichonyx oryzivorus</i>	Landbird	3	3	B		1,2,4,5
Red-winged Blackbird - <i>Agelaius phoeniceus</i>	Landbird	4	4	BMW	r,w	1,2,4,5
Western Meadowlark - <i>Sturnella neglecta</i>	Landbird	4	4	BMW	s	1,2,4,5
Yellow-hd. Blackbird - <i>Xanthocephalus xanthocephalus</i>	Landbird	3	3	BMW	w	1,2,4,5
Brewer's Blackbird - <i>Euphagus cyanocephalus</i>	Landbird	2	4	BW	r,s,w	1,2,4,5
Great-tailed Grackle - <i>Quiscalus mexicanus</i> **	Landbird	4	NB	BW	r	1,2,4,5
Common Grackle - <i>Quiscalus quiscula</i>	Landbird		4	BMW	r	1,2,4,5
Brown-headed Cowbird - <i>Molothrus ater</i>	Landbird	4	4	BMW	r,s,w	1,2,4,5
Bullock's Oriole - <i>Icterus bullockii</i>	Landbird	3	3	B	r	1,2,4,5
Scott's Oriole - <i>Icterus parisorum</i>	Landbird	3	3	B	j,r	1,2,4,5
Black Rosy-Finch - <i>Leucosticte atrata</i>	Landbird		1	BW		2,4,5,10
Gray-crowned Rosy-Finch - <i>Leucosticte tephrocotis</i>	Landbird	3	3	BMW		2,4,5,10
Pine Grosbeak - <i>Pinicola enucleator</i>	Landbird	4	4	BW		1,2,4,5
Cassin's Finch - <i>Carpodacus cassinii</i>	Landbird	3	1	BW		1,2,4,5
House Finch - <i>Carpodacus mexicanus</i>	Landbird	4	4	BW	p,r	1,2,4,5
Red Crossbill - <i>Loxia curvirostra</i>	Landbird	4	2	BW		1,2,5
White-winged Crossbill - <i>Loxia leucoptera</i>	Landbird	NB	4	BMW		1,2,5
Common Redpoll - <i>Carduelis flammea</i>	Landbird	NB	NB	MW		2,4
Pine Siskin - <i>Carduelis pinus</i>	Landbird	4	4	BW	j,p	1,2,4,5
Lesser Goldfinch - <i>Carduelis psaltria</i> **	Landbird	4	NB	B	r	1,4,5
American Goldfinch - <i>Carduelis tristis</i>	Landbird	4	4	BW	r	1,2,4,5
Evening Grosbeak - <i>Coccothraustes vespertinus</i>	Landbird	3	3	BMW		1,2,4,5
House Sparrow - <i>Passer domesticus</i>	Landbird	4	4	BW	r	1,2,5

* occurs only in BMR-50

** occurs only in BMR-51

Appendix B. Sample Size Estimation Procedure for Products of IBIS and Coordinated Bird Monitoring

This Appendix presents sample size formulas for regional models, site-based models, and project evaluations.

Regional and Site-based Models

Standard regression (or other) methods are used to construct the models. Mixed effects models (e.g., Agresti 2002) are often needed to acknowledge stratification, multi-stage sampling (e.g., surveying clusters of points), or both. The three most common predictions, and their measures of accuracy, are (a) estimated region-wide total or mean, (b) estimated parameter value for a single site that has not been surveyed, typically because the habitat of interest is part of a proposed project and does not yet exist on the ground, and (c) estimated change in parameter value with each unit increase in one of the independent variables. CVs provide useful measures of accuracy for all three estimates. As an example of the third estimate, suppose that a model predicted abundance/ha, y , as $y = b_0 + 0.5(\text{stand size in ha}) + (\text{other terms})$. The equation predicts that the average number of birds per ha increases by 0.5 for each 1-ha increase in stand size (if other variables do not change). If the CV for the coefficient (0.5) was 0.25, it would mean that the 95% CI for the increase was $\pm 50\%$ of the coefficient or (0.25, 0.75).

Pilot study data are needed for reliable estimation of the sample sizes needed to construct regression models but the following approach may be of some use for planning. In estimating a regional mean we hope that the regression model will improve precision compared to the simple mean. But performance of the regression model cannot be worse than the simple mean, so we might estimate sample sizes for the simple mean as a conservative initial estimate. With simple random sampling, the sample size for any desired $CV(\bar{y})$ may be expressed as

$$n = \left(\frac{CV(y_i)}{CV(\bar{y})} \right)^2$$

where y_i is the mean from the i^{th} primary unit (e.g., transect or point). Table B1 gives some typical values. For example, if the desired $CV(\bar{y})$ is 0.20 (95% CI \approx mean $\pm 40\%$ of the mean) and $CV(y_i) = 2$, then the needed sample size is 100.

Table B1. Sample size for estimating a mean expressed.

Desired $CV(\bar{y})$	$CV(y_i)$			
	1	1.5	2	2.5
0.15	44	100	178	278
0.20	25	56	100	156
0.25	16	36	64	100
0.30	11	25	44	69

An advance estimate of the sample size needed to achieve a specified CV for the regression coefficient can also be obtained if we can estimate the correlation coefficient between the independent and dependent variables or, perhaps more reasonably, if we assume that variables are only interesting if they have a fairly high correlation with the dependent variable. Table B2 gives some values. For example, suppose (a) we are trying to predict abundance, (b) the desired CV of the regression coefficient, b_k , is 0.15, and (c) we are mainly interested in independent variables whose correlation with abundance is at least 0.6 (on the basis that variables with lower correlations have little capacity for helping us predict abundance or understand what determines it). In this case, from Table B2, the needed sample size is 81. These analyses suggest that a sample size of 100 points seems reasonable for initial efforts to develop

regression models that can be used to estimate regional means or help elucidate factors correlated with the parameter (e.g., abundance, a fitness indicator).

Table B2. Sample size for estimating regression coefficients, b_k .

Desired CV(b_k)	Correlation coefficient of x_k and y_k				
	0.4	0.5	0.6	0.8	0.9
0.10	527	302	180	58	25
0.15	235	135	81	27	12
0.20	133	77	46	16	8
0.25	86	50	30	11	6

Accuracy targets for these estimates also may be expressed using the *CV*. A *CV* of 0.25, for example, means that the 95% confidence interval (CI) is approximately the mean $\pm 50\%$ of the mean. Thus, if the estimate was 50 and the *CV* was 0.25, then the 95% CI would be approximately (25, 75).

Project Evaluations

Project evaluations involve surveys on a project site before, during, and after the project. These surveys help evaluate and perhaps revise the project and they document effects of the project on birds.

Sample sizes required in project evaluations to detect a given change, R , may be estimated if an estimate of the *CV* of the measurements is available from a pilot study or from surveys in other areas. The procedure should be based on results per "primary sampling units". If clusters of points are surveyed, then the cluster is the primary sampling unit. If points are evenly (or randomly) distributed across a study area, then the individual point is the primary unit. The sample size also depends on the level of significance, the change expected or that we wish to detect, and the probability (power) we wish to have of detecting the change (i.e., of obtaining a significant result in a statistical test). The change, R , is defined as (larger value)/(smaller value) and is thus always >1 . A two-step procedure is given here. First, choose the level of significance and power and read the corresponding value of " G " in Table B3. Then read the sample size from Table B4. For example, suppose the level of significance will be 0.05 and the desired power is 80% power. G , from Table B3, is 16. Suppose further that points are going to be evenly distributed across a study area, the *CV* ($SD(y_i)/\bar{y}$) of numbers recorded per point (or mean numbers if >1 survey is made) is 1.5, and the change of interest is a three-fold increase ($R=3$). The needed sample size, in each period is approximately 76. Conducting the surveys in >1 year is often worthwhile. If surveys were made in three years before the project and in three years after it, then about 25 points should be surveyed per year (in new locations each year).

Table B3. Values of G , used in Table B4 to obtain sample sizes.

Level of significance	Power		
	0.6	0.8	0.9
0.05	10	16	21
0.10	7	12	17
0.15	6	10	15

Table B4. Sample sizes as a function of the G (from Table B3), the estimated $CV(y_i)$, and the change of interest, R .

G	CV	R		
		1.5	2	3
5	0.5	11	5	3
5	1.0	45	20	11
5	1.5	101	45	25
5	2.0	180	80	45
10	0.5	23	10	6
10	1.0	90	40	23
10	1.5	203	90	51
10	2.0	360	160	90
15	0.5	34	15	8
15	1.0	135	60	34
15	1.5	304	135	76
15	2.0	540	240	135
20	0.5	45	20	11
20	1.0	180	80	45
20	1.5	405	180	101
20	2.0	720	320	180

Appendix C. Proposed Monitoring Sites in Idaho

BMR Site Name	Type	BMR Site Name	Type
51 American Falls Reservoir IBA	Aquatic	51 Lake Lowell IBA	Aquatic
51 Bear Lake NWR IBA	Aquatic	50 Lake Pend Oreille (Clark Fork Delta IBA) ²	Aquatic
51 Big Cottonwood WMA	Upland	50 Lake Pend Oreille (Denton Slough IBA)	Aquatic
51 Billingsley Creek WMA	Aquatic	50 Lake Pend Oreille (Fisherman I./Oden Bay IBA)	Aquatic
51 Blackfoot Reservoir	Aquatic	50 Lake Pend Oreille (Pack River Delta IBA)	Aquatic
51 Blackfoot River WMA	Aquatic	51 Magic Reservoir IBA	Aquatic
51 Blacks Creek Reservoir IBA	Aquatic	50 Mann Lake IBA	Aquatic
51 Boise Ridge IBA	Upland	51 Market Lake WMA IBA	Aquatic
51 Boise River IBA	Aquatic	50 McArthur Lake WMA IBA	Aquatic
51 Boise River WMA	Upland	51 Mesa Marsh IBA	Aquatic
50 Boundary Creek WMA	Aquatic	50 Miners & Flat Creeks IBA	Upland
51 Bowen Canyon Eagle Sanctuary IBA	Upland	51 Minidoka NWR IBA	Aquatic
51 Camas NWR IBA	Aquatic	51 Mink Creek/Cherry Springs IBA	Upland
51 Camas Prairie WMA IBA	Aquatic	51 Montpelier WMA	Upland
51 Carey Lake WMA IBA	Aquatic	51 Mormon Reservoir	Aquatic
51 Cartier Slough WMA IBA	Aquatic	50 Morton Slough IBA	Aquatic
50 Cascade Reservoir	Aquatic	51 Mud Lake WMA IBA	Aquatic
50 Cecil Andrus WMA	Upland	51 Niagara Springs WMA	Aquatic
50 Coeur d'Alene River WMA (Chain Lakes)	Aquatic	50 North Idaho College IBA	Upland
51 Chilly Slough IBA	Aquatic	51 Owyhee Uplands IBA	Upland
51 City of Rocks National Reserve IBA	Upland	51 Oxford Slough IBA	Aquatic
51 C.J. Strike Reservoir WMA IBA	Aquatic	51 Payette River WMA	Aquatic
50 Coeur d'Alene Lake	Aquatic	51 Portneuf WMA	Upland
50 Coeur d'Alene Lake (Wolf Lodge IBA)	Aquatic	51 Raft River - Curlew Valley IBA	Upland
50 Craig Mountain WMA	Upland	50 Red River WMA	Aquatic
51 Craters of the Moon IBA	Upland	50 Salmon River E. of Riggins IBA	Upland
51 Deer Flat NWR IBA	Aquatic	51 Sand Creek WMA	Aquatic
51 Deer Parks WMU	Aquatic	51 Silver Creek Preserve IBA	Aquatic
51 Eagle Island IBA	Aquatic	51 Snake River ACEC IBA	Aquatic
50 Farragut WMA	Upland	51 Snake River Birds of Prey NCA IBA	Upland
51 Fort Boise WMA IBA	Aquatic	51 Snake River Island Wildl. Hab. Area IBA	Aquatic
51 Georgetown Summit WMA	Upland	50 Snow Peak WMA	Upland
51 Grays Lake NWR IBA	Aquatic	50 St. Maries WMA	Upland
51 Hagerman WMA IBA	Aquatic	51 Sterling WMA	Aquatic
51 Harriman Wildlife Refuge IBA	Aquatic	51 Teton County (Cooke/Warm Creek)	Aquatic
50 Hayden Lake	Aquatic	51 Teton County (Foster's Slough/Upper Teton R.)	Aquatic
51 Henrys Lake	Aquatic	51 Teton County (Lazy K Marsh)	Aquatic
50 Heyburn State Park IBA	Aquatic	51 Teton County (Sundown Ranch)	Aquatic
50 Hixon Sharptail Reserve IBA	Upland	51 Teton County (Teton Creek/Six Springs)	Aquatic
51 INEEL IBA	Upland	51 Tex Creek WMA IBA	Upland
50 Kootenai NWR IBA	Aquatic	50 Westmond Lake IBA	Aquatic

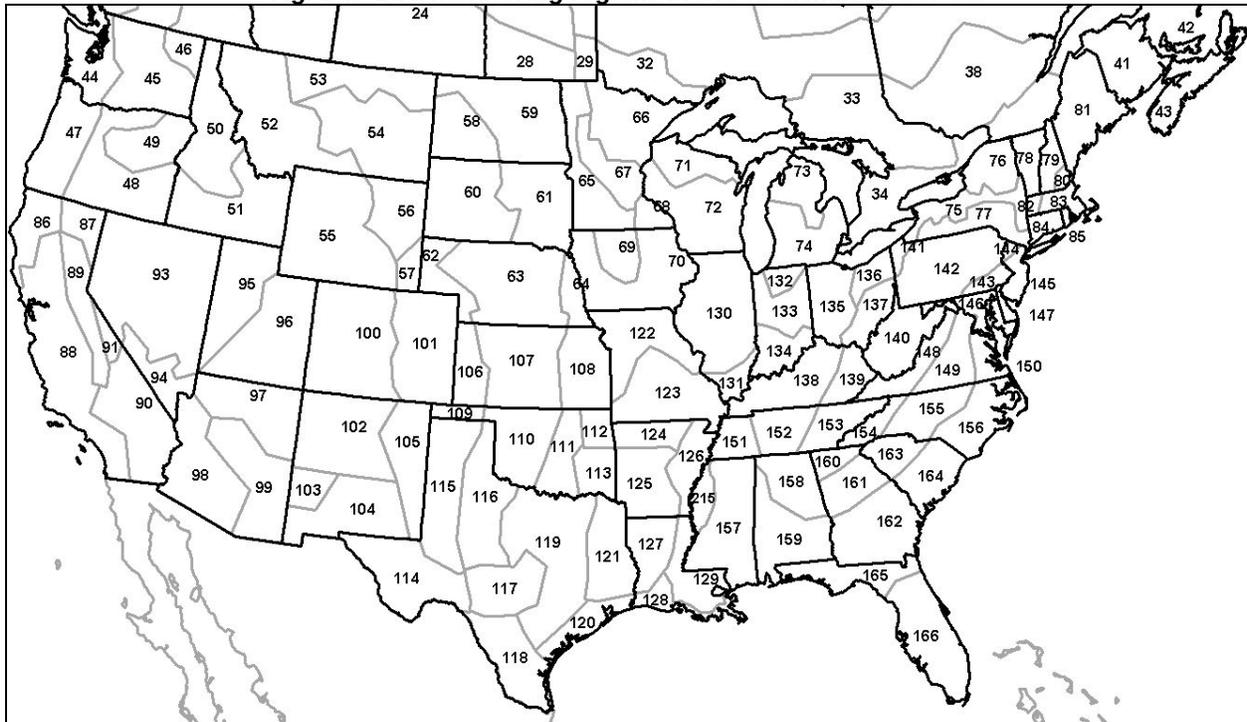
² Note that Pend Oreille State WMA is encompassed by the four Lake Pend Oreille IBIS sites

Appendix D. Aquatic Bird Monitoring in BMR-50

Introduction

The bird conservation initiatives – waterbirds, waterfowl, shorebirds, and landbirds – are cooperating to design a “coordinated bird monitoring” (CBM) program for Canada and the United States (Bart et al., *in press*). One element in the approach is detailed descriptions of sites at which aquatic birds congregate at any time of year. A series of “bird monitoring regions” (Fig. D1) has been delineated to help organize these descriptions. The regions were defined by intersecting a Bird Conservation Region (BCR) map with a Province and State map, smoothing the borders, and eliminating small polygons. Survey results and sampling plans based on these regions can be stepped up either to the Province and State level or to a BCR level.

Fig. D1. Bird monitoring regions in the coterminous States.



This report describes protocols for aquatic bird surveys in bird monitoring region 50, Idaho–BCR 10 (Northern Rockies). The first step in preparing the report was identifying the “focal aquatic species” (Table D1, Appendix D1) for the region. This list contains species that occur in aquatic sites in the monitoring region in sufficient numbers that surveys for them could be useful in achieving monitoring goals identified at the continental, regional, or local level.

Table D1. Number of aquatic species by initiative and season.
See Appendix D1 for the complete list.

Initiative	Season			Total
	Breeding	Migration	Winter	
Waterbirds	19	18	18	35
Waterfowl	20	13	28	32
Shorebirds	8	23	4	28
Landbirds	14	2	9	14
Total	61	56	59	

The region was partitioned into two strata (Fig. D2). Stratum 1 (Fig. D1, Table D2) contains sites that have substantial numbers of birds and can be surveyed at a reasonable cost. Detailed suggestions are made about how to survey aquatic birds at each of these sites. The second stratum, Northern Idaho, covers all other areas. Aquatic sites in this stratum are widely distributed and probably cannot all be surveyed. Thus, sampling plans will be needed to select aquatic areas to be surveyed in these strata. Brief suggestions are made about how the sampling plans might be designed, but detailed work will depend on specific project objectives and is therefore not included in this report (to be completed in final draft).

Fig. D2. Sites (Stratum 1) and Stratum 2 in bird monitoring region 50. (to be completed in final draft)

Table D2. Discrete aquatic sites (stratum 1) in bird monitoring region 50.

No.	Site Name	IDFG Region
50-1	Boundary Creek WMA	Panhandle
50-2	Cascade Reservoir	Southwest
50-3a	Coeur d'Alene Lake	Panhandle
50-3b	Coeur d'Alene Lake (Wolf Lodge, Beauty and Blue Creek Bays IBA)	Panhandle
50-4	Coeur d'Alene River WMA (Chain Lakes)	Panhandle
50-5	Hayden Lake	Panhandle
50-6	Heyburn State Park IBA	Panhandle
50-7	Kootenai NWR IBA	Panhandle
50-8a	Lake Pend Oreille (Clark Fork Delta IBA)	Panhandle
50-8b	Lake Pend Oreille (Denton Slough IBA)	Panhandle
50-8c	Lake Pend Oreille (Fisherman Island/Oden Bay IBA)	Panhandle
50-8d	Lake Pend Oreille (Pack River Delta IBA)	Panhandle
50-9	Mann Lake IBA	Clearwater
50-10	McArthur Lake WMA IBA	Panhandle
50-11	Morton Slough IBA	Panhandle
50-12	Red River WMA	Clearwater
50-13	Westmond Lake IBA	Panhandle

Descriptions of each site in stratum 1 are needed to specify how the birds should be surveyed. A start has been made on developing these descriptions by collecting *readily available* information and presenting it in a standardized format. For most sites, more detailed work will be needed to develop final survey protocols. The sites were described using the following headings:

1. Boundaries and ownership
2. Focal species using the site and timing of use
3. Location of type 1 and 2 habitat within the site
4. Access to the type 1 and 2 habitat and visibility of the birds
5. Conservation issues

6. Conservation measures taken, in progress, or proposed
7. Past and current surveys
8. Potential survey method
 - a. Description
 - b. Selection bias
 - c. Measurement error and bias
9. Needed pilot studies
10. Contact

Boundaries were depicted on site maps. These maps make the document too large to handle easily so they are not included here. Individual site descriptions, including the maps, will be posted on the CBM website. "Ownership" includes advice on obtaining permission to conduct surveys on the site. Focal species (item 2 above) are briefly described (e.g., "all focal aquatic species for the region except..."). Items 3 and 4 describe where surveys should be conducted. Up to three types of habitats are described for each focal species or group of focal species at each site. Type 1 habitats include the regularly-used areas that should be sampled intensively using a well-defined sampling plan. Type 2 habitats include areas used sparingly by the focal species. Type 2 habitat will probably not be surveyed as often or with rigorously defined methods, but might be surveyed less formally every few years to document continued low use by the focal species. Type 3 habitats receive virtually no use by the focal species during the study period and probably would not be surveyed as part of the monitoring program. Requests, however, might be circulated for any records of the focal species occurring in substantial numbers in these areas. Type 1 habitat throughout the bird monitoring region should be delineated so that it includes at least 75% of the bird-use days, for any of the region's aquatic focal species, in any season. Type II habitat should include no more than 20% of the bird-use days, and Type III habitat should include no more than 5% of the bird-use days.

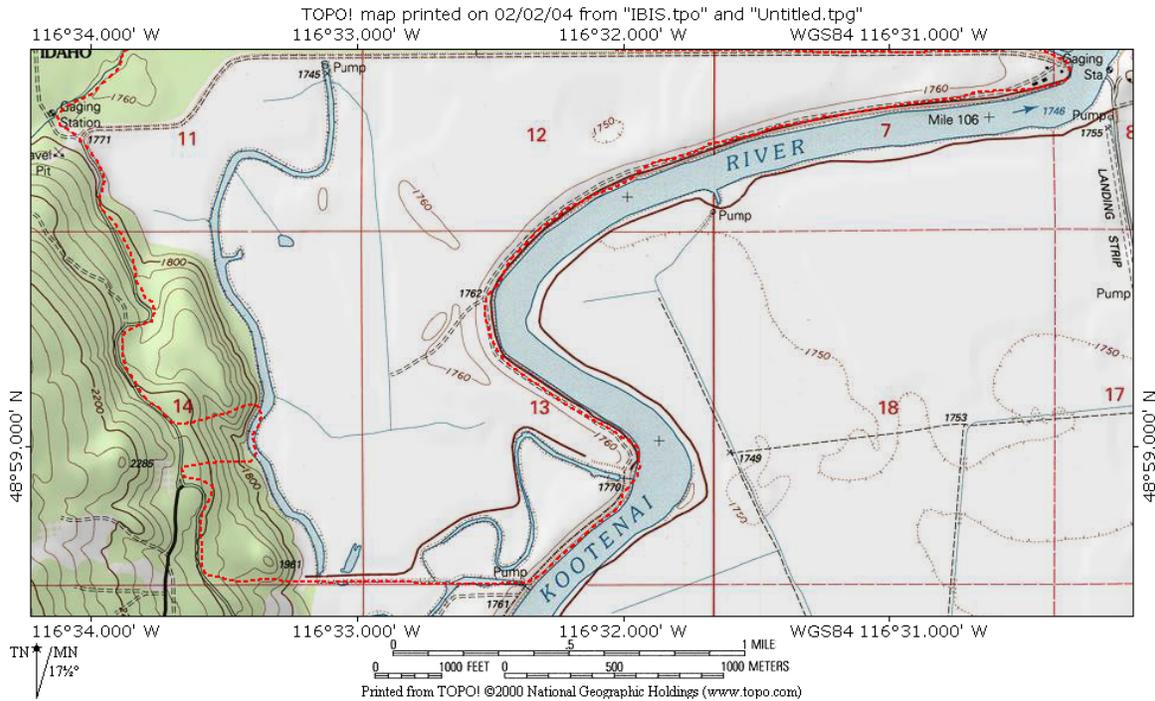
Descriptions of known or potential conservation issues/problems at the site are provided in Item 5. These can include issues that are unique to the site, such as predation pressure at a nesting tern colony, or issues that are common to many aquatic sites (e.g., significant recreational use). If any measures have been taken, or are proposed, to remedy these issues, they are described in Item 6.

Past and current surveys (item 7) are described in enough detail to show how past efforts could help design future ones and how current efforts might be incorporated into a comprehensive monitoring plan if managers of the current surveys are interested in doing this.

Item 8a, description of potential survey methods, identifies the best ways to estimate the number of individuals present describing both field and statistical methods briefly (e.g., complete count using area search methods; density estimation using distance methods). Items 8b and 8c discuss possible bias and error in estimating numbers present and trend in numbers present. Bias means a long-term trend in the ratio (number recorded)/(average number present). Selection bias is bias due to some Type I habitat being excluded from the sampled population, usually because of access or visibility problems. Exclusion of some Type I habitat does not necessarily cause selection bias, because trends in sampled areas might be the same as trends in non-sampled areas. Measurement error means not detecting all birds present in the surveyed area at the time of the survey. Measurement bias is long-term trend in the proportion of birds present at the time of the survey that are detected on the survey. Measurement error does not necessarily cause measurement bias, because the proportion of birds detected might not change through time. Additional explanation of the methods is provided in Appendix D2.

Stratum 1: Discrete Sites

50-1. BOUNDARY CREEK WILDLIFE MANAGEMENT AREA (WMA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked

Ownership: Idaho Department of Fish and Game

Focal species using the site and timing of use:

Waterfowl (Canada Goose, Common Merganser, Gadwall, Mallard, American Wigeon, Cinnamon Teal, Blue-winged Teal, Redhead, Ring-necked Duck, Northern Shoveler), waterbirds (Pied-billed Grebe, Black Tern, American Coot, Sora, Virginia Rail, Sandhill Crane), shorebirds (Killdeer, Wilson's Snipe, Wilson's Phalarope, Spotted Sandpiper), Bald Eagles, Osprey, and Vaux's swifts are present during the summer; the majority of which breed here. American White Pelicans occur here in late summer, and Red-necked Grebes may also occur here. Large waterfowl migration in fall and spring (>2,000; American Wigeon, Mallard, Green-winged Teal, Pintail, Lesser Scaup, Common Goldeneye, Bufflehead, White-fronted goose, Canada Goose, others) and shorebird migration in August (>100; Killdeer, Wilson's Snipe, Greater Yellowlegs, Long-billed Dowitcher, Western Sandpiper, Spotted Sandpiper, Solitary Sandpiper).

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Both foot and boat access is available to the public. Access roads (permission required from WMA manager during breeding season) wind through all wetland habitat at this site. Visibility is quite good from these access roads. Canoe may be helpful in some of the wetland areas.

Conservation issues:

- Drained and farmed until 1998.
- The area is used seasonally by grizzly bears.

Conservation measures taken, in progress, or proposed:

- Wetland restoration is underway. Water control structures are installed and wetland cells flooded. Re-vegetation continues. Shorebird use expected to diminish with vegetation recovery under current management.
- The adjacent Thorman property was purchased by Ducks Unlimited in 2003. IDFG has a management agreement with DU to manage the Thorman property.
- Covered by the Boundary Creek WMA long-range management plan.
- Albeni Falls mitigation program is being funded by BPA.

Past and current surveys:

- Triennial point counts (through wetland habitat) planned as part of BPA monitoring obligation.
- Waterfowl breeding pair and brood surveys

Potential survey methods*Description:*

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. A canoe may be necessary for access.
- b. Colony counts for nesting large waders. Locations of nesting sites is currently unknown.
- c. Census for waterfowl and other waterbirds on the open water from shoreline, using access roads. Canoe may be helpful in some areas, but probably not necessary.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds from along access roads.

Selection bias: N/A

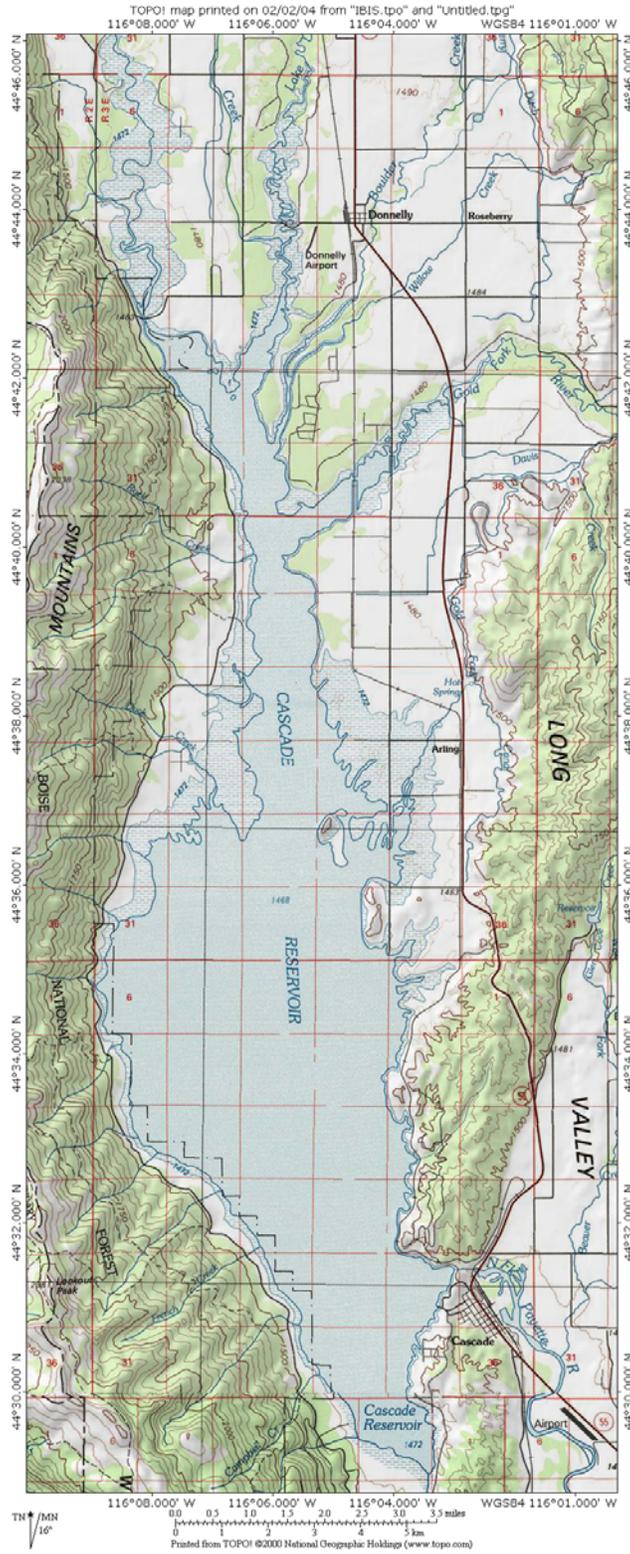
Measurement error and bias: N/A

Needed pilot studies: None needed

Contact:

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50-2. CASCADE RESERVOIR



Boundaries and ownership:

Boundaries: Located near Donnelly and Cascade, ID; Borders: East - US 55, West -West Mountain Road, North -Tamarack Falls Road, South - Cabarton Road. **(boundaries need to be refined)**

Ownership: U.S. Forest Service, U.S. Bureau of Reclamation, Idaho Dept. of Parks and Recreation, Private

Focal species using the site and timing of use:

Waterbirds (Great Blue Heron, American White Pelican, Sandhill Crane, Sora, Virginia Rail), waterfowl (Mallard, American Wigeon, mergansers), and gulls (California Gull, Ring-billed Gull) occur regularly during summer. Bald Eagles and Osprey also nest in the area. Migrating Common Loons, Tundra and Trumpeter Swans, Caspian Terns, and waterfowl. Reservoir freezes over in winter. Long-billed Curlews can also be found here.

Colonies: Clark’s Grebe, Western Grebe – major nesting site

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation; nesting grebes at mouth of Duck Creek; small streams and ponds along mudflats until reservoir fills in summer	none
large waders	shorelines	none
secretive marshbirds	water's edge at mouth of Duck Creek	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats around the reservoir	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds: When reservoir is full in the summer, observe waterbirds from road. During drawdown in spring, fall, and winter can access by walking along shoreline. Appropriate viewing sites will vary by species groups, and all will require a scope. Visibility of birds may be affected by presence of emergent vegetation, surface water conditions, etc. The west shore has a number of campgrounds and boat launches that provide viewing access, and much of the western shoreline and near-shore open water also is visible from the road. East side has fewer locations that are potential viewing sites, especially from the outlet north to Sugarloaf and along the arms in the northern end. Complete surveys of open water, if that is an objective, will require more than shoreline surveys. Recommend a medium-sized motorboat (17-20+ft long, with a 50 hp motor or bigger), to adequately survey the open water. Aerial surveys are an option, depending on level of detail needed (i.e., might not get identification to species). Some focused site-specific work could be accomplished by canoe.

Most of west side is open to public or access could be gained with permission from Bureau of Reclamation. Boat launches are public. Other areas, if deemed important observation sites, would need permission from private landowners.

Conservation issues:

- Planned drawdown of reservoir for exotic species removal,
- Recreational use/overuse
- Broadscale nest failure of Western/Clark’s Grebes, although reason for failure is unknown (potentially predation or water level fluctuations)
- Water quality

Conservation measures taken, in progress, or proposed: None at this time

Past and current surveys:

- Osprey and Bald Eagle nesting success, territories, and prey are monitored by Boise State University (contact Marc Bechard for more information) during spring and summer since the late 1980's.
- Western Grebe population surveys conducted by boat in June and August 2003 by IDFG (Diane Evans Mack) and Colleen Sweeney. IDFG monitored Western Grebe nesting colonies during summer 2003. Methods included shore-based observation of nests and of open-water concentrations, canoe checks of nesting areas, and walk-through of colonies to map nests and assess outcome after nesting season. Data summary available upon request.

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. **Western Grebes are very sensitive to disturbance at nest sites.** A strict protocol will be needed to assure the least amount of disturbance possible. In addition, surveys for other species nesting in emergent vegetation should be undertaken with caution, as some waterfowl nest sites are in the same locations as grebes.
- b. Census for waterfowl and other waterbirds on the open water by walking along shoreline or by boat. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat.

Selection bias: A long-term monitoring plan for Cascade may need to be based on stratified random sampling, because it probably is not feasible to cover all potential areas, regardless of access issues. Alternatively, monitoring could focus on the 6 WMAs established around the reservoir by the BOR.

During early summer, access to one wetland on west side of reservoir north of Duck Creek is restricted by locked gate controlled by BOR. (Restriction in place to protect nesting waterfowl and other wildlife.)

During late summer, upper reaches of Lake Fork Arm, Boulder Arm, and Gold Fork Arm not accessible by motor boat due to dropping water levels. Similarly, near-shore areas along east shore east and north of Sugarloaf Island also too shallow.

Measurement error and bias: Growth of emergent vegetation over season will make some observations sites ineffective from one visit to next. Late season counts, at least for WEGR, will need to account for possible immigration of migrants or birds from other colonies that could appear to inflate numbers. Seasonal changes in intensity of recreational use could alter movement patterns and concentration areas for species using open water.

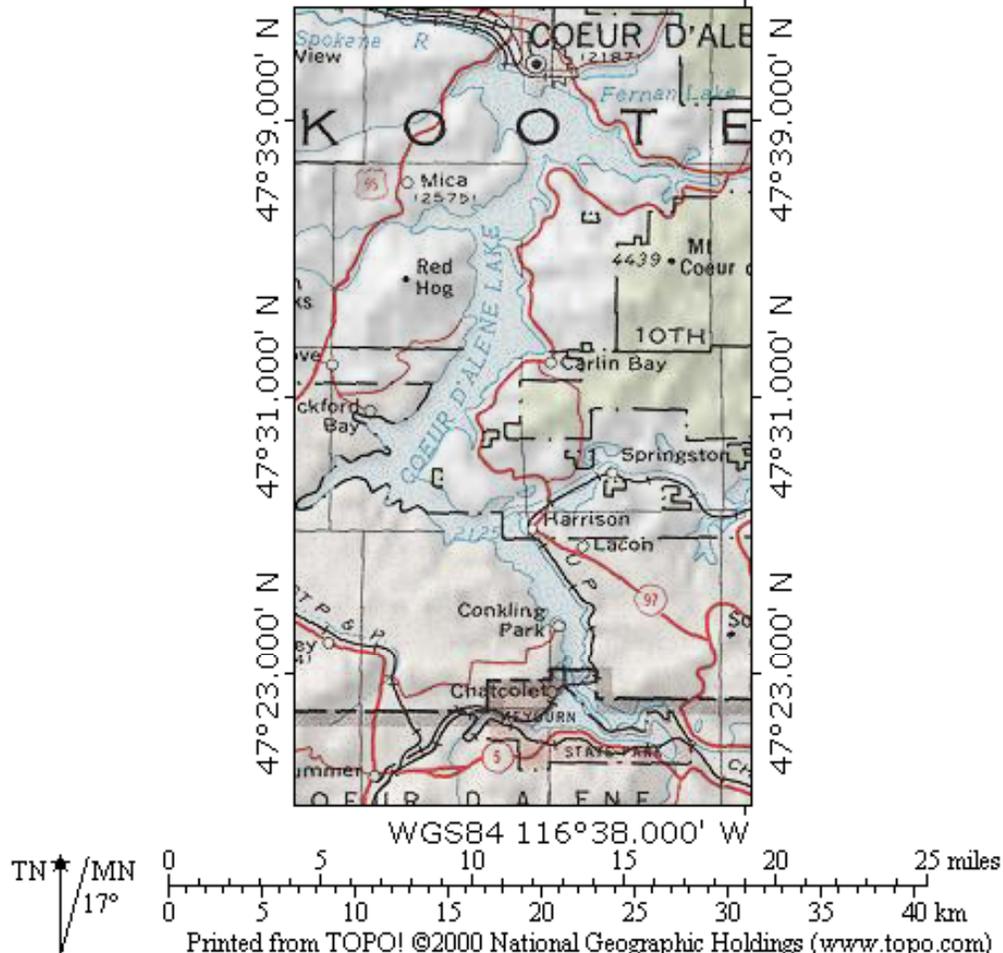
Needed pilot studies:

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50-3A. COEUR D'ALENE LAKE

TOPO! map printed on 02/02/04 from "IBIS.tpo" and "Untitled.tpg"
WGS84 116°38.000' W



Boundaries and ownership:

Boundaries: Lake shoreline, but not including Wolf Lodge, Beauty, and Blue Creek Bays, or Heyburn State Park

Ownership: Bureau of Land Management, USDA Forest Service, The Nature Conservancy, municipal, private

Focal species using the site and timing of use:

Nesting species around the lake include waterfowl (Canada Goose, Cinnamon Teal, Northern Pintail, Wood Duck, and others), waterbirds (Pied-billed Grebe, Red-necked Grebe, Common Merganser, Hooded Merganser, Sora [Valhalla Point], Great Blue Heron), shorebirds (Killdeer, Wilson's Snipe, Spotted Sandpiper), raptors (Osprey, Bald Eagle, and others), Belted Kingfishers, and Red-winged Blackbirds. During migration and/or winter waterfowl (Trumpeter Swan, American Wigeon, Eurasian Wigeon, Redhead, Ring-necked Duck, Bufflehead, Common Goldeneye), waterbirds (Common Loon, Pacific Loon, Horned Grebe, Western Grebe), and occasional shorebirds can be seen.

Mica Bay: Waterfowl (Cinnamon Teal, Northern Pintail) and Soras breeding. Virginia Rails may be there, but haven't been heard in many years.

Cougar Bay (12 acres protected by The Nature Conservancy): filled during migration by waterfowl (Tundra Swan, Canada Goose, Wood Duck, Cinnamon Teal, Blue-winged Teal, Northern Shoveler, Ruddy Duck, and Mallard). Summer breeders include waterbirds (Great Blue Heron, Sora, Red-necked Grebe, Pied-billed Grebe, Double-crested Cormorants [new]), shorebirds (Killdeer, Spotted Sandpiper, Wilson's Snipe), Cinnamon Teal, Bald Eagles, and Osprey (large concentration).

Colonies: Great Blue Heron (Mica Bay/Fernan Lake) – Mica Bay colony may have moved to Fernan Lake after nest tree fell.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies (Mica Bay/Fernan Lake) emergent vegetation	rest of shoreline
secretive marshbirds	water's edge (Cougar Bay, Mica Bay, Valhalla Point)	none
waterfowl	open water, edges during breeding season	none
shorebirds	shoreline	none
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

East side of lake is easily accessible by road that winds along the lake. West side a little more difficult, and may require use of a boat. Mica Bay is easily accessible and birds are visible from a viewing platform and the boat launch, as well as from along the dike. Cougar Bay would require boat access, particularly for birds in marsh habitat. Accessibility and visibility of birds will vary depending on the bay.

Conservation issues:

- Disturbance from residential development along shoreline, from family pets, and from recreation (particularly jet ski users)
- Conflict among various recreational users: birdwatchers, fishermen, duck hunters, etc.
- Noxious weeds
- Road construction through Mica Bay likely altered the habitat, and may cause disturbance to nesting waterbirds

Conservation measures taken, in progress, or proposed:

- 12 acres have been acquired by TNC at Cougar Bay

Past and current surveys:

- Nest boxes in some bays (Wood Duck)
- Informal surveys by Coeur d'Alene Audubon twice a month at Mica Bay for last two years
- Informal surveys by Coeur d'Alene Audubon of Cougar Bay
- Osprey nest monitoring/banding for several years

Potential survey methods

Description:

- Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Can be done from shoreline in some areas (i.e., Mica Bay), but others will require a canoe (i.e., Cougar Bay).
- Colony counts for nesting Great Blue Herons.

- c. Census for waterfowl on the open water using a boat, or from land along east side of lake. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat. This may be low priority as migrating shorebird numbers are very low at this site.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: There may be some bias associated with ability to survey certain bays because of ownership issues. Some of this bias may be remedied by surveying birds from a boat in bays that have private landowners along the shoreline.

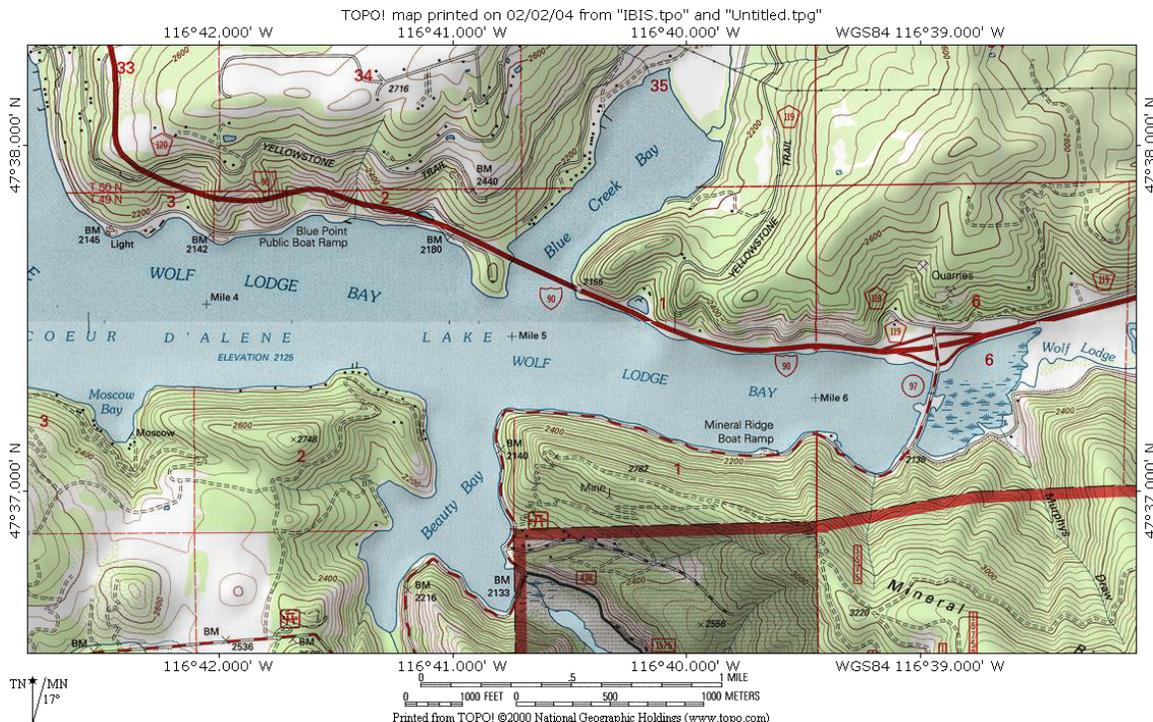
Measurement error and bias: ID skills may or may not be an issue; very few shorebirds or other hard to identify species are present. Development is a significant presence in the area and may result in changes of bird distribution around the lake over time.

Needed pilot studies: Because this is such a large area, a pilot study may be needed to determine where monitoring efforts should be concentrated and the most efficient way to survey the site.

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50-3B. COEUR D'ALENE LAKE (WOLF LODGE, BEAUTY AND BLUE CREEK BAYS IBA)



Boundaries and ownership:

Boundaries: Includes the three adjacent bays (Wolf Lodge, Beauty, and Blue Creek) to Couer d'Alene Lake

Ownership: Bureau of Land Management, private

Focal species using the site and timing of use:

Mostly a wintering site for waterbirds. Large numbers of Bald Eagles (40 per winter), with wintering waterfowl (Common and Barrow's Goldeneye, Bufflehead, Hooded Merganser), waterbirds (Horned, Red-necked, and Western Grebe), and gulls. Osprey arrive in late March, as well as Common Loons, Tundra Swans, and Northern Pintails. Wood Ducks and Cinnamon Teal breed in the area.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
waterfowl	open water, edges during breeding season (Wood Ducks and Cinnamon Teal in W.L Creek)	none
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Most of the site is easily accessible by roads weaving along the shoreline. Birds should be quite visible from the shoreline either through binoculars or a scope. Boat access may also be helpful (two boat ramps available).

Conservation issues:

- Logging on surrounding private lands is a significant problem
- Development of home sites along lakeshore
- Grazing in meadow pastures is a serious problem
- Significant recreational development/overuse could also be a potential disturbance problem for birds in the area

Conservation measures taken, in progress, or proposed:

- The BLM has acquired, and plans to acquire more, lands for the public
- The BLM has implemented environmental education at Mineral Ridge Trail and Wolf Lodge Eagle viewing. Public land along Blue Creek Bay offers excellent opportunity for additional environmental education.

Past and current surveys:

Winter Bald Eagle counts – record number of wintering eagles in 2003/2004

Potential survey methods*Description:*

- a. Census for waterbirds and waterfowl on the open water using a boat or from viewpoints along shoreline.
- b. Census for gulls and terns during waterfowl counts.
- c. Systematic sampling, probably including the use of playback calls, for secretive marshbirds marshy area of Wolf Lodge Bay, east of ID-97.

Selection bias: N/A

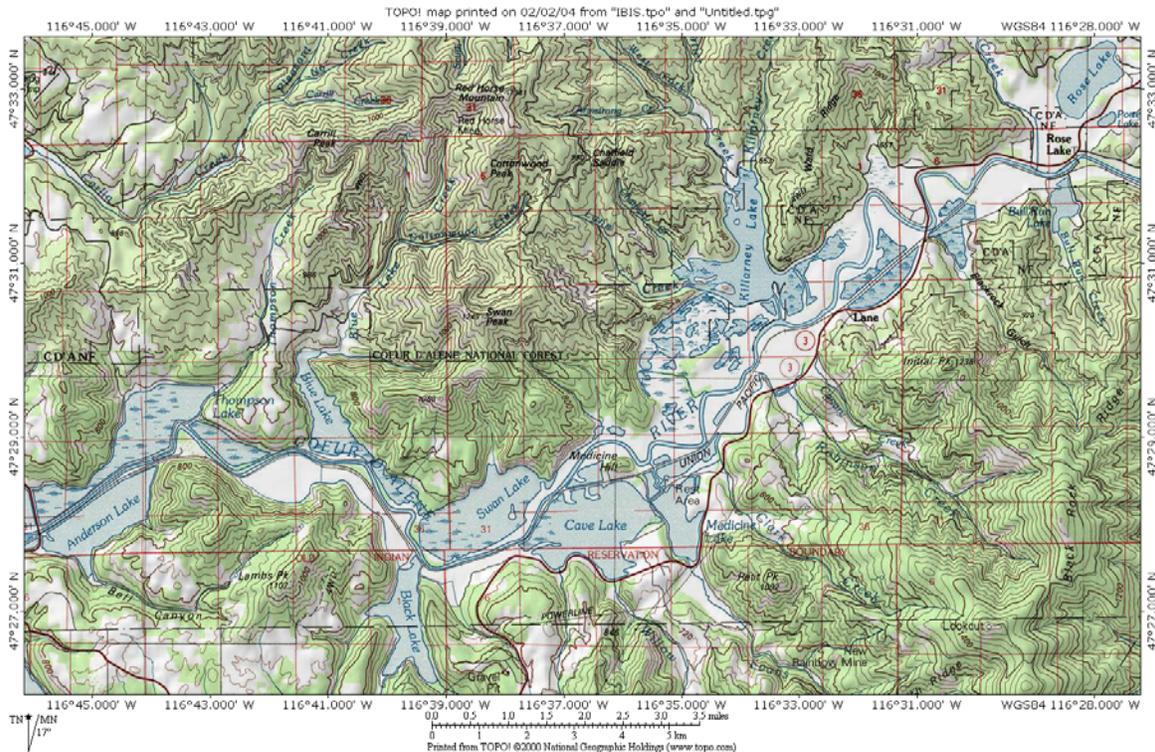
Measurement error and bias: N/A

Needed pilot studies: None may be needed.

Contact:

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50-4. COEUR D'ALENE RIVER WILDLIFE MANAGEMENT AREA (WMA; CHAIN LAKES)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked, although sections are not contiguous

Ownership: Idaho Department of Fish & Game

Focal species using the site and timing of use:

During the breeding season, waterfowl (primarily Canada Goose, Wood Duck, Mallard, Green-winged Teal), waterbirds (American Bittern, Virginia Rail, Sora, Wilson's Snipe, plus colonial nesters listed below), Osprey, Bald Eagles, and Belted Kingfishers are present. Waterfowl and Bald Eagles are also present during migration and winter.

Colonies: Great Blue Heron, Black Tern (Harrison Causeway, Killarney Lake, Rose Lake, Swan Lake), Western Grebe (Cave Lake)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water on lateral chain lakes, emergent vegetation at Lane Site, Thompson and Marshes, Black Rock Slough and Moffit Slough	none
large waders	breeding colonies, emergent vegetation adjacent to bike path along the river	rest of shoreline
secretive marshbirds	water's edge of Thompson, Bare, and Porter Marshes, and Black Rock and Moffit Sloughs	marshy areas throughout site

waterfowl	open water, marsh areas during breeding season	none
shorebirds	seasonally exposed mudflats	rest of shoreline
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Some areas (Moffit and Black Rock Sloughs, Thompson Marsh and Lake, Bare Marsh, and the Lane Site) may be surveyed with scope and binoculars using road access, but this is a very small portion of the entire wetland area. Boat access will give more options for survey areas but may disturb the birds during breeding/ nesting/ rearing. A new bike path also allows access to additional marshy areas and river habitat along the CdA River, and parallels some agricultural fields as well. Some areas easily accessible to the public, particularly those along the bike path. There are also numerous recreation access sites, although boaters may disturb survey areas and impact where birds are viewable. Visibility varies, but there is a lot of emergent vegetation throughout the summer (particularly on Thompson and Bare Marshes, and the sloughs).

Conservation issues:

- Heavy metal contamination is a serious issue. Dead swans and geese are found every year in the spring, so safety measures will need to be taken by surveyors to minimize exposure to contaminated soils.
- Noxious weeds are also an issue, particularly purple loosestrife. Other noxious weeds present include orange hawkweed and spotted knapweed.
- Disturbance to migratory waterfowl

Conservation measures taken, in progress, or proposed:

- Several clean-up efforts currently are under study and in progress
- Ongoing noxious weed (purple loosestrife) control program, using both chemical and biological methods
- Thompson Lake is closed to waterfowl hunting to provide a security area for migrating ducks and geese

Past and current surveys:

- Waterfowl breeding pair/brood counts every spring and summer, including monitoring of wood duck nest boxes
- Eagle and Osprey nests are monitored each year
- Owl surveys along upland portions of WMA have been initiated in 2004

Potential survey methods

Description:

- Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies.
- Colony counts for nesting Great Blue Herons, and Black Terns.
- Census for waterfowl on the open water from land in some areas, and from boat in others. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period and would cut down on disturbance.
- Area searches for migrating shorebirds from observation points near Type 1 habitat.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- Census for gulls and terns during waterfowl counts.

Selection bias: It may be preferable not to use a boat in some areas in order to not disturb nesting birds, which may therefore present some selection bias.

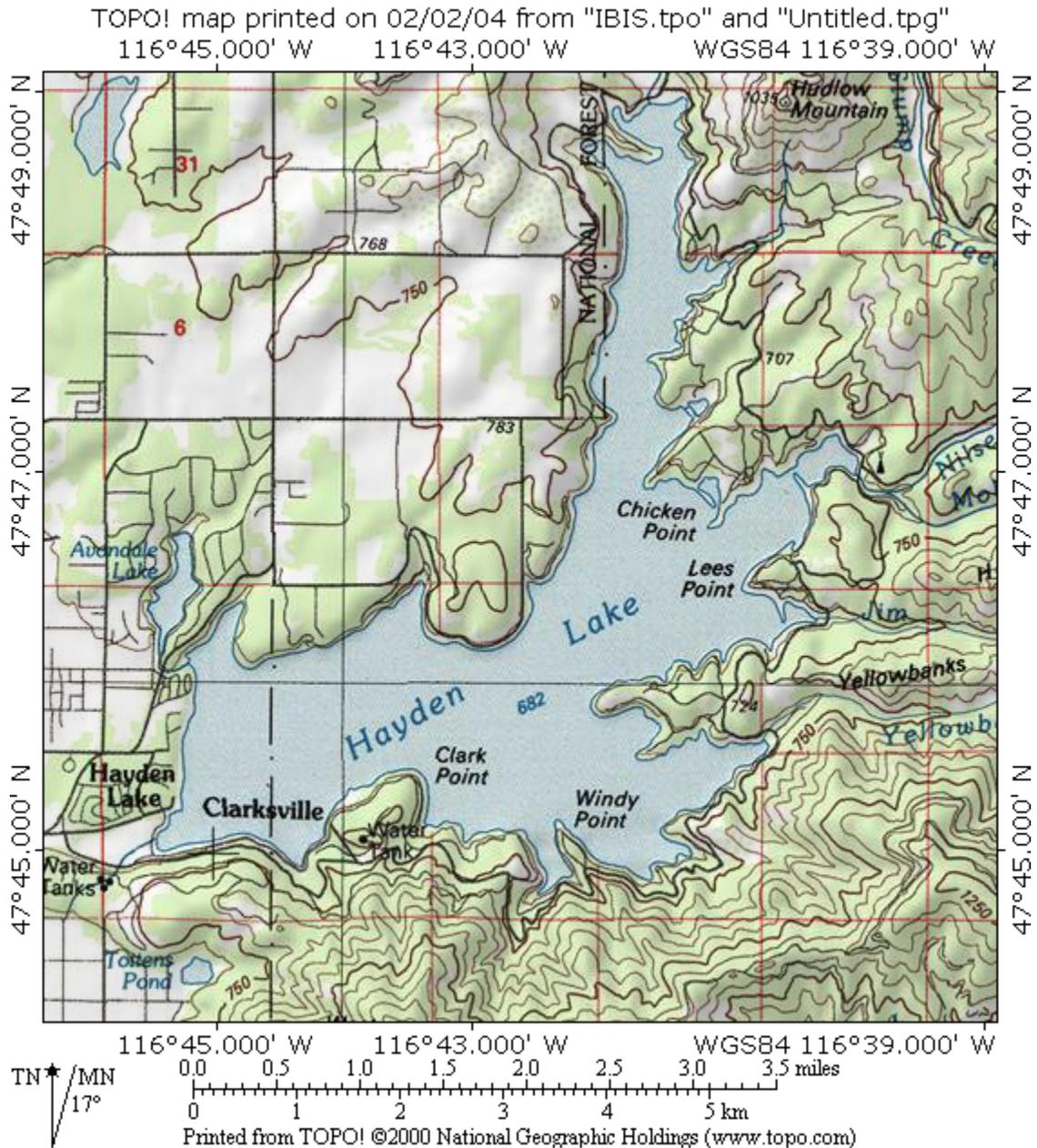
Measurement error and bias: Emergent vegetation in marshes and sloughs could be a substantial issue, for both visibility and access. Use of an airboat may decrease the access problem.

Needed pilot studies: Aerial photos could help in sample site determination and access logistics.

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50-5. HAYDEN LAKE



Boundaries and ownership:

Boundaries: Bordered on north, east, and south side by Hayden Lake Road. West – US95

Ownership: Mostly private, small sections of USDA Forest Service land

Focal species using the site and timing of use:

Nesting Red-necked Grebes, Wood Ducks, American Wigeon, and Cinnamon Teal. Horned Grebes, ducks, and gulls common in late fall through spring. Loons, swans, and Osprey also in the area. Very limited, if any, shorebird use.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation (particularly in Mokins Bay)	none
large waders	emergent vegetation, particularly at NE end	rest of shoreline
secretive marshbirds	water's edge at NE end of lake	none
waterfowl	open water, edges during breeding season (particularly in Mokins Bay)	none
shorebirds	shoreline	none
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds: View grebes, loons, waterfowl, and gulls through a scope from Honeysuckle Beach (SW end) and the Sportsman's Access (NW end) from late fall to spring. Overall, recreational use is quite high in late summer and might make any surveying at that time difficult. Viewing area at Tobler Marina for waterfowl on the lake, including grebes. In Mokins Bay, good area to search marshes for nesting ducks and grebes. This site would be best surveyed by boat; public boat access is available at NW and SW (Honeysuckle Beach) end.

Conservation issues:

- Recreational use/overuse
- The Lake is already surrounded by private development and it looks like there is more shoreline development on the way
- It has also been noted by Ned Horner (fisheries biologist IDFG) that there are concerns with eutrication and noxious weeds, specifically with Eurasian Milfoil

Conservation measures taken, in progress, or proposed:

- There is a Hayden Lake Management Plan Steering Committee that is connected to the Idaho Department of Environment Quality. Currently, they may be writing a new management plan to address water quality/development issues.

Past and current surveys:

- The Coeur d'Alene River District of the Idaho Panhandle National Forest does the Hayden Lake portion of the midwinter Bald Eagle Survey every year

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies by canoe, to minimize disturbance. Red-necked grebes appear to concentrate in small bays in north end and east side of the lake.
- b. Census for waterfowl on the open water using a boat or from viewing areas around lake, or by boat. Counts may be best done during fall, before ice forms on the lake. Boaters may disrupt late summer counts unless conducted in very early hours? Much of the lake is frozen in winter, so boat surveys will not be possible at this time.
- c. Area searches for migrating shorebirds during boat surveys? May have little or no shorebird use at this site.
- d. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- e. Census for gulls and terns during waterfowl counts.

Selection bias: N/A

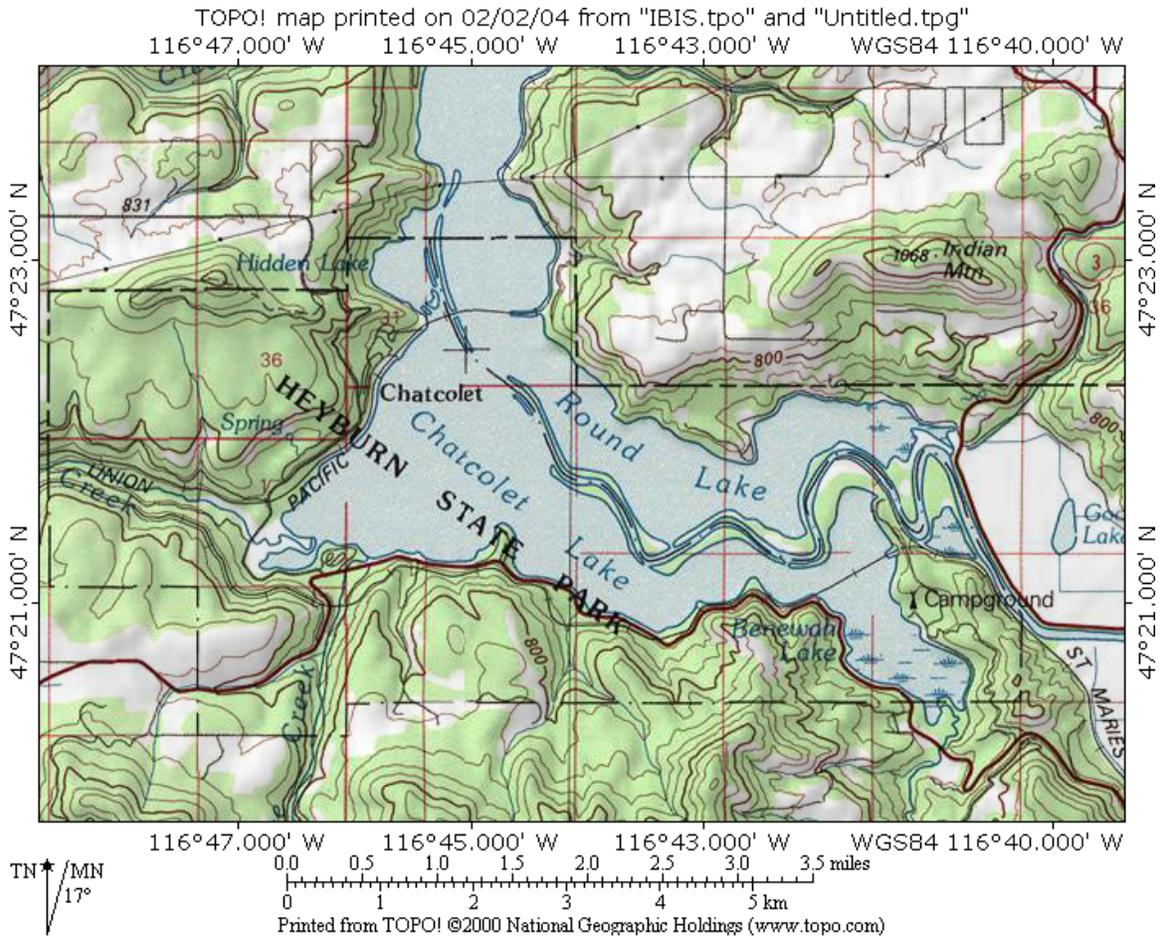
Measurement error and bias: Not sure if there would be any issues here, as no surveys have been done on waterbirds at this site.

Needed pilot studies: Given the lack of surveying on the lake in the past, pilot work to determine best places and times to survey by boat is suggested.

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50-6. HEYBURN STATE PARK (IBA)



Boundaries and ownership:

Boundaries: Boundaries clearly marked

Ownership: Idaho Department of Parks and Recreation

Focal species using the site and timing of use:

Nesting Red-necked Grebes, Wood Ducks, Canada Geese, Soras, and Osprey. Large flocks of waterfowl (5,000-10,000; mostly Mallards, Geese, and American Wigeon) from October to freeze-up, as well as Bald Eagles. Canada Geese and Great Blue Herons present during winter when there is open water.

Colonies: Great Blue Heron (35-59 pairs; Benowah Lake)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies (Benowah Lake), emergent vegetation	rest of shoreline
secretive marshbirds	Plummer Creek Marsh and east end of Benowah Lake	none

waterfowl	open water, edges during breeding season	none
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Multiple pull-outs along ID 5 and a boardwalk to scope for waterfowl/waterbirds in open water. Boat would be useful for accessing opposite shores and Benewah Lake. Marshbirds may be surveyed from the bridge along Plummer Creek Marsh. Most areas are accessible to the public, although there are a few private cabins within the park. Visibility of birds is unknown, and would therefore need a pilot study to assess.

Conservation issues:

- Western White Pine, particularly old growth W. white pine, has been affected by introduced white pine blister rust
- Recreational power boating in summer, and waterfowl hunting in fall, results in months of constant disruption of waterbird activities
- Loss of bank habitat on the St. Joe is a concern, as the bank appears to be washing away

Conservation measures taken, in progress, or proposed:

- Prescribed burning proposed to maintain Ponderosa Pine
- The University of Idaho is drafting a Natural Resource Management Plan for the park
- The park is currently attempting to plant Black Cottonwoods, but with marginal success

Past and current surveys:

- Wood Duck, Canada Goose artificial nest structures monitored annually for 10-25 years
- Christmas Bird Counts by Coeur d’Alene Audubon
- Area searches will occur once every season as part of IBA monitoring

Potential survey methods

Description:

- Nest searches for grebes nesting in the emergent vegetation in small colonies. Canoe likely will be necessary, but extreme care should be taken not to disturb the birds.
- Colony counts for nesting Great Blue Herons.
- Census for waterfowl and other waterbirds (particularly Common Loons) on the open water from shoreline. Late summer or fall counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- Systematic sampling, probably including the use of playback calls, for Soras from the boardwalk.
- Continuation of artificial nest structure monitoring.

Selection bias: N/A – unless some areas prove to be too shallow for a boat

Measurement error and bias: None known at this time

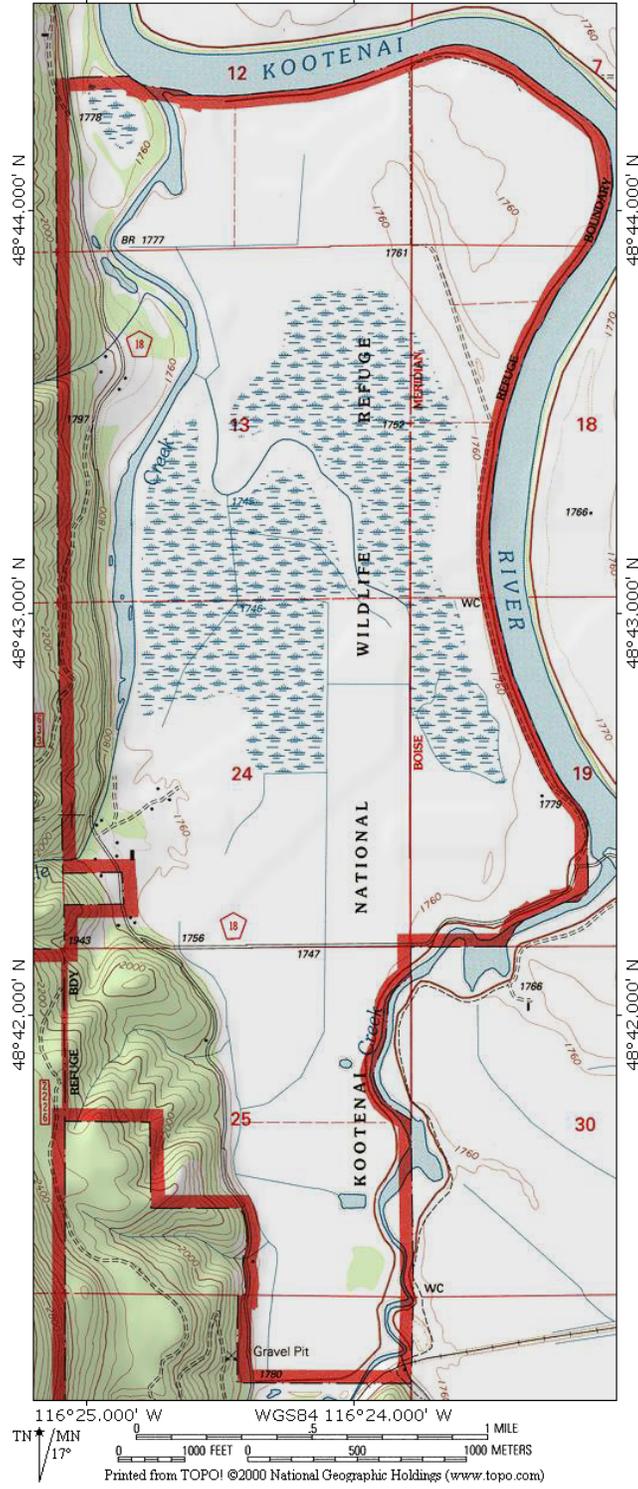
Needed pilot studies: Survey methods and sites should be further explored at this site. Because of complete lack of previous work on waterbirds, a pilot study focused on determining the best places to survey birds would be helpful.

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50-7. KOOTENAI NATIONAL WILDLIFE REFUGE (IBA)

TOPO! map printed on 01/30/04 from "IBIS.tpo" and "Untitled.tpg"
116°25.000' W WGS84 116°24.000' W



Boundaries and ownership:

Boundaries: Boundaries are clearly marked; North and East - Kootenai River and Deep Creek, West: Selkirk Mountains/Westside Road

Ownership: U.S. Fish and Wildlife Service

Focal species using the site and timing of use:

A total of 220 bird species have been recorded on the refuge, including 80 species that commonly use the refuge for nesting and feeding. Red-necked Grebes (5-15 pairs), other waterbirds (Pied-billed Grebe, American Bittern, Virginia Rail, Sora, American Coot), shorebirds (Killdeer, Spotted Sandpiper, Wilson’s Snipe), Northern Harriers (2-3 pairs), and Bald Eagles (1-2 pairs) routinely nest on the refuge, as well as numerous waterfowl and Red-winged and Yellow-headed Blackbirds. American Dippers nesting under bridge of Myrtle Creek. The refuge is also an important migration stop for migratory waterfowl. Spring and fall peaks of upwards of 40,000 ducks (Mallard – 80-85%, Northern Pintail, American Wigeon), 4,000 Canada Geese (fall peak), 400 Tundra Swans (spring peak), over 100 shorebirds (fall peak; Killdeer, Greater and Lesser Yellowlegs, Wilson’s Snipe, Long-billed Dowitcher), and up to 15 Bald Eagles (fall peak). Refuge ices over in winter from approximately December through February.

Colonies: Black Tern (25-30 pairs)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation	rest of shoreline
secretive marshbirds	water’s edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats	rest of shoreline
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Many parts of the area can be viewed from auto tour route that traverses the refuge, as well as the country road along the southern portion of the refuge. Special use permit needed to survey the rest of area. All water areas are visible from service roads, and boat access should not be necessary. Dikes surrounding wetlands are high enough to get a view of most, if not all, of the wetland areas.

Conservation issues:

- Introduced plants/animals
- Overextraction of groundwater; water rights
- Recreational development/overuse

Conservation measures taken, in progress, or proposed:

- USFWS is currently working on wetland projects to manage water levels, etc. May see more shorebird habitat available in near future.

Past and current surveys:

- Bi-weekly surveys have been conducted in the past, but not in the last couple of years
- Wood duck nest box monitoring taking place currently
- A bird checklist is available with all birds known to be present on the refuge

Potential survey methods

Description

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies, which should be visible from the shoreline.
- b. Colony counts for Black Terns and Black-crowned Night Herons. These counts must be done from a distance to minimize disturbance.
- c. Census for waterfowl and other waterbirds on the open from shoreline along auto tour route and service roads. Established brood count survey route should be used to allow for contribution to past data. Additional survey routes may be added to cover entire area.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds. Can be conducted from shorelines, along dike roads.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: N/A

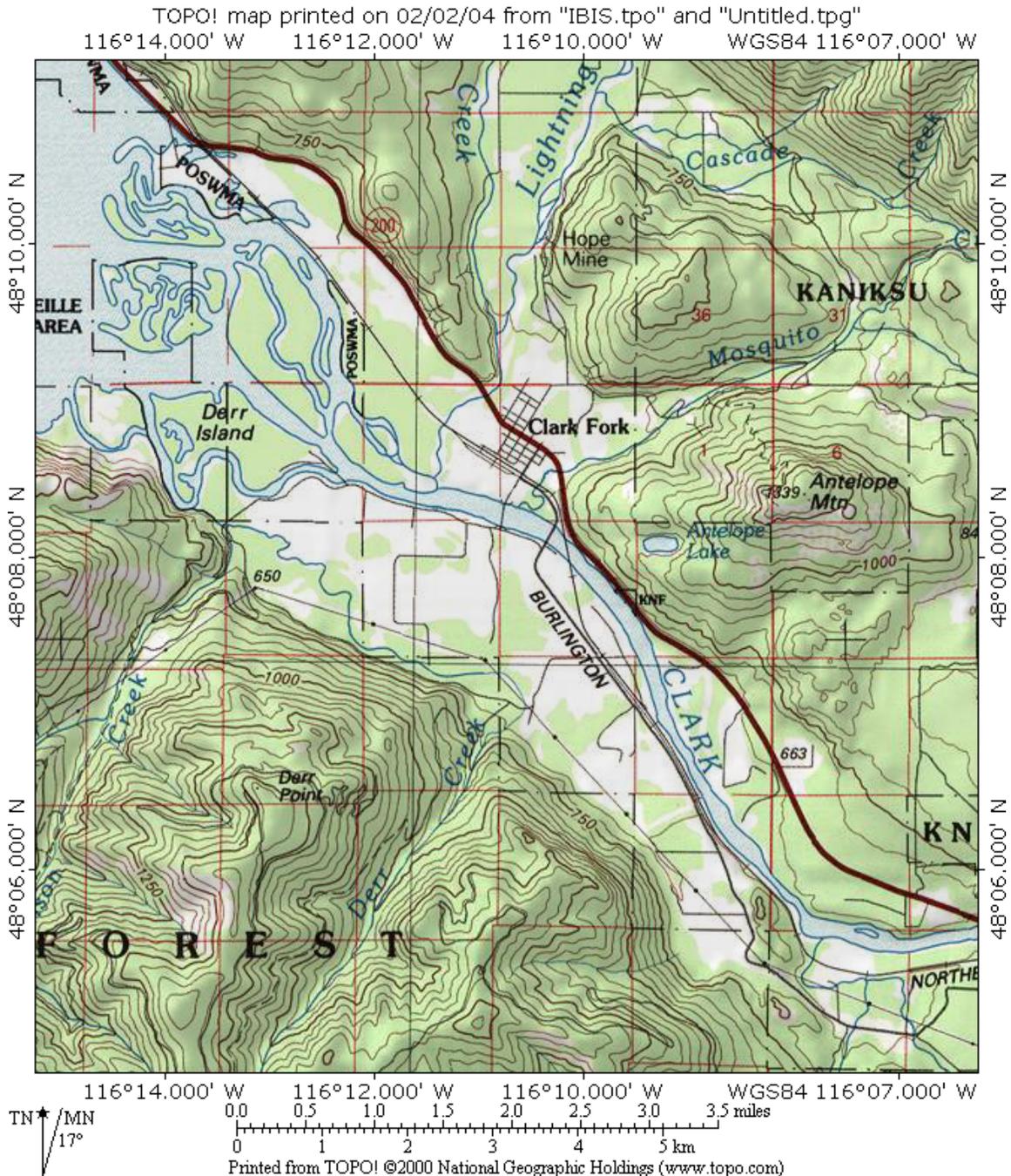
Measurement error and bias: some emergent vegetation issues, but very minor. Most of the area can be seen quite well from raised dikes surrounding the wetlands.

Needed pilot studies: None may be needed.

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50-8A. LAKE PEND OREILLE (CLARK FORK DELTA IBA)



Boundaries and ownership:

Boundaries: West – Lake Pend Oreille, East – bridge, South – Johnson Creek Sportsman Access road

Ownership: Idaho Department of Fish and Game, Army Corps of Engineers, Private

Focal species using the site and timing of use:

This site supports double-crested cormorants, shorebirds and more than 2,000 ducks, swans, and geese (Redhead, Wood Duck, Common Merganser, Green-winged Teal, American Widgeon, Mallard, Common Goldeneye, Tundra Swan, Canada Goose) in spring and fall migrations. Supports two Bald Eagle nests and 20+ osprey nests. Vaux’s swifts sometimes occur in high numbers during the summer. Common loons present during migration and occasionally heard during the breeding season but no documented breeding.

Colonies: Great Blue Heron

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Best access is by motor boat (Sportsman’s Access at Clark Fork, or public access in town of Hope), as visibility of birds is good from the water. Access road along part of the delta allows for good survey points for a portion of the area. Contact Army Corps of Engineers regarding access to drift yards from March 1 – June 15.

Conservation issues:

- Dam operation causes continuing loss of delta land to erosion
- Private land in the delta is being subdivided and sold
- Dam operation alters natural hydrology resulting in degraded habitat quality

Conservation measures taken, in progress, or proposed:

- Mitigation money from Bonneville Power Administration is available; WWP Cabinet Dam relicensing procedure starting
- Covered by the Pend Oreille WMA long-range management plan

Past and current surveys:

- Aerial winter waterfowl surveys
- Bald Eagle nest monitoring
- Fall waterfowl check stations
- Occasional Audubon field trips to the area
- Common Loon Surveys by Nate Hall of the Army Corps of Engineers

Potential survey methods

Description

- Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies.
- Colony counts for nesting Great Blue Herons.
- Census for waterfowl on the open water, probably by boat.
- Area searches for migrating shorebirds from observation points near Type 1 habitat.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- Census for gulls and terns during waterfowl counts.

Selection bias: None for water-based surveys

Measurement error and bias: N/A

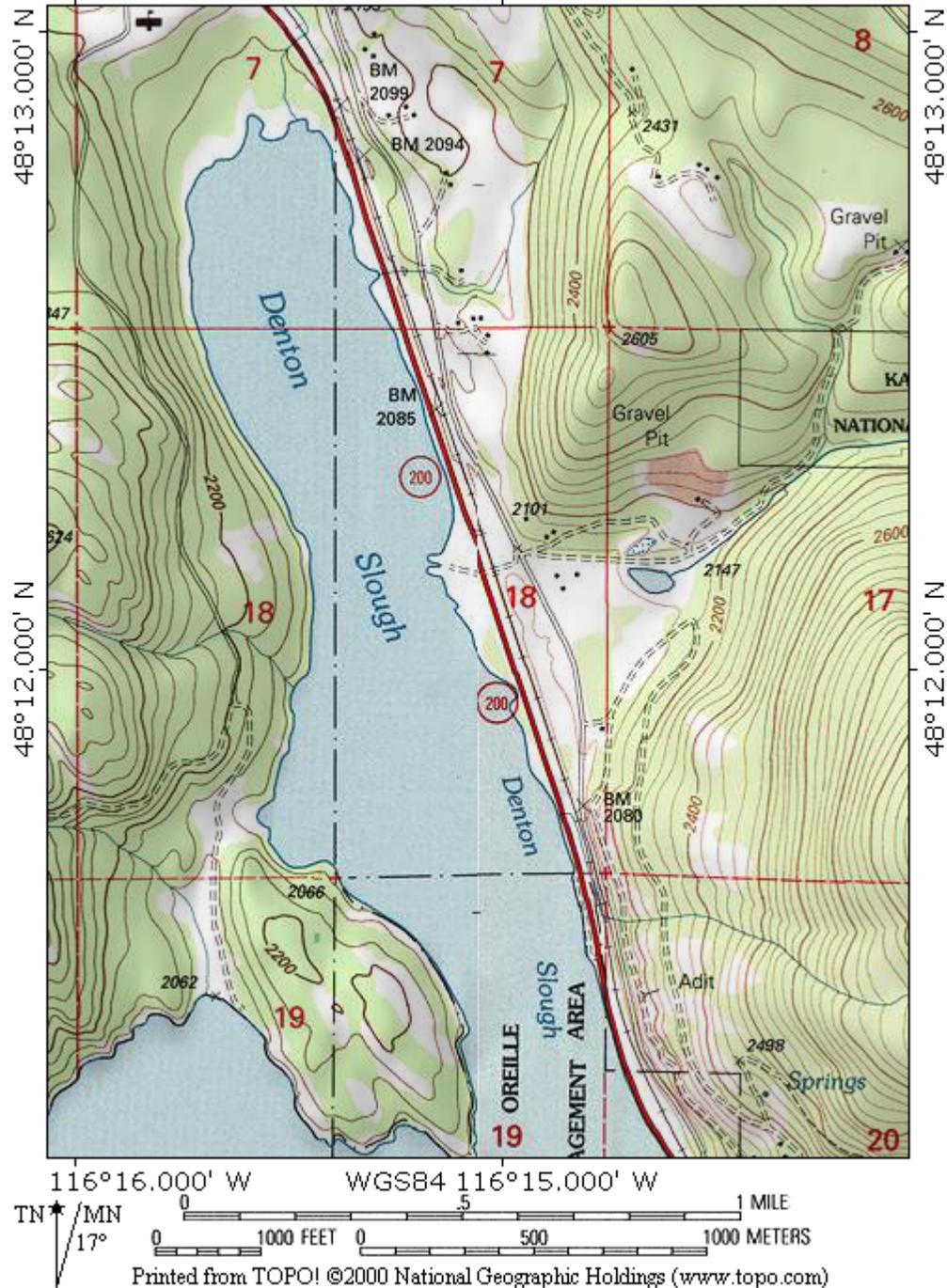
Needed pilot studies: None needed.

Contact:

NAME: Bryan Helmich or David Leptich - IDFG
ADDRESS: 2750 Kathleen Ave., Coeur d'Alene, ID 83815
PHONE: 208-769-1414
FAX: 208-769-1418
EMAIL: bhelmich@idfg.state.id.us, dleptich@idfg.state.id.us

50-8B. LAKE PEND OREILLE (DENTON SLOUGH IBA)

TOPO! map printed on 02/02/04 from "IBIS.tpo" and "Untitled.tpg"
116°16.000' W WGS84 116°15.000' W



Boundaries and ownership:

Boundaries: East – ID 200, South - Lake Pend Oreille

Ownership: Army Corps of Engineers; Idaho Department of Fish & Game; managed by Idaho Department of Fish and Game

Focal species using the site and timing of use:

Supports large nesting colony of Western Grebes (30+ nests). Summer waterbirds also include: Double-crested Cormorants, Great Blue Herons, Canada Geese, and Black Terns. Thousands of waterfowl (American Wigeon, Redhead, Lesser Scaup, Green-winged Teal, Mallard, Tundra Swan, Canada Goose) use Denton Slough during migration.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Access by car, boat, or foot. The majority of the area can be seen from two IDFG Sportsman's Access points along ID 200. Larger species can be observed from one or two shoreline stations with the aid of a spotting scope.

Conservation issues:

- Dam operation alters natural hydrology resulting in degraded habitat quality.
- Easy public access has potential for disturbing breeding birds although the birds seem fairly habituated to the disturbance. However, Western Grebes are nesting within several meters of a boat access point, which could be a serious problem.
- Most, if not all, grebe nests failed in 2003 for reasons unknown.

Conservation measures taken, in progress, or proposed:

- Covered by the Pend Oreille WMA long-range management plan
- Albeni Falls mitigation program is being funded by BPA

Past and current surveys:

- Counts in 1996 and 2000 to present for nesting grebes
- Annual waterfowl breeding pair and brood counts starting in 2000
- Triennial point counts planned as part of BPA monitoring obligation

Potential survey methods*Description*

- Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies.
- Colony counts for nesting large waders.
- Census for waterfowl on the open water from land.
- Area searches for migrating shorebirds from observation points near Type 1 habitat.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- Census for gulls and terns during waterfowl counts.

Selection bias: N/A

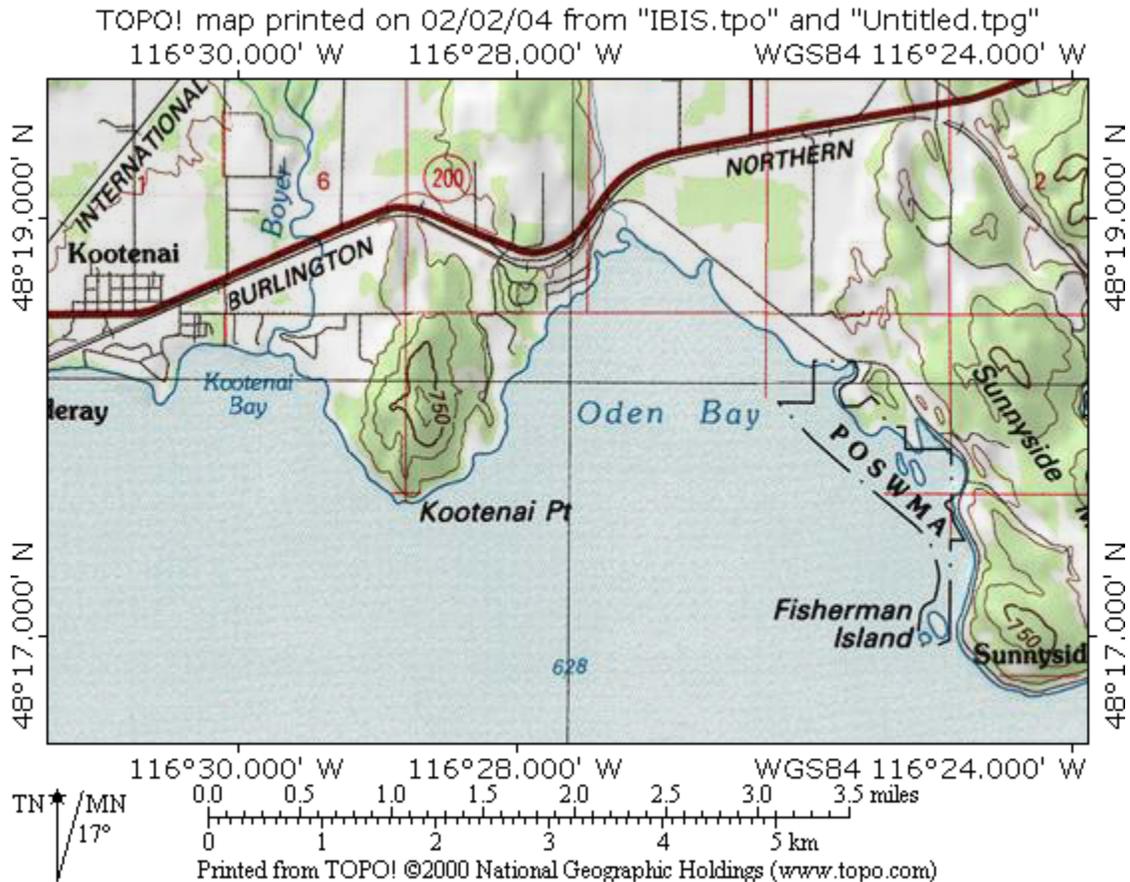
Measurement error and bias: N/A

Needed pilot studies: None needed.

Contact:

NAME: Bryan Helmich or David Leptich - IDFG
ADDRESS: 2750 Kathleen Ave., Coeur d'Alene, ID 83815
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50-8C. LAKE PEND OREILLE (FISHERMAN ISLAND/ODEN BAY IBA)



Boundaries and ownership:

Boundaries: Southwest - Lake Pend Oreille, Northwest Sunnyside Rd.

Ownership: Army Corps of Engineers

Focal species using the site and timing of use:

This site supports over 5,000 waterfowl (Redhead, Lesser Scaup, Common Merganser, Red-breasted Merganser, Common Goldeneye, Barrow's Goldeneye, American Wigeon, Hooded Merganser, American Coot) in migration and winter. Waterfowl concentrate in large rafts offshore and into Oden Bay to the north. Common Loons are also present during migration. Bald Eagles nest on Fisherman Island, and Western Grebes, Red-necked Grebes, and Common Mergansers are present during the summer.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Roadside viewing is good on the east side along Sunnyside Road, although not many places to stop (traffic is low). One public access point is available along the east side, where a trail leads to the bay. Good visibility at this point. West and North side is mostly private property, with very little, if any, access available. Boat access may be necessary to survey this side of the bay.

Conservation issues:

- Dam operation alters natural hydrology resulting in degraded habitat quality

Conservation measures taken, in progress, or proposed:

- Covered by the Pend Oreille WMA long-range management plan
- Albeni Falls mitigation program is being funded by BPA

Past and current surveys:

- Mid-winter aerial waterfowl counts
- Bald Eagle nest monitoring

Potential survey methods*Description*

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies.
- b. Census for waterfowl on the open water from boat.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: N/A

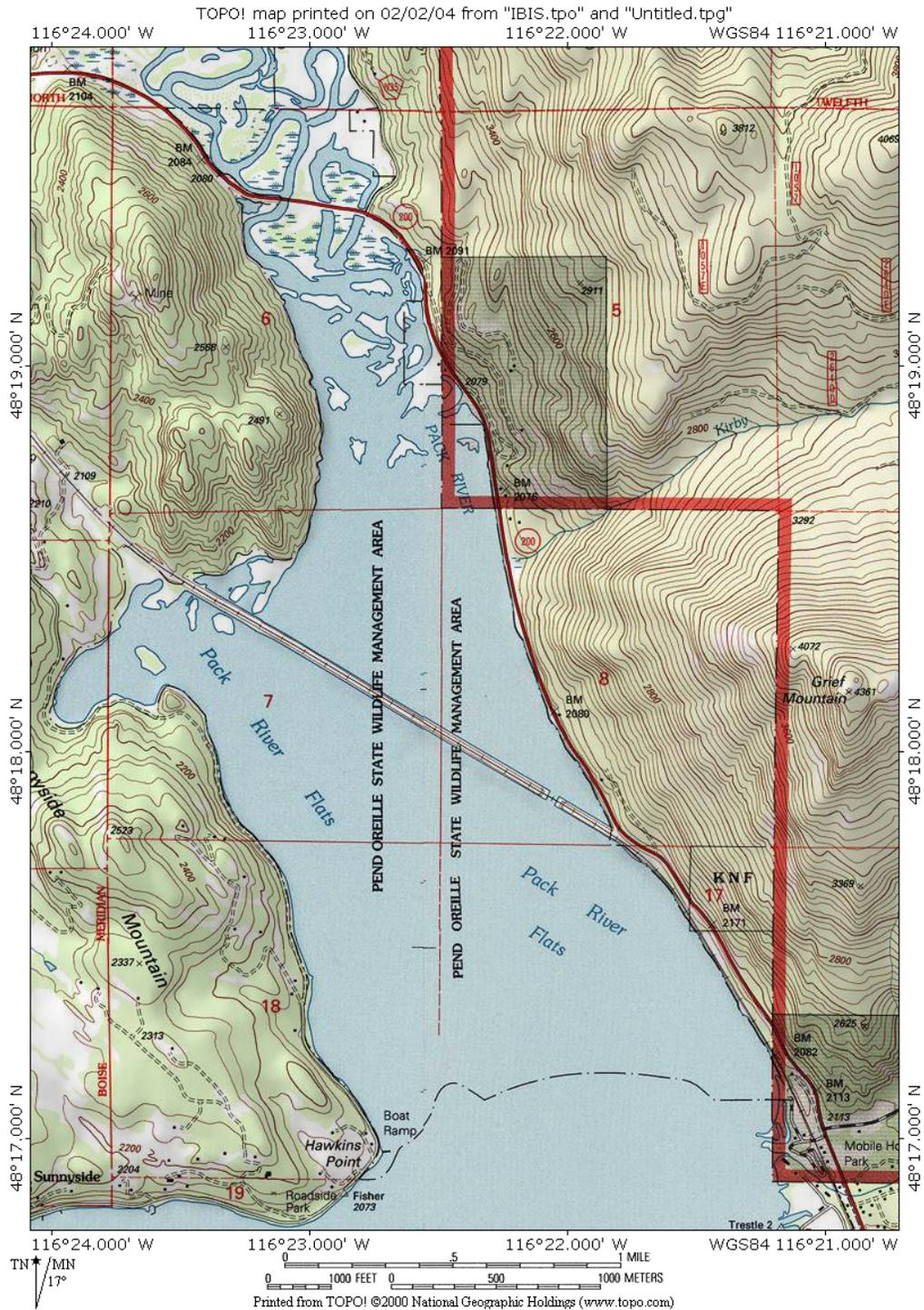
Measurement error and bias: N/A

Needed pilot studies: None needed.

Contact:

NAME: Bryan Helmich or David Leptich - IDFG
ADDRESS: 2750 Kathleen Ave., Coeur d'Alene, ID 83815
PHONE: 208-769-1414
FAX: 208-769-1418
EMAIL: bhelmich@idfg.state.id.us, dleptich@idfg.state.id.us

50-8D. LAKE PEND OREILLE (PACK RIVER DELTA IBA)



Boundaries and ownership:

Boundaries: North/East – ID 200, South – Lake Pend Oreille, East – Sunnyside road.

Ownership: Army Corps of Engineers, managed by Idaho Dept. Fish and Game

Focal species using the site and timing of use:

This site supports thousands of waterfowl (Tundra Swans, Canada Geese, Redheads, Lesser Scaup, Common Goldeneye, Common Merganser, Mallard, American Wigeon, Ring-necked Duck) and Common Loons during spring and fall migrations. Osprey, Bald Eagles, and Great Blue Herons nest along the shoreline. Bald Eagles also use the area for foraging during high waterfowl concentrations.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
waterfowl	open water, edges during breeding season	none

Access to the type 1 and 2 habitat and visibility of the birds:

Foot and motor boat access is available to the public. A few pull-outs are available along ID-200 for viewing. Sunnyside road, which is along the west side of the delta also provides a few viewing spots. However, the majority of the site will need to be surveyed by boat.

Conservation issues:

- Operation of Albeni Falls Dam causes continuing erosion
- Dam operation alters natural hydrology resulting in degraded habitat quality

Conservation measures taken, in progress, or proposed:

- Albeni Falls mitigation program is being funded by BPA
- Covered by the Pend Oreille WMA long-range management plan

Past and current surveys:

- Aerial winter waterfowl count
- Canada goose nesting pair counts

Potential survey methods

Description

- Colony counts for nesting Great Blue Herons.
- Census for waterfowl and waterbirds on the open water by boat (or on foot from areas along shoreline accessed by boat) during migration.

Selection bias: N/A

Measurement error and bias: None if surveys are done by boat. If surveying from shoreline, measurement bias would be an issue.

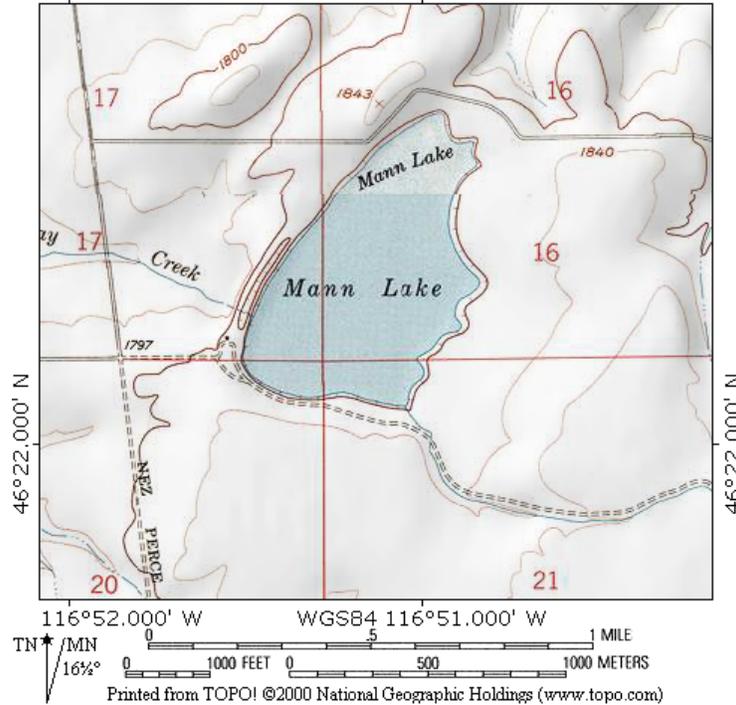
Needed pilot studies: None needed.

Contact:

NAME: Bryan Helmich or David Leptich - IDFG
 ADDRESS: 2750 Kathleen Ave., Coeur d'Alene, ID 83815
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50-9. MANN LAKE (IBA)

TOPO! map printed on 02/02/04 from "IBIS.tpo" and "Untitled.tpg"
 116°52.000' W WGS84 116°51.000' W



Boundaries and ownership:

Boundaries: Entire reservoir; west – Dam, South – East Powers Ave.

Ownership: Lewiston Orchards Irrigation District, managed through a cooperative agreement with Idaho Department of Fish and Game

Focal species using the site and timing of use:

In spring and summer, waterbirds (American Coot, Western Grebe, Double-crested Cormorant, Great Blue Heron, Great Egret, Ring-billed Gull, California Gull, Franklin's Gull, Bonaparte's Gull) and waterfowl (Canada Goose, Mallard, American Wigeon, Northern Pintail, Redhead, Bufflehead, Ruddy Duck) are common, although likely that little breeding occurs at the lake itself. Large migratory shorebird population in the fall (July-September), including Western Sandpiper, Semipalmated Plover, Black-bellied Plover, Killdeer, American Avocet, Greater and Lesser Yellowlegs, Spotted Sandpiper, Semipalmated Sandpiper, Least Sandpiper, Baird's Sandpiper, Stilt Sandpiper, Long-billed Dowitcher, and Wilson's Phalarope. Also present during migration are the waterbird species listed above for the summer months, as well as Common Tern, Caspian Tern, and Black Tern. Wintering species include waterfowl (including occasional use by Tundra Swans and Snow Geese), Great Blue Herons, and assorted gulls.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	exposed mudflats	Rip-rap dam
waterfowl	open water	none

shorebirds	exposed mudflats	rest of shoreline
gulls	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Good access to mudflats on eastern shore – footpath down to water from the model airplane airport. Can scan most of reservoir from this spot. Can also view most of the area from the main parking lot. Mann Lake is freely accessible to the public from dawn to dusk.

Conservation issues:

- Excessive drawdown (this areas is managed primarily for irrigation) as a result of a severe drought in the early 1990’s allowed shoreline shrubs, in particular willows, to become established (although some may also have been planted by local birders). This has reduced the area of the mudflats to migrating shorebirds and loafing waterfowl, but has increased the available habitat for resident and migratory songbirds.

Conservation measures taken, in progress, or proposed:

- The Lewiston Orchards Irrigation District regularly scalps the shoreline with heavy equipment, thus preventing afforestation on approximately 20 % of the shoreline
- Because the lake has a large crappie population, it may be suitable for an artificial Osprey nesting platform

Past and current surveys:

- Multiple studies of shorebird migration – contact the Palouse or Canyon Audubon chapters for more information and data

Potential survey methods

Description

- a. Census for waterfowl and waterbirds on the open water in late summer or winter.
- b. Area searches for migrating shorebirds from observation points near Type 1 habitat (eastern shore of reservoir by the model airplane airport).
- c. Census for gulls during waterfowl counts.

Selection bias: N/A - The lake is entirely visible and available for surveys with a limited amount of walking necessary

Measurement error and bias: N/A - It is a small lake so a skilled birder with binoculars and a spotting scope should be able to identify every bird

Needed pilot studies: None needed

Contact:

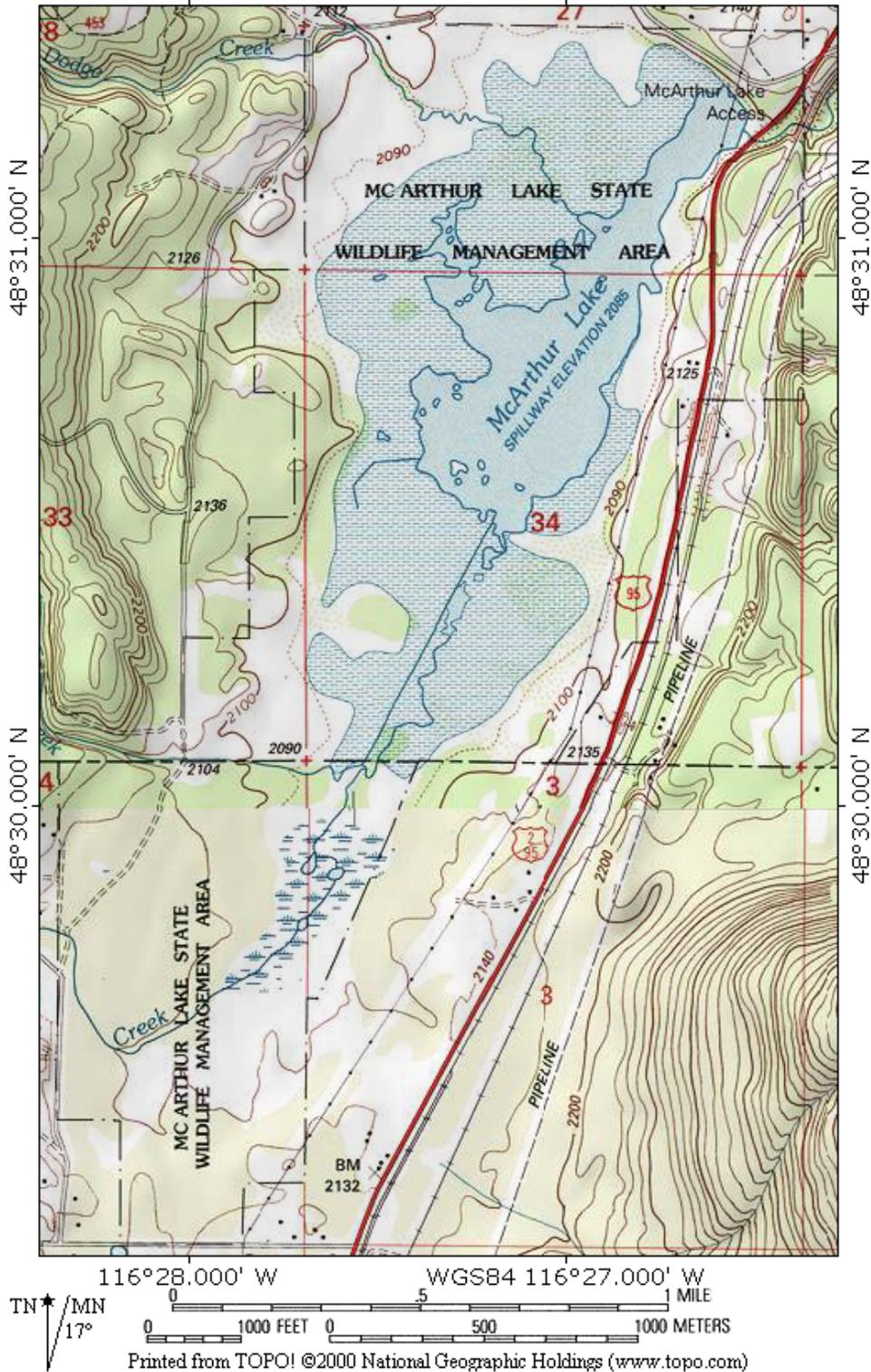
NAME: Joel Sauder – IDFG
 ADDRESS: 1540 Warner Ave., Lewiston, ID 83501
 PHONE: 208-799-5010
 FAX: 208-799-5012
 EMAIL: jsauder@idfg.state.id.us

Secondary Contact:

NAME: Charles Swift – Palouse Audubon
 PHONE: (w) 208-885-5331
 (h) 208-883-0553
 EMAIL: charless@moscow.com

50-10. MCARTHUR LAKE WILDLIFE MANAGEMENT AREA (WMA/IBA)

TOPO! map printed on 02/02/04 from "IBIS.tpo" and "Untitled.tpg"
116°28.000' W WGS84 116°27.000' W



Boundaries and ownership:

Boundaries: South/West – West Elmira Rd.; East – U.S. 95; North – County Rd A-4; boundaries are clearly marked

Ownership: Idaho Department of Fish and Game

Focal species using the site and timing of use:

Waterfowl (Canada Goose, Mallard, Ruddy Duck, Ring-necked Duck, Wood Duck, Gadwall, Redhead, Northern Shoveler, Blue-winged Teal, Cinnamon Teal, Green-winged Teal, American Wigeon), waterbirds (Pied-billed Grebe, Sora, Virginia Rail, American Coot, Great Blue Heron), shorebirds (Killdeer, Wilson’s Snipe, Wilson’s Phalarope, Spotted Sandpiper), Bald Eagles, Osprey, and Belted Kingfishers are present during the summer; majority of which are breeding here. American White Pelicans occur here in late summer. Large waterfowl migration in fall and spring (>2,000; American Wigeon, Mallard, Green-winged Teal, Lesser Scaup, Common Goldeneye, Bufflehead, Canada Goose, others) and shorebird migration in August (>100; Killdeer, Wilson’s Snipe, Greater Yellowlegs, Long-billed Dowitcher, Western Sandpiper, Spotted Sandpiper, Solitary Sandpiper).

Colonies: Great Blue Heron (12 nests), Black Terns (4-6 nests?)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats on western shore	rest of shoreline
terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Motor boat, canoe, and foot access is available to the public. Visibility is good from the water, and entire lake may be surveyed by canoe in a couple of hours. Foot access is pretty limited, and wouldn’t provide a good view of the area.

Conservation issues:

- Introduced plants (tansy and knapweed)
- Predation of waterfowl nests by Common Ravens
- Marsh succession appears advanced

Conservation measures taken, in progress, or proposed:

- Drawdowns have been executed to control succession
- Field conversion to seeded grassland
- Use of selective pesticides for raven control (carefully conducted using artificial nests)
- Covered by the McArthur Lake WMA long-range management plan.

Past and current surveys:

- Annual Canada Goose banding (1986 – 1994)
- Pre-hunting season duck banding (since 1993 – present)

Potential survey methods

Description

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe is necessary for access

- b. Colony counts for nesting Great Blue Herons and Black Terns.
- c. Census for waterfowl and other waterbirds on the open water by boat/canoe.
- d. Area searches for migrating shorebirds from shoreline or by boat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
Canoe is necessary for access.

Selection bias: N/A

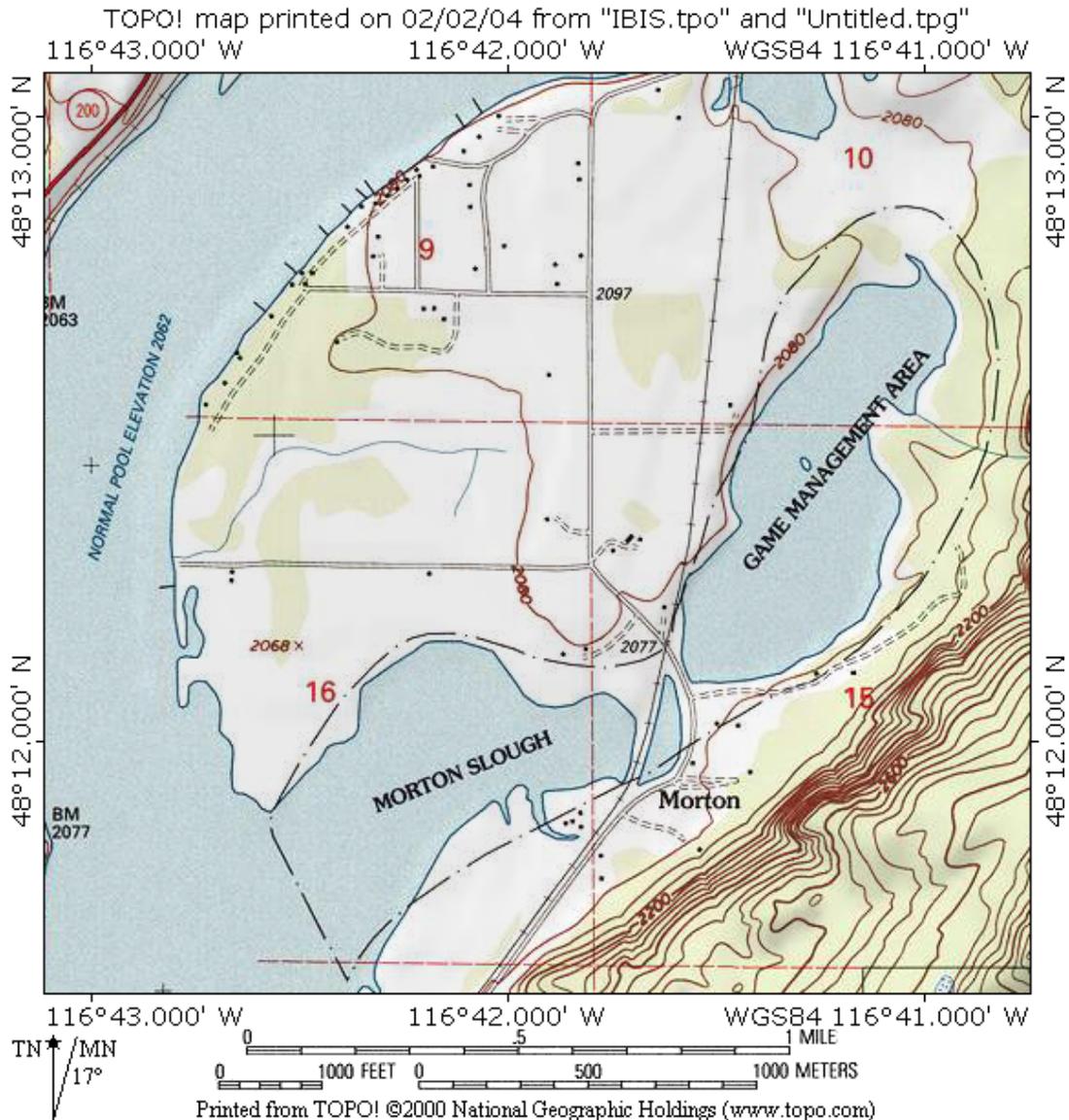
Measurement error and bias: N/A

Needed pilot studies: None needed, other than determining location of heron and tern colonies.

Contact:

NAME: Bryan Helmich - IDFG
ADDRESS: 2750 Kathleen Ave., Coeur d'Alene, ID 83815
PHONE: 208-769-1414
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EMAIL: bhelmich@idfg.state.id.us

50-11. MORTON SLOUGH (IBA)



Boundaries and ownership:

Boundaries: West – Pend Oreille River, South/East (roughly) – Lakeshore Drive and shoreline of Morton Slough, North - shoreline

Ownership: Army Corps of Engineers and managed by Idaho Department of Fish and Game; Private

Focal species using the site and timing of use:

Large numbers of migratory waterfowl (>2000; Redhead, Canvasback, Lesser Scaup, Common Merganser, Hooded Merganser, American Wigeon, Common Goldeneye, Ring-necked Duck, Bufflehead, Mallard, Gadwall, Canada Goose, Tundra Swan, Canada Goose), Great Blue Herons, and Double-crested cormorants. Also supports many breeding waterfowl. Bald Eagle nest nearby.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation	rest of shoreline
waterfowl	open water, edges during breeding season	none

Access to the type 1 and 2 habitat and visibility of the birds:

Foot, motor boat, and canoe access is available to the public. The entire slough may be viewed from three observation points, using a spotting scope (**observation points will be added to topomap in final draft**).

Conservation issues:

- Subdivisions and homebuilding taking place adjacent to slough
- Dam operation alters natural hydrology resulting in degraded habitat quality

Conservation measures taken, in progress, or proposed:

- Covered by the Pend Oreille WMA long-range management plan
- Albeni Falls mitigation program is being funded by BPA

Past and current surveys:

- Used as a waterfowl banding site in the past
- Canada goose nesting pair surveys

Potential survey methods

Description

- a. Census for waterfowl and waterbirds on the open water from shoreline. Concentrate on migration period, as waterfowl may be the only species present during the breeding season.

Selection bias: Private ownership may limit access to some sites.

Measurement error and bias: N/A

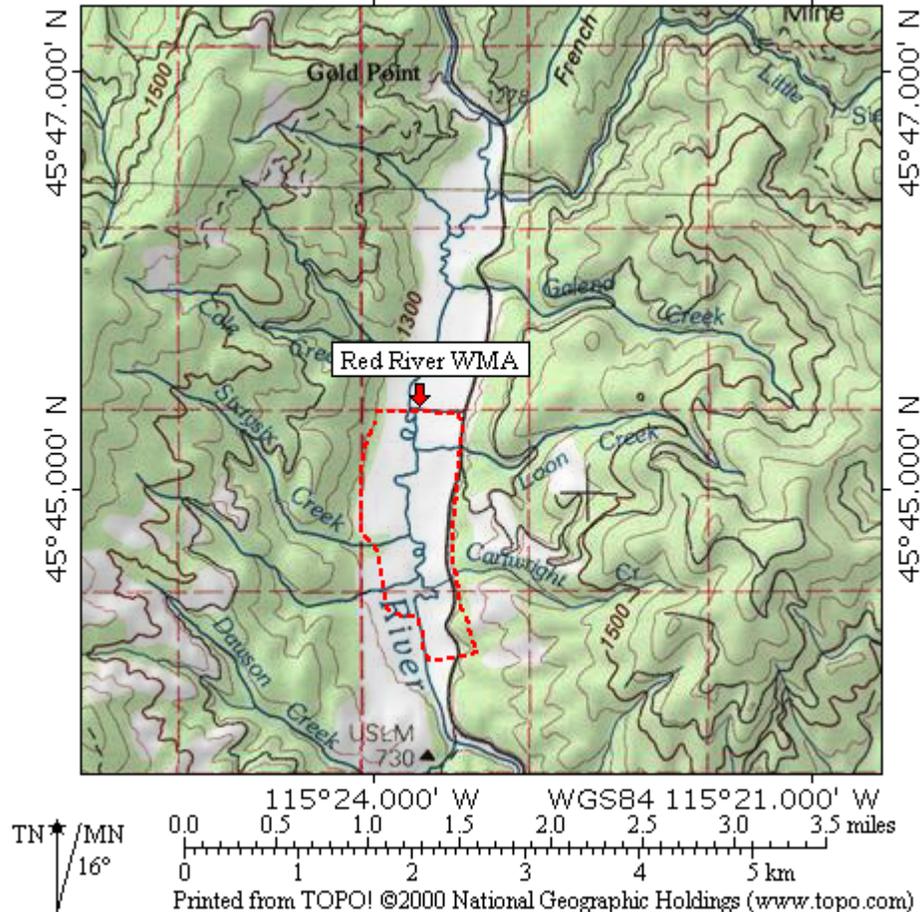
Needed pilot studies: None needed.

Contact:

NAME: Bryan Helmich or David Leptich- IDFG
ADDRESS: 2750 Kathleen Ave., Coeur d'Alene, ID 83815
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50-12. RED RIVER WILDLIFE MANAGEMENT AREA (WMA)

TOPO! map printed on 02/04/04 from "IBIS.tpo" and "Untitled.tpg"
 115°24.000' W WGS84 115°21.000' W



Boundaries and ownership:

Boundaries: Boundaries clearly marked

Ownership: Idaho Department of Fish & Game

Focal species using the site and timing of use:

Waterfowl, waterbirds, and shorebirds are present during breeding season. Waterbirds, herons, waterfowl, shorebirds, gulls and terns are in this area during migration. No waterbirds present during the winter.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation	rest of shoreline
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Shoreline observation sites are easily accessible to the general public. Meadow access is restricted from 15 April – 15 June to reduce disturbance to elk calving and waterfowl nesting. Contact Miles Benker, WMA Manager regarding survey timeframe. Surveys can be done along shoreline. All groups of birds would be best surveyed in this manner.

Conservation issues:

- Residential development of private lands adjacent the WMA

Conservation measures taken, in progress, or proposed:

- Upstream and downstream property owners have been informed of Conservation Easements and other options available to them

Past and current surveys:

- Annual line transect survey (since 1996) in mid-June conducted by local birder, Mindy Weibush (intended to be a permanent monitoring site)

Potential survey methods*Description*

- a. Census for waterfowl and waterbirds on open water using shoreline surveys or line transects within the riparian area. Breeding pair surveys during spring migration, fall surveys during fall migration period.
- b. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- c. Census for gulls and terns during waterfowl counts or in late summer/fall, as not breeding at this site.

Selection bias: N/A Red River WMA can be surveyed in its entirety

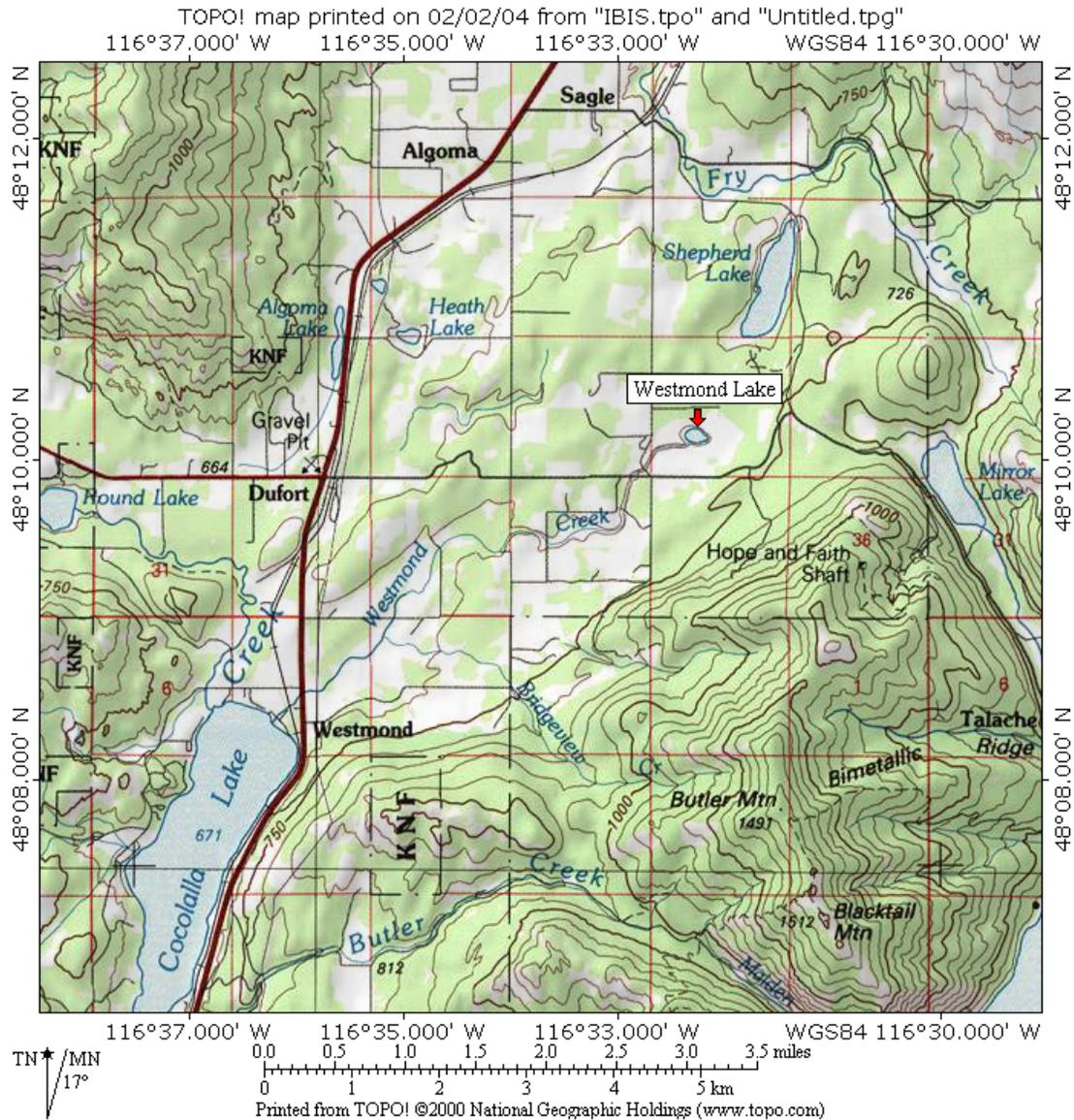
Measurement error and bias: Restricted views with increase in emergent vegetation and woody vegetation establishment along restored streambanks

Needed pilot studies: None needed

Contact:

NAME: Miles Benker - IDFG
ADDRESS: 1540 Warner Ave., Lewiston, ID 83501
PHONE: 208-799-5100
FAX: 208-799-2012
EMAIL: mbenker@idfg.state.id.us

50-13. WESTMOND LAKE (IBA)



Boundaries and ownership:

Boundaries: South – Dufort rd., West – Westmond road. Shorelines of the lake plus adjacent wetlands.

Ownership: Idaho Department of Fish and Game, private

Focal species using the site and timing of use:

Nesting waterfowl (Mallard, Wood Duck, Canada Goose, Cinnamon Teal, Green-winged Teal), Wilson's Phalaropes, and Black Terns. Soras, Virginia Rails, and Great Blue Herons also present. Migration site for waterfowl (>200 individuals, mostly Northern Pintail) and shorebirds, (>100 in late summer; Western Sandpiper, Long-billed Dowitcher, Greater Yellowlegs, Killdeer, Spotted Sandpiper).

Colonies: Black Tern (>30 individuals)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
secretive marshbirds	water's edge	none
waterfowl	open water, adjacent flooded wetlands (April-July)	none
shorebirds	exposed mudflats in late summer	rest of shoreline
terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Pond is accessible by foot, and visibility of birds is variable. Emergent vegetation will be a problem, and the area may be best surveyed by flush counts.

Conservation issues:

- Site is currently drained by a functioning drainage system
- Potential for new residential homes

Conservation measures taken, in progress, or proposed:

- Covered by the Pend Oreille WMA long-range management plan
- Albeni Falls mitigation program is being funded by BPA

Past and current surveys:

- Waterfowl breeding pair and brood surveys
- Triennial point counts planned as part of BPA monitoring obligation

Potential survey methods

Description

- a. Colony counts for nesting Black Terns.
- b. Census for waterfowl on the open water from shoreline and temporarily-flooded (April – July) wetlands adjacent to pond by foot. Little use of the area during late summer or winter. Survey with one transect through center of area (between pond and adjacent wetlands)
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- d. Conduct playback surveys for secretive marshbirds from one point along shoreline. Area is too small for more than one survey point.

Selection bias: N/A

Measurement error and bias: N/A

Needed pilot studies: None needed.

Contact:

NAME: Bryan Helmich or David Leptich- IDFG
ADDRESS: 2750 Kathleen Ave., Coeur d'Alene, ID 83815
PHONE: 208-769-1414
FAX: 208-769-1418
EMAIL: bhelmich@idfg.state.id.us, dleptich@idfg.state.id.us

Stratum 2: Northern Idaho

Boundaries and ownership:

Boundaries: This stratum includes all other wetland areas in BMR-50

Ownership: U.S. Forest Service (majority), Bureau of Land Management, State of Idaho, Bureau of Reclamation, Bureau of Indian Affairs, National Park Service, military, and private

Focal species using the site and timing of use: All focal species for BMR-50

Location of type 1 and 2 habitat within the site

Type I Habitat:

(all lakes greater than 300 acres in size are listed below)

Lake Name	IDFG Region	Lake Name	IDFG Region
Alturas Lake	Salmon	Lost Valley Reservoir	McCall Subregion
Anderson Lake	Panhandle	Lower Twin Lake	Panhandle
Black Canyon Reservoir	Southwest	Oxbow Reservoir	McCall Subregion
Brownlee Reservoir	McCall Subregion	Payette Lake	McCall Subregion
Cocolalla Lake	Panhandle	Pettit Lake	Salmon
Deadwood Reservoir	Southwest	Priest Lake	Panhandle
Dworshak Reservoir	Clearwater	Redfish Lake	Salmon
Fernan Lake	Panhandle	Spirit Lake	Panhandle
Goose Lake	McCall Subregion	Upper Payette Lake	McCall Subregion
Hauser Lake	Panhandle	Upper Priest Lake	Panhandle
Hells Canyon Reservoir	McCall Subregion	Upper Twin Lake	Panhandle
Little Payette Lake	McCall Subregion	Warm Lake	McCall Subregion

Type II Habitat:

Numerous small lakes and ponds scattered throughout the region. In the Salmon region, the Salmon, Pahsimeroi, and Lemhi rivers are good sites for nesting Great Blue Herons and shorebirds.

Access to the type 1 and 2 habitat and visibility of the birds: access and visibility depends on the site and varies widely across the region.

Past and current surveys:

Potential survey methods

Description: Potentially all types of survey methods would apply over the region - aerial, ground (foot, motor vehicle), and boat. The Salmon River corridor could be effectively surveyed by drift boat.

Selection bias:

Measurement error and bias:

Needed pilot studies:

Appendix D1. Aquatic Focal Species for BMR-50

Species:	Initiative	Class. Level	Season(s)
Red-throated Loon - <i>Gavia stellata</i>	Waterbird	NB	M
Pacific Loon - <i>Gavia pacifica</i>	Waterbird	NB	M
Common Loon - <i>Gavia immer</i>	Waterbird	2	BW
Pied-billed Grebe - <i>Podilymbus podiceps</i>	Waterbird	3	BW
Horned Grebe - <i>Podiceps auritus</i>	Waterbird	4	BMW
Red-necked Grebe - <i>Podiceps grisegena</i>	Waterbird	3	BW
Eared Grebe - <i>Podiceps nigricollis</i>	Waterbird	4	MW
Western Grebe - <i>Aechmophorus occidentalis</i>	Waterbird	3	BW
Clark's Grebe - <i>Aechmophorus clarkii</i>	Waterbird	3	B
American White Pelican - <i>Pelecanus erythrorhynchos</i>	Waterbird	2	B
Double-crested Cormorant - <i>Phalacrocorax auritus</i>	Waterbird	4	BMW
American Bittern - <i>Botaurus lentiginosus</i>	Waterbird	3	B
Great Blue Heron - <i>Ardea herodias</i>	Waterbird	4	BW
Cattle Egret - <i>Bubulcus ibis</i>	Waterbird	4	M
Green Heron - <i>Butorides virescens</i>	Waterbird		BW
Black-crowned Night-Heron - <i>Nycticorax nycticorax</i>	Waterbird	4	M
Tundra Swan - <i>Cygnus columbianus</i>	Waterfowl	NB	MW
Trumpeter Swan - <i>Cygnus buccinator</i>	Waterfowl	1	MW
Greater White-fronted Goose - <i>Anser albifrons</i>	Waterfowl	NB	M
Snow Goose - <i>Chen caerulescens</i>	Waterfowl	NB	M
Ross' Goose - <i>Chen rossii</i>	Waterfowl	NB	MW
Canada Goose - <i>Branta canadensis</i>	Waterfowl	4	BW
Wood Duck - <i>Aix sponsa</i>	Waterfowl	3	BW
Green-winged Teal - <i>Anas crecca</i>	Waterfowl	4	BW
Mallard - <i>Anas platyrhynchos</i>	Waterfowl	4	BW
Northern Pintail - <i>Anas acuta</i>	Waterfowl	4	BW
Blue-winged Teal - <i>Anas discors</i>	Waterfowl	4	B
Cinnamon Teal - <i>Anas cyanoptera</i>	Waterfowl	4	BW
Northern Shoveler - <i>Anas clypeata</i>	Waterfowl	4	BW
Gadwall - <i>Anas strepera</i>	Waterfowl	4	BW
Eurasian Wigeon - <i>Anas penelope</i>	Waterfowl	NB	MW
American Wigeon - <i>Anas americana</i>	Waterfowl	4	BW
Canvasback - <i>Aythya valisineria</i>	Waterfowl	3	MW
Redhead - <i>Aythya americana</i>	Waterfowl	3	BW
Ring-necked Duck - <i>Aythya collaris</i>	Waterfowl	3	BMW

Species:	Initiative	Class. Level	Season(s)
Greater Scaup - <i>Aythya marila</i>	Waterfowl	NB	MW
Lesser Scaup - <i>Aythya affinis</i>	Waterfowl	4	BW
Harlequin Duck - <i>Histrionicus histrionicus</i>	Waterfowl	2	B
Long-tailed Duck - <i>Clangula hyemalis</i>	Waterfowl	NB	MW
Surf Scoter - <i>Melanitta perspicillata</i>	Waterfowl	NB	MW
White-winged Scoter - <i>Melanitta fusca</i>	Waterfowl	NB	MW
Common Goldeneye - <i>Bucephala clangula</i>	Waterfowl	3	BW
Barrow's Goldeneye - <i>Bucephala islandica</i>	Waterfowl	2	BW
Bufflehead - <i>Bucephala albeola</i>	Waterfowl	3	BW
Hooded Merganser - <i>Lophodytes cucullatus</i>	Waterfowl	3	BW
Common Merganser - <i>Mergus merganser</i>	Waterfowl	3	BW
Red-breasted Merganser - <i>Mergus serrator</i>	Waterfowl	NB	MW
Ruddy Duck - <i>Oxyura jamaicensis</i>	Waterfowl	3	BW
Osprey - <i>Pandion haliaetus</i>	Landbird	4	B
Bald Eagle - <i>Haliaeetus leucocephalus</i>	Landbird	1	BW
Northern Harrier - <i>Circus cyaneus</i>	Landbird	3	BW
Peregrine Falcon - <i>Falco peregrinus</i>	Landbird	1	BM
Virginia Rail - <i>Rallus limicola</i>	Waterbird	3	BW
Sora - <i>Porzana carolina</i>	Waterbird	4	B
American Coot - <i>Fulica americana</i>	Waterbird	4	BW
Sandhill Crane - <i>Grus canadensis</i>	Waterbird	3	M
Black-bellied Plover - <i>Pluvialis squatarola</i>	Shorebird	NB	M
American Golden-Plover - <i>Pluvialis dominica</i>	Shorebird	NB	M
Snowy Plover - <i>Charadrius alexandrinus</i>	Shorebird	3	M
Semipalmated Plover - <i>Charadrius semipalmatus</i>	Shorebird	NB	M
Killdeer - <i>Charadrius vociferus</i>	Shorebird	4	BW
American Avocet - <i>Recurvirostra americana</i>	Shorebird	3	BM
Greater Yellowlegs - <i>Tringa melanoleuca</i>	Shorebird	NB	MW
Lesser Yellowlegs - <i>Tringa flavipes</i>	Shorebird	NB	M
Solitary Sandpiper - <i>Tringa solitaria</i>	Shorebird	NB	M
Willet - <i>Catoptrophorus semipalmatus</i>	Shorebird	3	BM
Spotted Sandpiper - <i>Actitis macularia</i>	Shorebird	3	BW
Upland Sandpiper - <i>Bartramia longicauda</i> **	Shorebird	2	B
Whimbrel - <i>Numenius phaeopus</i>	Shorebird	NB	M
Long-billed Curlew - <i>Numenius americanus</i>	Shorebird	3	B
Marbled Godwit - <i>Limosa fedoa</i>	Shorebird	NB	M
Sanderling - <i>Calidris alba</i>	Shorebird	NB	M
Semipalmated Sandpiper - <i>Calidris pusilla</i>	Shorebird	NB	M
Western Sandpiper - <i>Calidris mauri</i>	Shorebird	NB	M

Species:	Initiative	Class. Level	Season(s)
Least Sandpiper - <i>Calidris minutilla</i>	Shorebird	NB	M
Baird's Sandpiper - <i>Calidris bairdii</i>	Shorebird	NB	M
Pectoral Sandpiper - <i>Calidris melanotos</i>	Shorebird	NB	M
Dunlin - <i>Calidris alpina</i>	Shorebird	NB	M
Stilt Sandpiper - <i>Calidris himantopus</i>	Shorebird	NB	M
Long-billed Dowitcher - <i>Limnodromus scolopaceus</i>	Shorebird	NB	M
Short-billed Dowitcher - <i>Limnodromus griseus</i>	Shorebird	NB	M
Wilson's Snipe - <i>Gallinago delicata</i>	Shorebird	4	BW
Wilson's Phalarope - <i>Phalaropus tricolor</i>	Shorebird	1	BM
Red-necked phalarope - <i>Phalaropus lobatus</i>	Shorebird	NB	M
Franklin's Gull - <i>Larus pipixcan</i>	Waterbird	3	M
Bonaparte's Gull - <i>Larus philadelphia</i>	Waterbird	NB	M
Mew Gull - <i>Larus canus</i>	Waterbird	NB	MW
Ring-billed Gull - <i>Larus delawarensis</i>	Waterbird	4	BW
California Gull - <i>Larus californicus</i>	Waterbird	3	MW
Herring Gull - <i>Larus argentatus</i>	Waterbird	NB	MW
Thayer's Gull - <i>Larus thayeri</i>	Waterbird	NB	MW
Glaucous-winged Gull - <i>Larus glaucescens</i>	Waterbird	NB	MW
Glaucous Gull - <i>Larus hyperboreus</i>	Waterbird	NB	MW
Sabine's Gull - <i>Xema sabini</i>	Waterbird	NB	M
Caspian Tern - <i>Sterna caspia</i>	Waterbird	4	B
Common Tern - <i>Sterna hirundo</i>	Waterbird	4	B
Arctic Tern - <i>Sterna paradisaea</i>	Waterbird	NB	M
Forster's Tern - <i>Sterna forsteri</i>	Waterbird	3	B
Black Tern - <i>Chlidonias niger</i>	Waterbird	2	B
Belted Kingfisher - <i>Ceryle alcyon</i>	Landbird	3	BW
American Crow - <i>Corvus brachyrhynchos</i>	Landbird	4	BW
Tree Swallow - <i>Tachycineta bicolor</i>	Landbird	3	B
Violet-green Swallow - <i>Tachycineta thalassina</i>	Landbird	4	B
Marsh Wren - <i>Cistothorus palustris</i>	Landbird	3	BW
Common Yellowthroat - <i>Geothlypis trichas</i>	Landbird	4	B
Song Sparrow - <i>Melospiza melodia</i>	Landbird	4	BW
Swamp Sparrow - <i>Melospiza georgiana</i>	Landbird	NB	MW
Red-winged Blackbird - <i>Agelaius phoeniceus</i>	Landbird	4	BW
Yellow-headed Blackbird - <i>Xanthocephalus xanthocephalus</i>	Landbird	3	BW

Classification levels: 1 – Highest Priority, 2 – Moderate Priority, 3 – Low Priority, 4 – No Priority, NB – Non-breeder

Appendix D2. Preparation of Site Descriptions

1. **Boundaries and ownership** – This is a brief description of who owns the land. If special permission or permits are needed to access the site, note this. Include local contact names and phone numbers, if appropriate. **Briefly describe the habitat at the site (will be completed in final draft).**
2. **Focal species using the site and timing of use** – Identify which of the focal species are found at the site. Observers should record information regarding the timing or season of use (e.g., spring migration) and estimated numbers of birds using the site, if known.
3. **Location of Type 1 and 2 habitat within the site** - Describe Type 1 and Type 2 habitat boundaries within the site. It may be useful to group species into functional groups (e.g., migrating shorebirds, secretive marshbirds).
4. **Access to Type 1 and 2 habitat and the visibility of the birds** – Describe access to the site, including observation points, boat access and permission requirements. If complete access is possible, note this. Describe problems with seeing all birds during a survey, if any. If visibility is different for different species note this (e.g., large waders are easily detected, but distances are too great to accurately identify smaller waders).
5. **Conservation Issues** - Describe any conservation issues/problems pertinent to the site. These may include site-specific issues, such as predation pressure at a tern colony, or issues that are common to many aquatic sites (e.g., significant recreational use).
6. **Conservation measures taken, in progress, or proposed** – As a follow-up to Item 5, describe any projects or measures taken to remedy the issues mentioned above. Also include any projects/measures that are on-going or have been proposed.
7. **Past and current surveys** – Briefly describe past or current surveys at the site. Provide survey means, if available; however, do not spend a lot of time analyzing the data.
- 8a. **Potential survey methods: *description*** – Discuss the surveys methods appropriate for each species or functional group at the site and recommend the best method(s). Consider access, visibility and past survey results in your recommendation. Consider differences in survey methods among seasons, if appropriate. Bear in mind, however, that the final decision regarding the season for monitoring will be made at a larger scale. Consider when during the day surveys should be conducted. In general, all surveys in a site should be made during a single period. Timing of surveys is especially important at tidal sites but may be important at other sites due to the sun or other factors. Note that if the number of birds present varies rapidly, as is often the case with tidal areas, then the survey period should be brief. Otherwise, surveyors may gradually learn when surveys will yield the highest counts and may be tempted to visit at these times.
- 8b. **Potential survey methods: *selection bias*** – Discuss the potential for selection bias in the proposed survey methods. See text in (“Components of Accuracy”) in the body of this report for definition of selection bias. If the entire site can be surveyed completely, there is no selection bias and “not applicable” can be entered. If a subsample of the site is sampled, discuss reasons why the portion sampled may not be representative of the total site. Provide recommendations for minimizing potential selection bias.
- 8c. **Potential survey methods: *measurement error and bias*** – Discuss the potential for measurement error and bias in your proposed survey methods. See text in “Preparation of site

descriptions” in the body of this report for definitions of these terms. If most of the birds present at the time of the survey are counted, then measurement error and bias will be minimal. If many birds may be missed because of poor visibility or access problems, then measurement error and bias are important considerations. Discuss ways to minimize error and/or bias, if known.

9. **Needed Pilot Studies** – Identify what information is needed before a sampling plan could be devised for each site. For each site, if all the information above is known, a pilot study is not needed for the site.

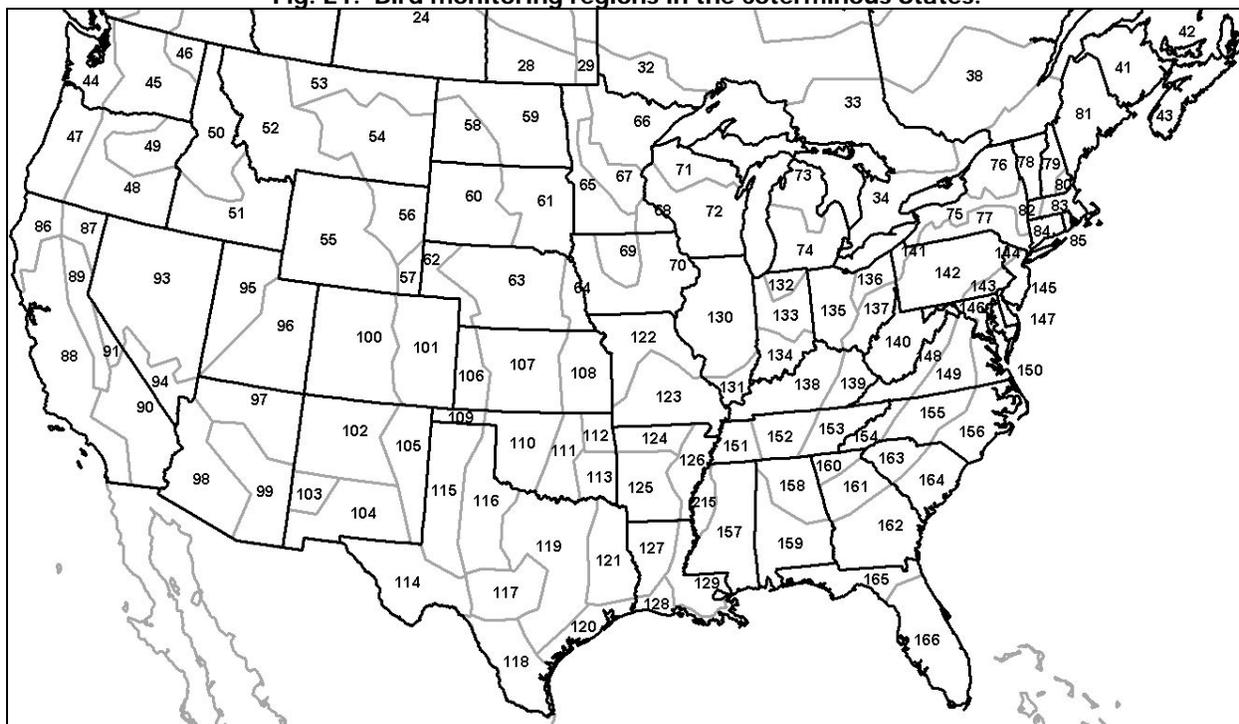
10. **Contact** – Identify local contact name and phone number of individual who is familiar with the site and has provided the site description information for IBIS. These are generally state or federal agency personnel who have nominated the site as an Important Bird Area (IBA), or are responsible for the management of that particular site (e.g., Wildlife Management Areas, National Wildlife Refuges).

Appendix E. Aquatic Bird Monitoring in BMR-51

Introduction

The bird conservation initiatives – waterbirds, waterfowl, shorebirds, and landbirds – are cooperating to design a “coordinated bird monitoring” (CBM) program for Canada and the United States (Bart et al., *in press*). One element in the approach is detailed descriptions of sites at which aquatic birds congregate at any time of year. A series of “bird monitoring regions” (Fig. E1) has been delineated to help organize these descriptions. The regions were defined by intersecting a Bird Conservation Region (BCR) map with a Province and State map, smoothing the borders, and eliminating small polygons. Survey results and sampling plans based on these regions can be stepped up either to the Province and State level or to a BCR level.

Fig. E1. Bird monitoring regions in the coterminous States.



This report describes protocols for aquatic bird surveys in bird monitoring region 51, Idaho–BCR 9 (Great Basin). The first step in preparing the report was identifying the “focal aquatic species” (Table E1, Appendix E1) for the region. This list contains species that occur in aquatic sites in the monitoring region in sufficient numbers that surveys for them could be useful in achieving monitoring goals identified at the continental, regional, or local level.

Table E1. Number of aquatic species by initiative and season.
See Appendix E1 for the complete list.

Initiative	Season			Total
	Breeding	Migration	Winter	
Waterbirds	29	14	20	37
Waterfowl	22	12	28	32
Shorebirds	9	20	5	28
Landbirds	13	2	9	14
Total	73	48	62	

The region was partitioned into two strata (Fig. E2). Stratum 1 (Fig. E1, Table E2) contains sites that have substantial numbers of birds and can be surveyed at a reasonable cost. Detailed suggestions are made about how to survey aquatic birds at each of these sites. The other stratum, Southern Idaho, covers all other areas. Aquatic sites in this stratum are widely distributed and probably cannot all be surveyed. Thus, sampling plans will be needed to select aquatic areas to be surveyed in these strata. Brief suggestions are made about how the sampling plans might be designed, but detailed work will depend on specific project objectives and is therefore not included in this report (to be completed in final draft).

Fig. E2. Sites (Stratum 1) and Stratum 2 in bird monitoring region 51. (to be completed in final draft)

Table. E2. Discrete aquatic sites (stratum 1) in bird monitoring region 51.

No.	Site Name	IDFG Region
51-1	American Falls Reservoir IBA	Southeast
51-2	Bear Lake NWR IBA	Southeast
51-3	Billingsley Creek WMA	Magic Valley
51-4	Blackfoot Reservoir	Southeast
51-5	Blackfoot River WMA	Southeast
51-6	Blacks Creek Reservoir IBA	Southwest
51-7	Boise River IBA	Southwest
51-8	Camas NWR IBA	Upper Snake
51-9	Camas Prairie WMA IBA	Magic Valley
51-10	Carey Lake WMA IBA	Magic Valley
51-11	Cartier Slough WMA IBA	Upper Snake
51-12	Chilly Slough IBA	Upper Snake
51-13	C.J. Strike Reservoir WMA IBA	Southwest
51-14	Deer Flat NWR IBA	Southwest
51-15	Deer Parks WMU	Upper Snake
51-16	Eagle Island IBA	Southwest
51-17	Fort Boise WMA IBA	Southwest
51-18	Grays Lake NWR IBA	Southeast
51-19	Hagerman WMA	Magic Valley
51-20	Harriman Wildlife Refuge IBA	Upper Snake
51-21	Henrys Lake	Upper Snake
51-22	Lake Lowell IBA	Southwest
51-23	Magic Reservoir IBA	Magic Valley
51-24	Market Lake WMA IBA	Upper Snake
51-25	Mesa Marsh IBA	Upper Snake
51-26	Minidoka NWR IBA	Magic Valley

No.	Site Name	IDFG Region
51-27	Mormon Reservoir	Magic Valley
51-28	Mud Lake WMA IBA	Upper Snake
51-29	Niagara Springs WMA	Magic Valley
51-30	Oxford Slough IBA	Southeast
51-31	Payette River WMA	Southwest
51-32	Sand Creek WMA	Upper Snake
51-33	Silver Creek Preserve IBA	Magic Valley
51-34	Snake River ACEC IBA	Upper Snake
51-35	Snake River Island IBA	Magic Valley
51-36	Sterling WMA	Southeast
51-37a	Teton County (Cooke/Warm Creek)	Upper Snake
51-37b	Teton County (Foster's Slough/Upper Teton River)	Upper Snake
51-37c	Teton County (Lazy K Marsh)	Upper Snake
51-37d	Teton County (Sundown Ranch)	Upper Snake
51-37e	Teton County (Teton Creek/Six Springs Complex)	Upper Snake

Descriptions of each site in stratum 1 are needed to specify how the birds should be surveyed. A start has been made on developing these descriptions by collecting *readily available* information and presenting it in a standardized format. For most sites, more detailed work will be needed to develop final survey protocols. The sites were described using the following headings:

1. Boundaries and ownership
2. Focal species using the site and timing of use
3. Location of type 1 and 2 habitat within the site
4. Access to the type 1 and 2 habitat and visibility of the birds
5. Conservation issues
6. Conservation measures taken, in progress, or proposed
7. Past and current surveys
8. Potential survey method
 - a. Description
 - b. Selection bias
 - c. Measurement error and bias
9. Needed pilot studies
10. Contact

Boundaries were depicted on site maps. These maps make the document too large to handle easily so they are not included here. Individual site descriptions, including the maps, will be posted on the CBM website. "Ownership" includes advice on obtaining permission to conduct surveys on the site. Focal species (item 2 above) are briefly described (e.g., "all focal aquatic species for the region except..."). Items 3 and 4 describe where surveys should be conducted. Up to three types of habitats are described for each focal species or group of focal species at each site. Type 1 habitats include the regularly-used areas that should be sampled intensively using a well-defined sampling plan. Type 2 habitats include areas used sparingly by the focal species. Type 2 habitat will probably not be surveyed as often or with rigorously defined methods, but might be surveyed less formally every few years to document continued low use by the focal species. Type 3 habitats receive virtually no use by the focal species during the study period and probably would not be surveyed as part of the monitoring program. Requests,

however, might be circulated for any records of the focal species occurring in substantial numbers in these areas. Type I habitat throughout the bird monitoring region should be delineated so that it includes at least 75% of the bird-use days, for any of the region's aquatic focal species, in any season. Type II habitat should include no more than 20% of the bird-use days, and Type III habitat should include no more than 5% of the bird-use days.

Descriptions of known or potential conservation issues/problems at the site are provided in Item 5. These can include issues that are unique to the site, such as predation pressure at a nesting tern colony, or issues that are common to many aquatic sites (e.g., significant recreational use). If any measures have been taken, or are proposed, to remedy these issues, they are described in Item 6.

Past and current surveys (item 7) are described in enough detail to show how past efforts could help design future ones and how current efforts might be incorporated into a comprehensive monitoring plan if managers of the current surveys are interested in doing this.

Item 8a, description of potential survey methods, identifies the best ways to estimate the number of individuals present describing both field and statistical methods briefly (e.g., complete count using area search methods; density estimation using distance methods). Items 8b and 8c discuss possible bias and error in estimating numbers present and trend in numbers present. Bias means a long-term trend in the ratio (number recorded)/(average number present). Selection bias is bias due to some Type I habitat being excluded from the sampled population, usually because of access or visibility problems. Exclusion of some Type I habitat does not necessarily cause selection bias, because trends in sampled areas might be the same as trends in non-sampled areas. Measurement error means not detecting all birds present in the surveyed area at the time of the survey. Measurement bias is long-term trend in the proportion of birds present at the time of the survey that are detected on the survey. Measurement error does not necessarily cause measurement bias, because the proportion of birds detected might not change through time. Additional explanation of the methods is provided in Appendix E2.

Boundaries and ownership:

Boundaries: Located near towns of American Falls, Fort Hall, Aberdeen, and Springfield (Power and Bingham counties). Southern boundary is the American Falls Dam, roughly follows the shorelines northeast, and includes the Fort Hall Bottoms area along the Snake River and Spring Creek (up to the Tilden Rd. Bridge)

Ownership: U.S. Bureau of Reclamation, Bureau of Indian Affairs (Fort Hall Indian Reservation), Idaho Department of Fish & Game, Idaho Department of Lands, municipal, and private

Focal species using the site and timing of use:

There are over 200 species recorded in area including many rare Idaho species. The reservoir attracts thousands (>40,000) of migrating/wintering ducks, geese, and shorebirds (Black-bellied plover, American Golden Plover, Snowy Plover, Killdeer, Black-necked Stilt, American Avocet, Greater Yellowlegs, Lesser Yellowlegs, Willet, Long-billed Curlew, Spotted Sandpiper, Marbled Godwit, Sanderling, Semipalmated Sandpiper, Western Sandpiper, Least Sandpiper, Baird’s Sandpiper, Pectoral Sandpiper, Dunlin, Long-billed Dowitcher, Wilson’s Snipe, and Red-necked phalarope). The Intermountain West Regional Shorebird plan names this as one of only 2 sites (other is Lake Lowell) in Idaho with greater than 5000 shorebirds in more than half years surveyed (Peak = 5,000-10,000). It is a breeding and wintering area for Trumpeter Swans, a wintering area for Bald Eagles, and a minor fall staging area for Sandhill Cranes (200 to 400 cranes).

Fort Hall bottoms should have good rail habitat.

Colonies: Eared Grebe (McTucker-Danielson), Western and Clark’s Grebe (McTucker-Danielson, Rainbow & Seagull; 75-100 pairs), Double-crested Cormorant (McTucker-Danielson, Portneuf Mouth; 400-420 nests), Great Blue Heron (McTucker-Danielson; 30-50 nests), Black-crowned Night Heron (McTucker-Danielson; 70-90 nests), Snowy Egret (McTucker-Danielson, Portneuf Mouth), Great Egret (Portneuf Mouth), Cattle Egret (Portneuf Mouth), White-faced Ibis (McTucker-Danielson; 200-250 nests), Forster’s Tern (McTucker-Danielson), Black Tern (Portneuf Mouth), California Gull (Gull Island; 1700-1800 nests), Ring-billed Gull (Gull Island; 2000-2200 nests)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies (see above for locations), open water & emergent vegetation	none
large waders	breeding colonies (see above for locations), emergent vegetation	rest of shoreline
secretive marshbirds	possibly Fort Hall Bottoms	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats at NE end, N of Sterling, Big Hole, Willow Bay to AF Dam, and Bannock Creek (owned by reservation)	rest of shoreline
gulls and terns	breeding colonies on Gull Island, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Shorebirds: reservation surveys would require permission (or they could do them); most other spots could be reached. Four-wheelers might be used for access. When water goes down, mud flats at north end are too extensive to cover. A small boat could provide access to this area.

Open-water birds: probably would take boat or plane surveys though good vantages for a scope.

Colonial birds: Good access.

Conservation issues:

- Nutrient enrichment and pesticide runoff from surrounding agriculture lands
- Recreational activities are a disturbance to the avifauna
- There have been several episodes of botulism in the waterfowl
- Grazing may reduce the understory in willow and cottonwood habitats as well as contributing to the introduction of nutrients in the form of wastes to the system

Conservation measures taken, in progress, or proposed:

- Most of shoreline is federal or tribal lands
- A management plan has been written along with an irrigation water operation plan by the USBR in progress
- Springfield Bottoms has been designated as a shorebird reserve

Past and current surveys:

- Chuck Trost has done shorebird and colony surveys
- Mid-winter waterfowl and swan aerial surveys
- Christmas Bird Counts

Potential survey methods

Description: Ground based surveys for most area (see above)

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe or boat may be necessary for access.
- b. Colony counts for nesting herons, egrets, White-faced Ibis, Double-crested Cormorants, gulls, and terns. Gull island colonies: Can walk most of way around it so might be able to do it from the ground. Otherwise, photography by air.
- c. Census for waterfowl on the open water using a boat or plane.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat, or by using a boat. Contact Chuck Trost to determine if census routes used in the past can/should be used for future surveys.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds at Fort Hall Bottoms.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: NA

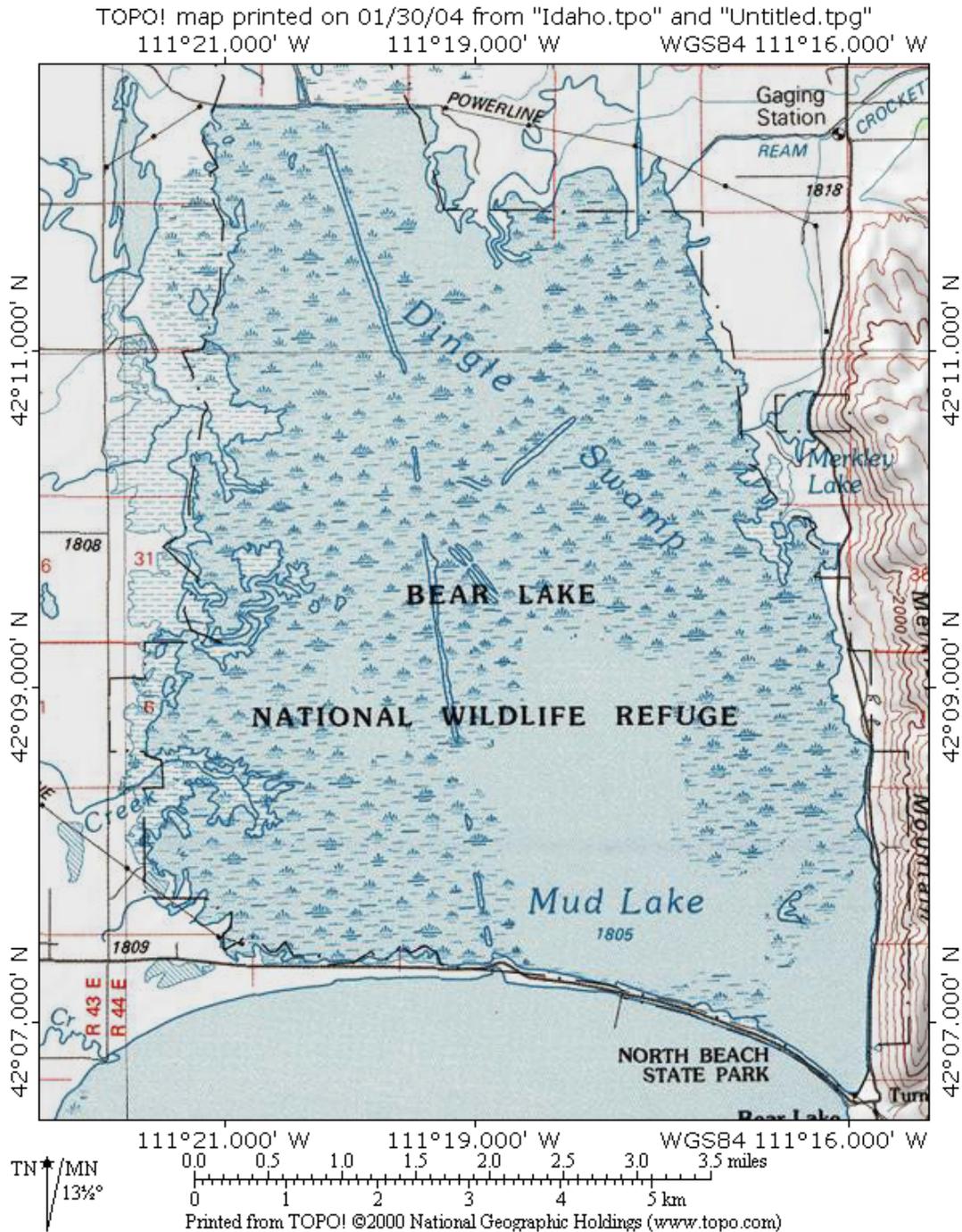
Measurement error and bias: NA (colonies a problem)

Needed pilot studies: Need to fly the whole area for colonies. Carl Anderson is a F&G employee and a pilot; not OAS approved but could take pictures

Contact:

NAME: Stephen H. Bouffard - USFWS
ADDRESS: Minidoka National Wildlife Refuge
961 E. Minidoka Dam Road, Rupert, ID 83350
PHONE: 208/436-3589
FAX: 208/436-1570
EMAIL: steve_bouffard@fws.gov

51-2. BEAR LAKE NATIONAL WILDLIFE REFUGE (IBA)



Boundaries and ownership

Boundaries: South – Bear Lake/Turnpike Road

Ownership: U.S. Fish and Wildlife Service and Utah Power and Light Co. (owns right to store water on the refuge)

Focal species using the site and timing of use:

Primarily nesting waterfowl, with dense populations of Canada Geese, Mallards, and Redheads. Additional nesting waterbird species include: Sandhill Crane, Killdeer, American Avocet, Black-necked Stilt, Willet, Spotted Sandpiper, American Bittern, Virginia Rail, Sora, American Coot, and Wilson’s phalarope. Fall staging area for 300-500 Sandhill Cranes. Nesting Long-billed Curlews and non-nesting American White Pelicans in summer. Shorebirds and waterfowl (approx. 10,000-20,000) during migration.

Colonies: Eared Grebe (10-12 nests), Western and Clark’s Grebe (40-50 nests), Double-crested Cormorant (50-60 nests), Great Blue Heron (15-50 nests), Black-crowned Night Heron (75-80 nests), Snowy Egret (70-80 nests), Cattle Egret, White-faced Ibis (largest colony in ID; 150-3,000 pairs), California Gull (120 nests), Franklin’s Gull (4,000 nests), Forster’s Tern (30-40 pairs), Black Tern (20-30 nests), Caspian Tern (6-10 pairs)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge N end of lake and up to Rt. 89	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats near Salt Meadow	rest of shoreline
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds: Good for rails and to see some of colonies; boat needed for other colonies, or can count from air.

Conservation issues:

- Introduced Carp and noxious weeds are management problems
- Water diversion (entire flow of Bear River) through the refuge is adding nutrients, and sediments to the marsh
- There is an inactive mine portal on the edge of the refuge though the ore body (phosphate rock) is not on refuge property
- change their storage regimes it could negatively affect water levels in the refuge

Conservation measures taken, in progress, or proposed:

- Efforts are under way to introduce Trumpeter Swans as a nesting species
- Mechanical, chemical, and biological control of noxious weeds and carp
- Cooperation and negotiation with Utah Power and Light to minimize negative impacts of water storage on the refuge
- All cattle grazing has been discontinued
- Haying and farming for wildlife
- Use of diking and timing of water intake to reduce influx of nutrients and sediments into the refuge
- Efforts being made upstream to reduce non-point nutrient and sediment input in Bear River

Past and current surveys:

Aerial surveys for goose and crane pairs. Grains fields N of NWR attract staging cranes in fall
Aerial surveys for Trumpeter Swans
Ground count of waterfowl breeding pairs
Colony counts have been conducted in the past, but are not currently

Potential survey methods

Description: In spring, incorporate into aerial surveys.

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe or boat may be necessary for access.
- b. Colony counts for nesting grebes, herons, egrets, White-faced Ibis, Double Crested Cormorants, gulls, and terns.
- c. Census for waterfowl on the open water by driving around area.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds from dikes.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: Some colonies (including the big ibis colony) cannot be reached by ground and many of the foraging spots are not visible from roads

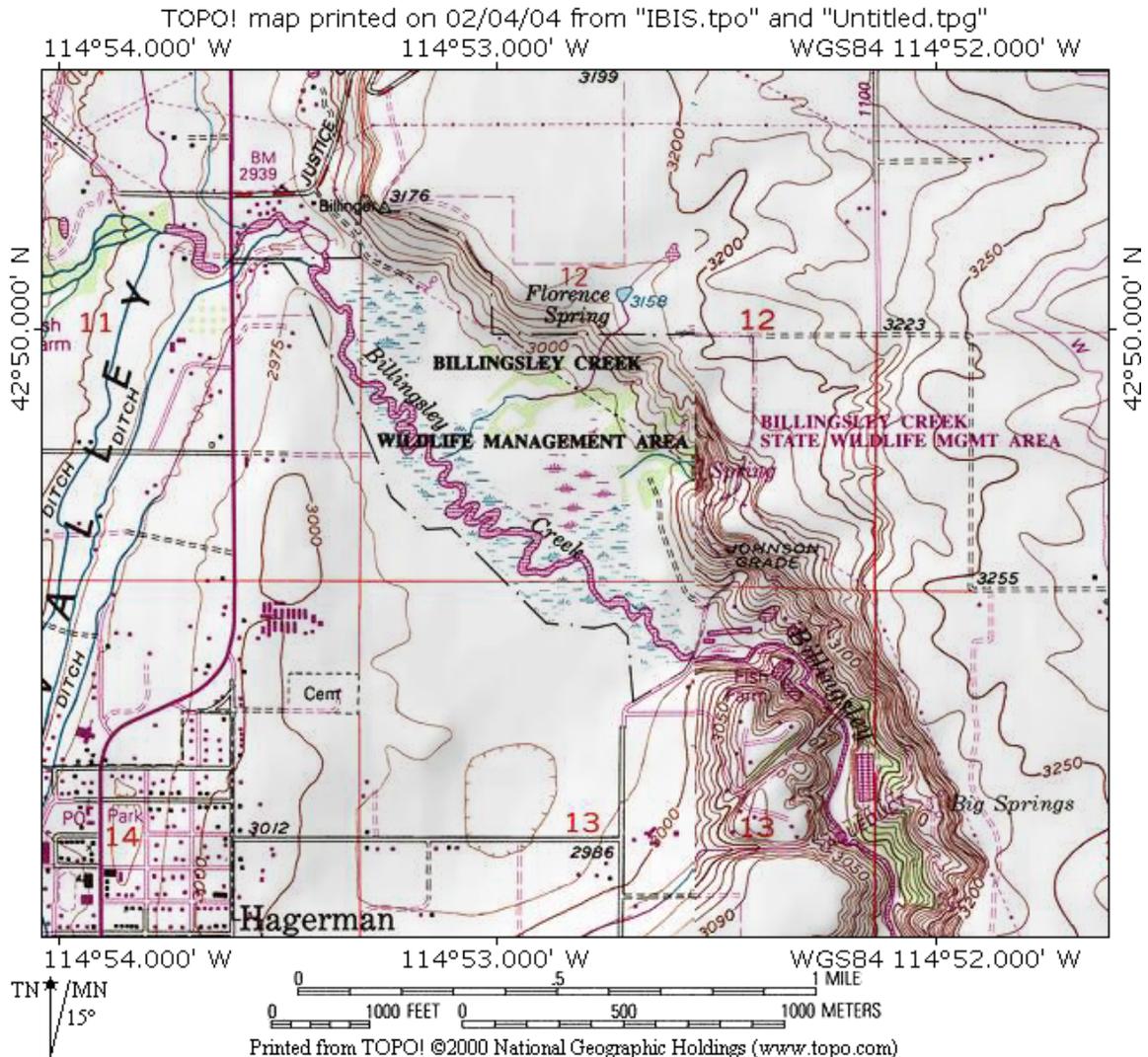
Measurement error and bias: Some birds not visible

Needed pilot studies: Design of colony counts, and determination of colony monitoring priorities, would be helpful. All surveys must be coordinated with refuge staff.

Contact:

NAME: Rob Bundy - USFWS
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51-3. BILLINGSLEY CREEK WILDLIFE MANAGEMENT AREA (WMA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked.

Ownership: Idaho Department of Fish & Game

Focal species using the site and timing of use:

Primarily waterfowl during breeding and wintering (particularly Mallards and Canada Geese) seasons. Other waterbirds, such as herons and rails, are present during the breeding season as well. Shorebirds are present during migration.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water of creek and larger spring channels	none
large waders	open waters of creek and emergent vegetation	rest of shoreline

secretive marshbirds	along creek in cattails and along spring channels	none
waterfowl	open water, edges during breeding season, and larger spring channels	none
shorebirds	on creek edge somewhat, but not a lot of exposed earth along shoreline	none
gulls and terns	all areas, although not much use by these species	none

Access to the type 1 and 2 habitat and visibility of the birds:

This site is highly accessible to the public. The best way to view birds would be by canoe, although larger species could be visible by scope from the basalt rim. There is a canoe/small boat take-out at the lower end of the site, and the current is mild enough to allow upstream paddling of a canoe. Visibility from the creek itself can get difficult later in the growing season.

Conservation issues:

- There is residential development nearby, although there is a "buffer" so to speak, in the form of Billingsley Ck State Park, which is adjacent to this site on the west side.
- Invasion by purple loosestrife.
- Large number of Russian olives.

Conservation measures taken, in progress, or proposed:

- IDFG has initiated a bio-control program (beetles) to reduce the loosestrife. These beetles are also used on Ft. Boise WMA, and have done wonders there.
- Try to not allow increases of Russian olives. However, many birds do use these trees.

Past and current surveys:

None known at this time.

Potential survey methods

Description

- Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies.
- Census for waterfowl on the open water using a boat.
- Area searches for migrating shorebirds from observation points near Type 1 habitat.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds, using a canoe for access.
- Census for gulls and terns during waterfowl counts.

Selection bias: N/A

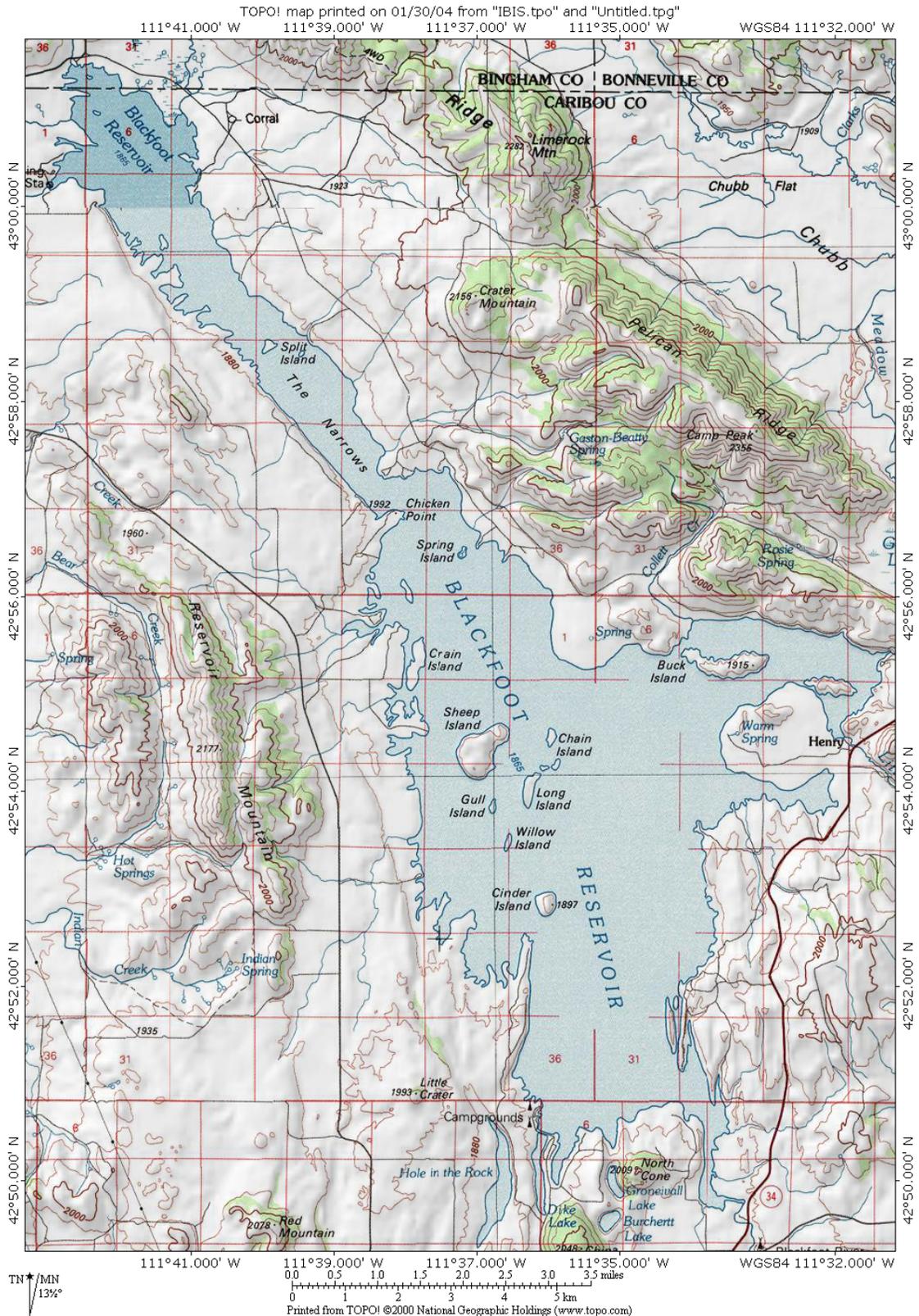
Measurement error and bias: It would be best to use a skilled birder or birders. The density of the wetlands/cattail areas would most likely be difficult to assess especially for secretive species such as rails.

Needed pilot studies: None may be needed, although would be helpful to determine best places and times to survey this area.

Contact:

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 FAX: 208-324-1160
 EMAIL: sgamo@idfg.state.id.us

51-4. BLACKFOOT RESERVOIR



Boundaries and ownership:

Boundaries(Roughly): West – Government Dam Rd, North – Blackfoot North Access Road, East – ID 34, South – China Cap Rd.

Ownership: Idaho Department of Lands, Bureau of Land Management, Bureau of Indian Affairs, Private

Focal species using the site and timing of use:

Used by waterfowl and shorebirds. Common shorebirds in summer include Greater and Lesser Yellowlegs, and Long-billed Dowitcher. Sandhill Cranes are found in the surrounding uplands during fall migration.

Colonies: Eared Grebe, Western Grebe, American White Pelican, Double-crested Cormorant, Great Blue Heron, Black-crowned Night Heron, Snowy Egret, Cattle Egret, California Gull, Ring-billed Gull, Black Tern, Caspian Tern

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration (eastern side of reservoir starting in July)	rest of shoreline
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

A plane would be the best way to survey waterfowl on the open water. Using a plane to take aerial photos for counting nesting gulls, pelicans, and cormorants on Gull Island may also be a good way to survey the island. Otherwise, a boat would be necessary. A boat would also be needed for surveying grebes nesting along island shorelines. There are public boat ramps at a few places around the Reservoir, although water levels are so low that many ramps are not usable. Shorebirds may have to be surveyed from the shoreline, although there are only a couple access sites on the east side of the reservoir. Visibility of nesting birds on the island is very good, and visibility of other birds is not really known at this point.

Conservation issues:

- Disturbance of nesting colonies (American White Pelicans, Double-crested cormorants, California and Ring-billed gulls) is a serious problem
- Reservoir can be drained for irrigation. This is especially a problem in drought or low-water years. This impacts the fishery and possibly reducing the birds’ food base. Low water could also leave the nesting island exposed to predation and disturbance.
- Fisheries managers are concerned about pelican and cormorant impacts on stocked rainbow trout and on native Yellowstone cutthroat trout
- Sportsmen are concerned about bird impacts on recreational fishing in the reservoir

Conservation measures taken, in progress, or proposed:

- Fisheries biologists have conducted a two-year study on pelican and cormorant food habits on the reservoir. Pelicans and cormorants were found to have a significant impact on stocked fish. Biologists are implementing various stocking options to reduce bird predation on stocked fish. Biologists are also concerned about pelican impacts on Yellowstone cutthroat trout during migration up the Blackfoot River and at the spawning areas. Hazing activities have been

undertaken to discourage birds from congregating in areas where fish are vulnerable to predation.

Past and current surveys:

- Colonial nesting waterbirds (American White Pelican, Double-crested Cormorant, gulls, terns, and herons) have been surveyed by Chuck Trost for multiple years, by IDFG biologists in 2002-2004, and will likely continue being conducted by IDFG personnel in the future.

Potential survey methods

Description

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Boat is necessary for access.
- b. Colony counts for pelicans, cormorants, herons, egrets, gulls, and terns by either aerial survey or boat survey.
- c. Census for waterfowl and other waterbirds on the open water by boat or by aerial survey.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.

Selection bias: Shoreline access is limited. Shorebird counts might be restricted to only a few sites unless they can be done by boat, but extensive mud flats and shallow water might also be a limiting factor.

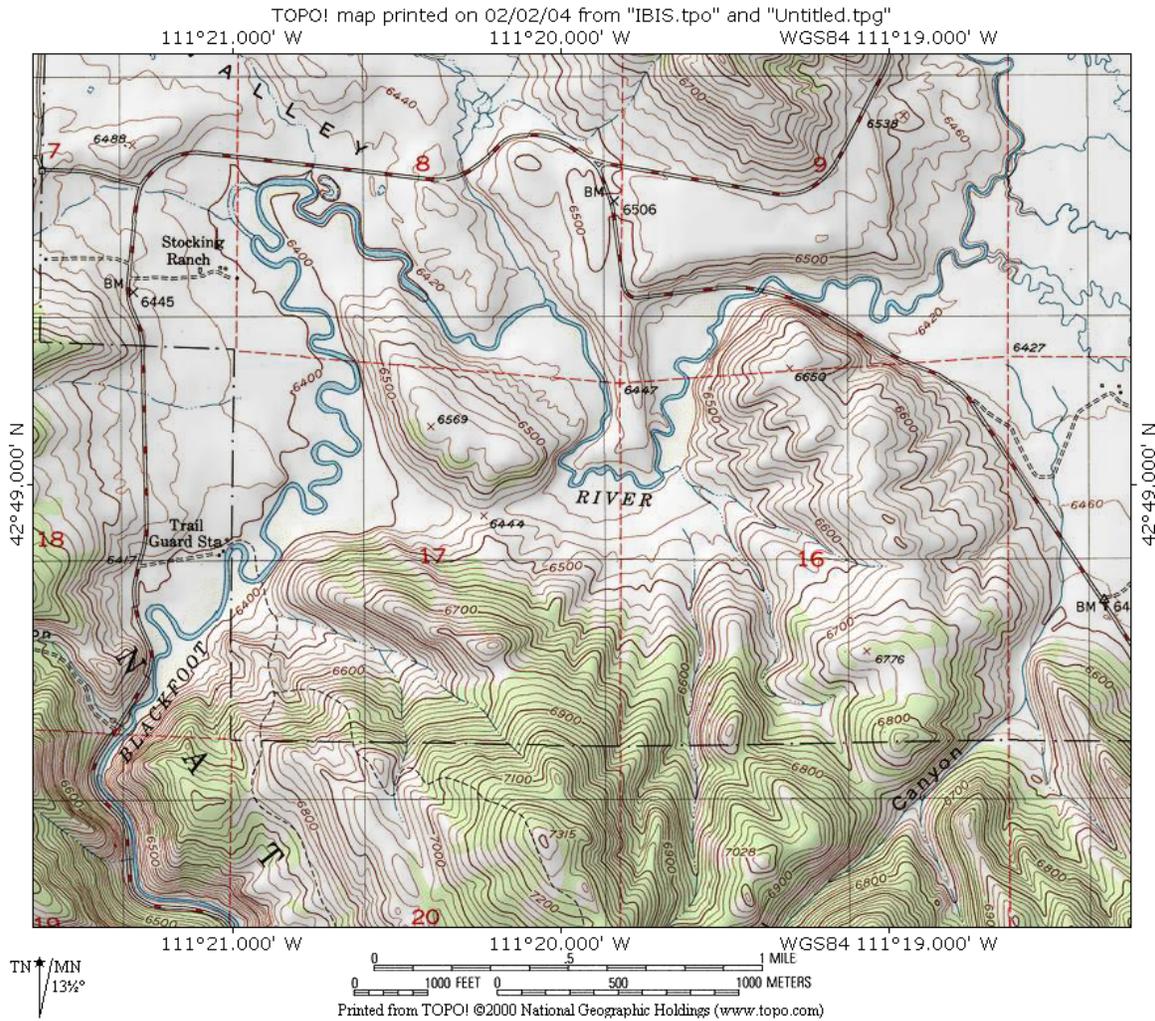
Measurement error and bias: Water level changes from one year to the next, which could bias surveys, particularly for shorebirds. Observer bias could be an issue as well. If volunteers are used, their skills could vary widely. On the other hand, the skills of one individual conducting surveys each year would likely improve over time and therefore also present a bias.

Needed pilot studies: Design of colony counts for gulls is needed.

Contact:

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51-5. BLACKFOOT RIVER WILDLIFE MANAGEMENT AREA (WMA)



(to be completed in final draft)

Boundaries and ownership:

Boundaries: Boundaries are clearly marked

Ownership: Idaho Department of Fish and Game, Bureau of Land Management

Focal species using the site and timing of use:

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
waterfowl	open water, edges during breeding season	none
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Conservation issues:

Conservation measures taken, in progress, or proposed:

Past and current surveys:

Potential survey methods

Description

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. A canoe is necessary for access.
- b. Colony counts for large waders, gulls, and terns.
- c. Census for waterfowl on the open water using a boat.

Selection bias:

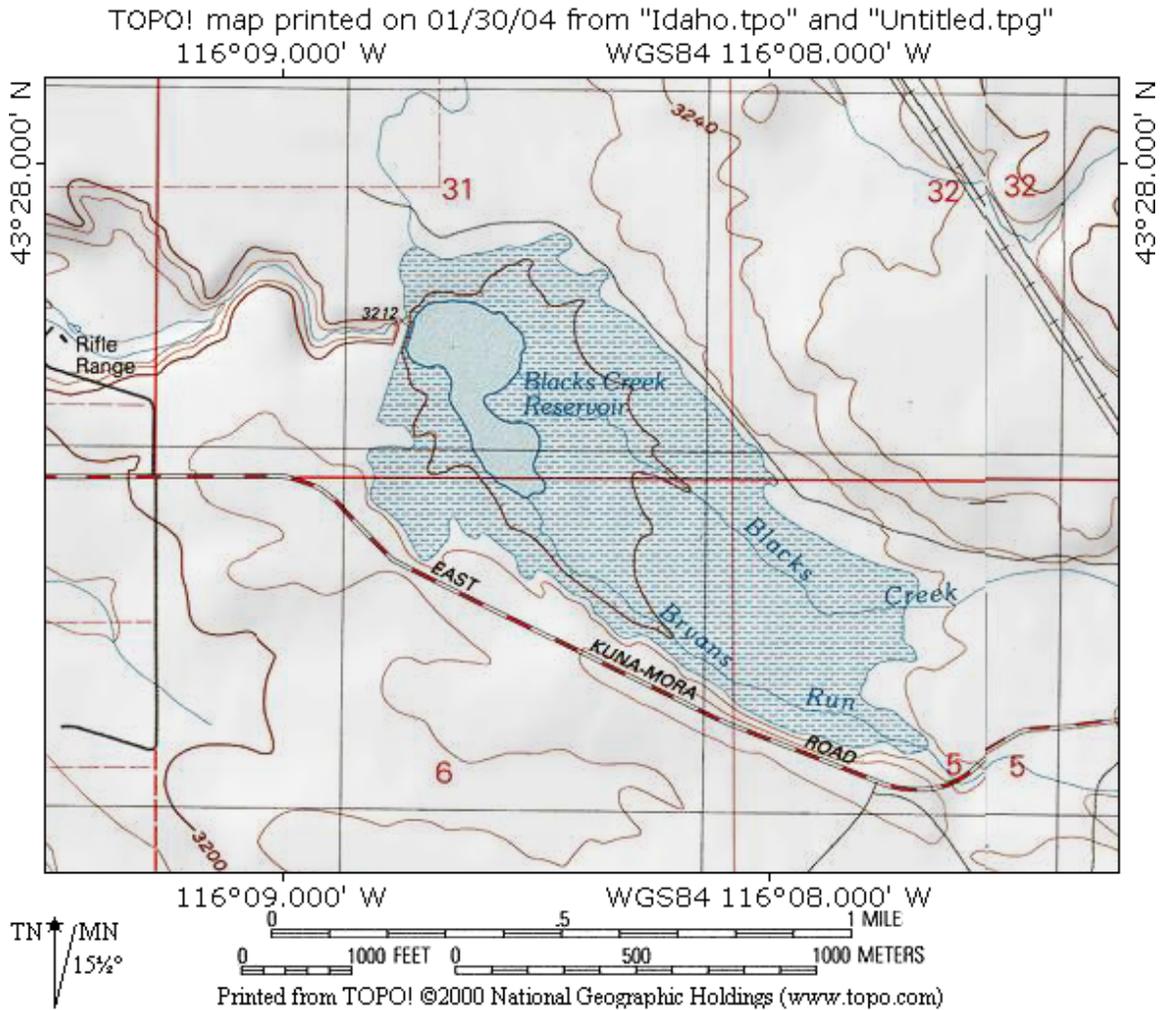
Measurement error and bias:

Needed pilot studies:

Contact:

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51-6. BLACKS CREEK RESERVOIR (IBA)



Boundaries and ownership:

Boundaries: Approximately 5 miles east of Boise on interstate 84. Take Blacks Creek Road exit south; approximately 5 miles. Includes whole reservoir, approximately 250 acres in size.

Ownership: Bureau of Land Management, Private

Focal species using the site and timing of use:

During the spring and summer, waterbirds (Western and Clark's Grebe, Eared Grebe, Double-crested Cormorant, Great Blue Heron, American Coot, Franklin's Gull, Ring-billed Gull, California Gull), shorebirds (American Avocet, Black-necked Stilt, Wilson's Phalarope, Spotted Sandpiper, Killdeer, Long-billed Curlew), and waterfowl (Mallard, Blue-winged Teal, Cinnamon Teal, Northern Shoveler, Northern Pintail, Redhead) are present. Abundant mudflats are present at certain seasons, and this is a migration stopover site for various waterfowl.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	shoreline	
waterfowl	open water	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline

Access to the type 1 and 2 habitat and visibility of the birds:

This site is easily accessed by the public. Numerous dirt roads and two-tracks surround the reservoir. Most birds can easily be observed and surveyed from a turnout along Blacks Creek Rd. All birds are quite visible from either the turnout or surrounding dirt roads. Vegetation does not seem to be an issue.

Conservation issues:

- Potential introduced plants/animals
- Potential excessive soil erosion/degradation
- Potential recreational development/overuse
- Potential disturbance of birds
- Serious drought problems
- Potential residential/commercial development

Conservation measures taken, in progress, or proposed: None at this time

Past and current surveys: Not known

Potential survey methods

Description:

- a. Census for waterfowl on the open water from shoreline.
- b. Area searches for migrating shorebirds from shoreline.

Selection bias: N/A – the entire reservoir can easily be surveyed

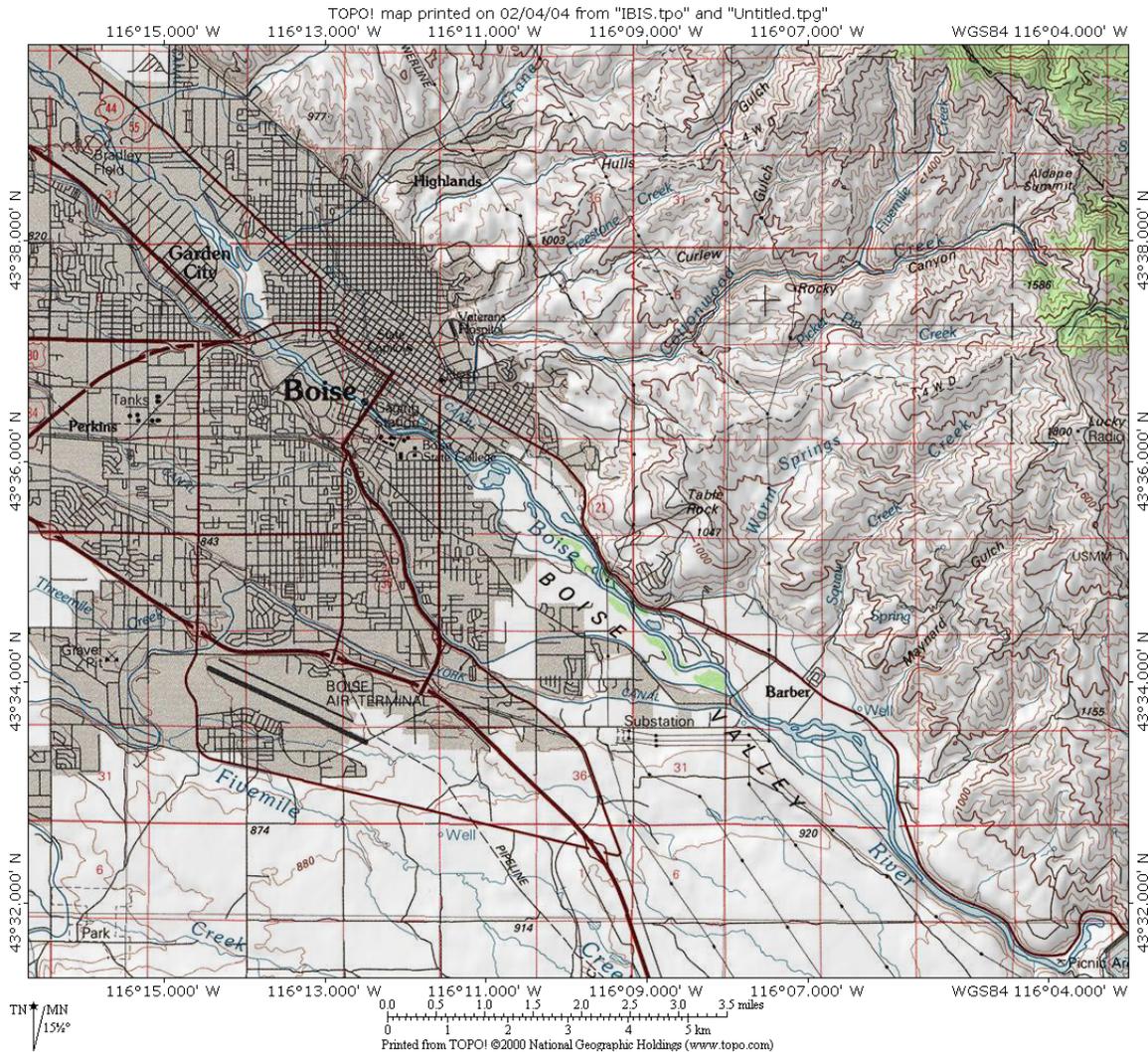
Measurement error and bias: N/A

Needed pilot studies: None are needed.

Contact:

NAME: Jon Curd – Golden Eagle Audubon Society/BLM
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208/ 378-8504 (h)
EMAIL: jon_curd@blm.gov

51-7. BOISE RIVER (IBA)



Boundaries and ownership:

Boundaries: River from Lucky Peak Dam to Glenwood Bridge, Boise

Ownership: Bureau of Reclamation, Bureau of Land Management, municipal, private

Focal species using the site and timing of use:

Osprey can be seen on the river throughout the spring and summer months, as well as waterfowl (Canada Goose, Mallard, Wood Duck, Hooded Merganser, Common Merganser), waterbirds (Pied-billed Grebe, American Coot, Double-crested Cormorant) and shorebirds (Killdeer, Spotted Sandpiper). Bald Eagles winter in area. Large flocks of waterfowl (particularly Canada Goose, Mallard, and American Wigeon, but also Wood Duck, Common and Barrow's Goldeneye), and gulls (California and Ring-billed) also use the river during the winter months.

Colonies: Great Blue Heron

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water, emergent vegetation	shoreline
large waders	breeding colonies, emergent vegetation	rest of shoreline
waterfowl	open water, shoreline during breeding season	shoreline
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

The river is easily accessible to the public, as a paved greenbelt follows the river for the majority of the IBA. A few sections of the site are not accessible via the greenbelt, and may not be accessible at all because of private land ownership. Some of these areas may be reached by boat, but this needs to be checked. Birds are very visible from the greenbelt.

Conservation issues:

- Water pollution and water diversion/channelization is a potential problem
- Residential and commercial development, as well as recreational development and overuse are all serious issues.
- Recreation and development results in serious disturbance to birds in the area.
- Drought

Conservation measures taken, in progress, or proposed:

Past and current surveys:

- Christmas Bird Counts
- Annual Bald Eagle count

Potential survey methods

Description

- a. Colony counts for nesting Great Blue Herons.
- b. Census for waterfowl and other waterbirds on the open water from shoreline along greenbelt, or using a boat.
- c. Census for migrating shorebirds from shoreline along greenbelt, or using a boat.

Selection bias: Shouldn't be any provided areas not accessible by the greenbelt are accessible by boat

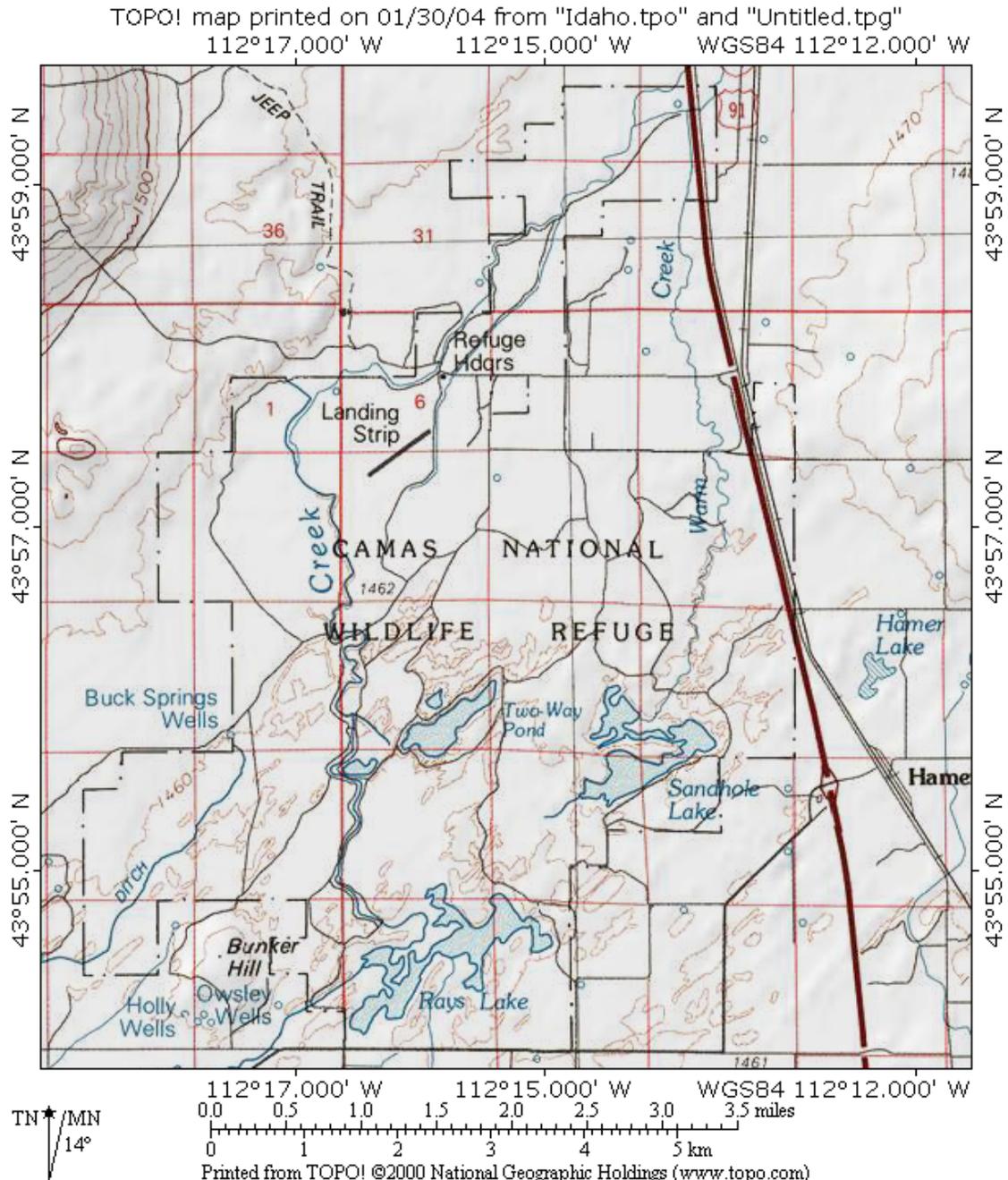
Measurement error and bias: May not be any

Needed pilot studies: None may be needed, other than determining how to survey sections of river not accessible by the greenbelt.

Contact:

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208/ 378-8504 (h)
FAX:
EMAIL: jon_curd@blm.gov

51-8. CAMAS NATIONAL WILDLIFE REFUGE (IBA)



Boundaries and ownership:

Boundaries: East – I-15; South – Oram Road;

Ownership: U.S. Fish and Wildlife Service

Focal species using the site and timing of use:

Numerous nesting waterfowl (Redhead, Mallard, Northern Shoveler, Gadwall, Cinnamon Teal, Lesser Scaup, Canada Goose, and others), waterbirds (Pied-billed Grebe, Horned Grebe, American White Pelican,

American Bittern, Sora, American Coot, Sandhill Crane), shorebirds (Killdeer, Black-necked Stilt, American Avocet, Willet, Long-billed Curlew, Wilson’s Snipe, and Wilson’s Phalarope) and at least one pair of Trumpeter Swans. A pair of Peregrine Falcons use the hack tower annually. The area is a fall staging area for Sandhill Cranes, migration site for shorebirds (Semipalmated Plover, Greater Yellowlegs, Lesser Yellowlegs, Western Sandpiper, Least Sandpiper), and a wintering area for Bald Eagles.

Colonies: Eared Grebe, Western and Clark’s Grebe (10-15 nests), Great Blue Heron (20-25 nests), Black-crowned Night Heron (15-25 nests), Snowy Egret, Great Egret (10 nests), Cattle Egret (15 nests), White-faced Ibis (20-30 nests), Franklin’s Gull, Black Tern (5-10 nests).

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	none
secretive marshbirds	emergent vegetation	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration, as well as summer	none
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Some areas of the refuge are accessible to the public. Other areas can be accessed with permission from the refuge manager. All water areas are accessible by roads through refuge. Visibility is good for most areas. Canoe may be necessary for some areas for marshbird and colony surveys. Much of the refuge is currently dry because of drought, so colonies are mostly inactive at this time

Conservation issues:

- Introduced noxious weeds especially Russian knapweed are serious problems.
- Upstream channelization has increased sediment flow onto the refuge.
- Increased ground water pumping in agricultural lands upslope from refuge have lowered the water table, drying up some marsh units and if continued could have drastic effects.

Conservation measures taken, in progress, or proposed:

- Chemical and biological weed control.
- Legal proceedings and cooperative agreements to repair banks damaged by channelization to reduce sediment transport onto refuge.
- Legal proceedings to reduce, stop, or mitigate upslope ground water pumping.
- Water level manipulation and pumping.
- Cessation of livestock grazing.

Past and current surveys:

- Waterfowl surveys are conducted when possible
- Colony counts for white-faced Ibis have been conducted in the past
- Fall counts of Sandhill Cranes

check with Mgr. for details

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe is necessary for access.

- b. Colony counts for nesting colonial species (herons, egrets, cormorants, terns, gulls) during wet years. Colonial birds not present during dry years.
- c. Census for waterfowl on the open water from vehicle. Only a few areas are difficult to see, but a step ladder in the back of a pick-up may be sufficient to survey most areas. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds using from from shoreline along access roads. Canoe may be necessary for some areas.
- f. Census for gulls and terns during waterfowl counts

Selection bias: N/A

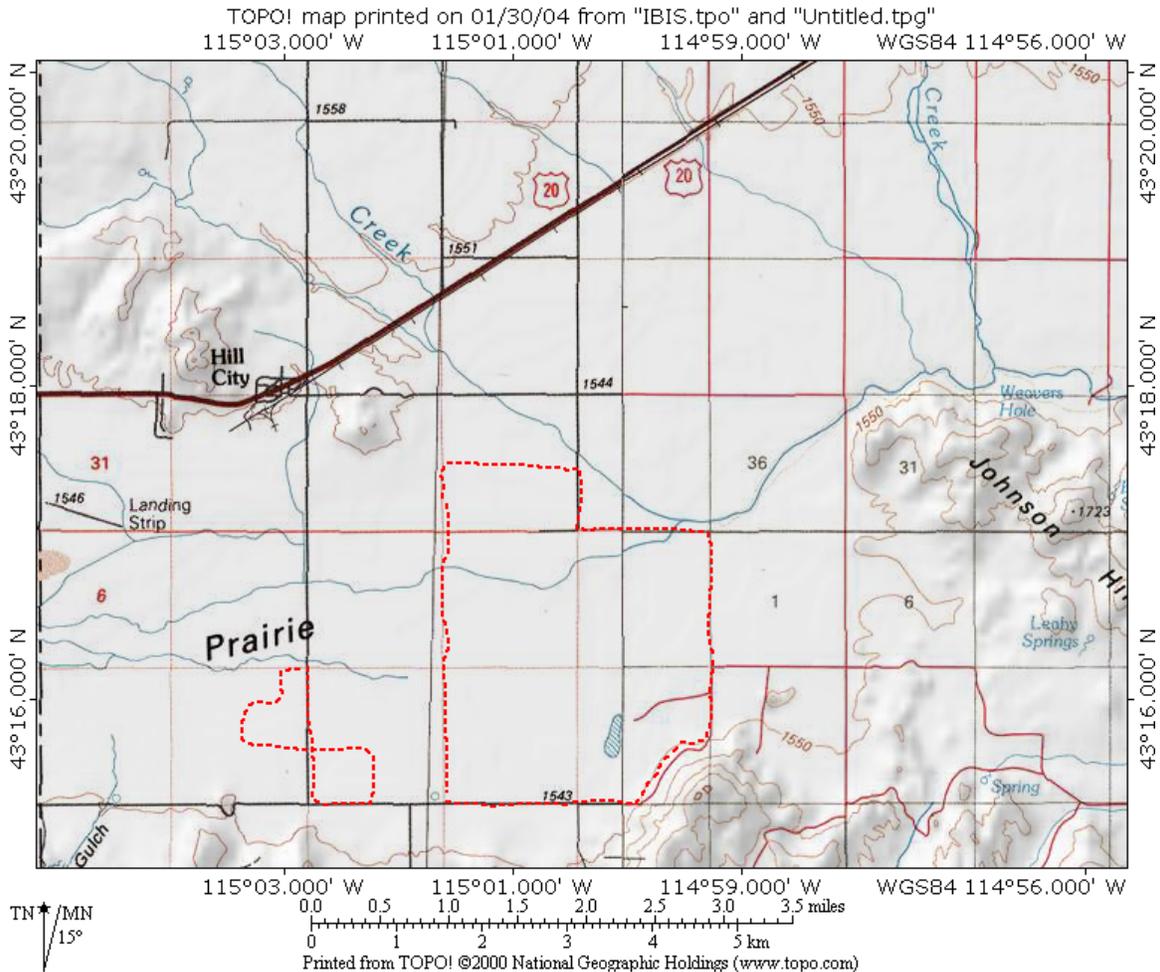
Measurement error and bias: N/A

Needed pilot studies: None for foraging birds; work on colonies may be needed.

Contact:

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51-9. CAMAS PRAIRIE CENTENNIAL MARSH WILDLIFE MANAGEMENT AREA (WMA/IBA)



Boundaries and ownership:

Boundaries (roughly): General location – South of US highway 20, 14 miles west of Fairfield. The main portion of Centennial Marsh is bordered by Stokes Road to the south, Swamp Rd. to the West, Trader Lane to the North, and Wolf Lane to the East. The Rice portion starts 1 mile south of Hill City on Swamp Rd., then 2 and ½ miles west, 1 mile south and back east 2 ½ miles east to Swamp Rd.

Ownership: Idaho Department of Fish and Game

Focal species using the site and timing of use:

Camas Creek is filled bank to bank from April through June and is dry by mid-July. During this time, thousands of waterfowl (Canada Goose, Mallard, Northern Pintail, Canvasback, Gadwall, Northern Shoveler, American Wigeon, Lesser Scaup, Ring-necked Duck, Cinnamon Teal, Green-winged Teal, and Blue-winged Teal), shorebirds (Killdeer, Long-billed Curlew, Willet, Black-necked Stilt, American Avocet, Wilson's Snipe, Wilson's Phalarope, Lesser Yellowlegs, Spotted Sandpiper, Least Sandpiper, Long-billed Dowitcher), and other waterbirds (Eared Grebe, Pied-billed Grebe, American Coot, Sora, American Bittern, Sandhill Crane, Black-Crowned Night Heron, Snowy Egret, Ring-billed Gull, California Gull) use the area.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during migration	rest of shoreline
gulls	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Large open water areas of the area are accessible to the public, but access to expansive marsh habitat would need to be cleared through the WMA manager. All of the area can be surveyed either by vehicle (ATV or truck) or on foot. Visibility is an issue as the breeding season progresses and vegetation gets higher. Flush counts of some areas may be necessary, particularly for small waterbirds/waterfowl (e.g., teal) that hide in the vegetation.

Conservation issues:

- Drought
- Predation

Conservation measures taken, in progress, or proposed:

- Brood rearing ponds supplied by wells
- On going predator trapping program

Past and current surveys:

- Annual Canada Goose nesting count
- Occasional waterfowl brood counts
- Species list developed over sixteen years of casual observation by area manager

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Can be accomplished with waders or hip boots.
- b. Census for waterfowl and other waterbirds on the open water from shoreline. The entire interior portion of the marsh is accessible by foot, and is probably the best way to survey.
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat. Suitable habitat occurs throughout the marsh, and are probably best surveyed on foot.
- d. Systematic sampling, probably including the use of playback calls, for secretive marshbirds from shoreline and within the interior of the marsh.
- e. Census for gulls during waterfowl counts

Selection bias: Surveying the entire marsh may not be feasible, although all Type 1 areas may be surveyed sufficiently. Stratified sampling may be necessary at this site.

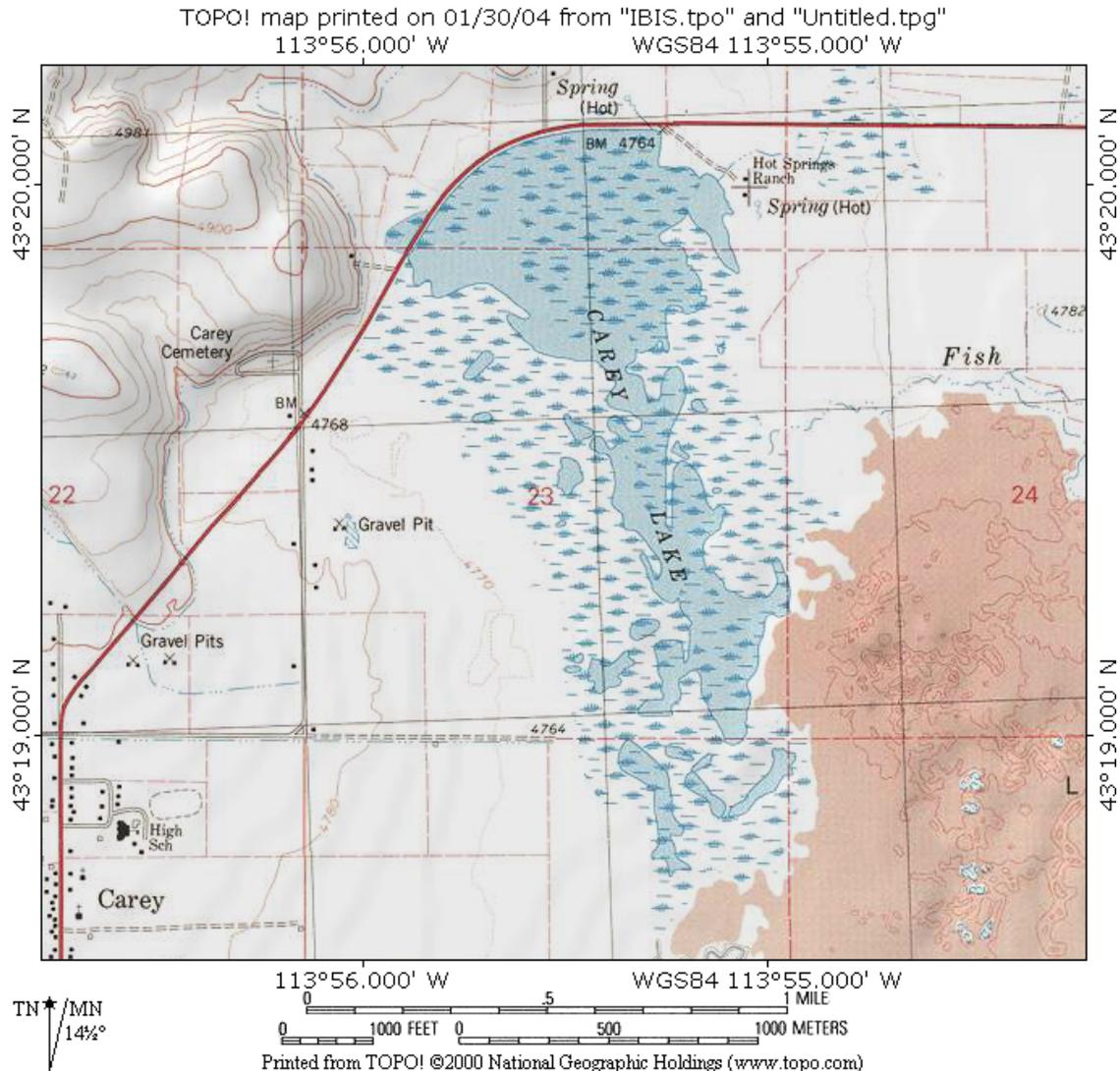
Measurement error and bias: Emergent vegetation may be a problem as the season progresses. Flush counts may alleviate some of this problem.

Needed pilot studies: None may be needed.

Contact:

NAME: Terry Gregory - IDFG
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51-10. CAREY LAKE WILDLIFE MANAGEMENT AREA (WMA/IBA)



Boundaries and ownership:

Boundaries: Bordered to the West, North, and East by the edge of the town of Carey; South/East—lava fields; North—Highway 20

Ownership: Idaho Department of Fish and Game

Focal species using the site and timing of use:

Primarily waterfowl, with dense spring populations of Mallard, Gadwall, Northern Pintail, American Wigeon, Cinnamon Teal, Green-Winged Teal, Blue-winged Teal, Redhead, Canvasback, Ruddy, and nesting Canada Geese. Other waterbirds (Sandhill Crane, Great Blue Heron, American Bittern, Virginia Rail, Sora, Pied-billed Grebe) and shorebirds (American Avocet, Black-necked Stilt, Wilson's Phalarope, Semipalmated Plover, Long-billed Curlew, Willet, Lesser and Greater Yellowlegs) are seen regularly at this location, whereas American White Pelican, Caspian Tern, Hooded Merganser, and American Pipit are seen occasionally. Avocets, stilts, curlews, willets, cranes present during summer.

Colonies: Eared Grebe, Black Tern

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Area is completely accessible to the public, and best surveyed by canoe. Some observations can be done from the shoreline with binoculars, but small islands in the reservoir will make visibility difficult for some portions of the reservoir. By canoe, birds are quite visible throughout the area.

Conservation issues:

- Drought
- Predation

Conservation measures taken, in progress, or proposed:

Water rights in Little Wood Reservoir are used to maintain water levels in Carey Lake
There is an on-going predator trapping program

Past and current surveys:

Canada Goose nesting surveys
Intermittent waterfowl brood surveys

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe is necessary for access.
- b. Colony counts for nesting Black Terns (Note: location of nesting terns is currently unknown).
- c. Census for waterfowl and other waterbirds on the open water from shore, using binoculars or scope, and/or from a canoe.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds using a canoe to access marshes
- f. Census for gulls and terns during waterfowl counts

Selection bias: N/A

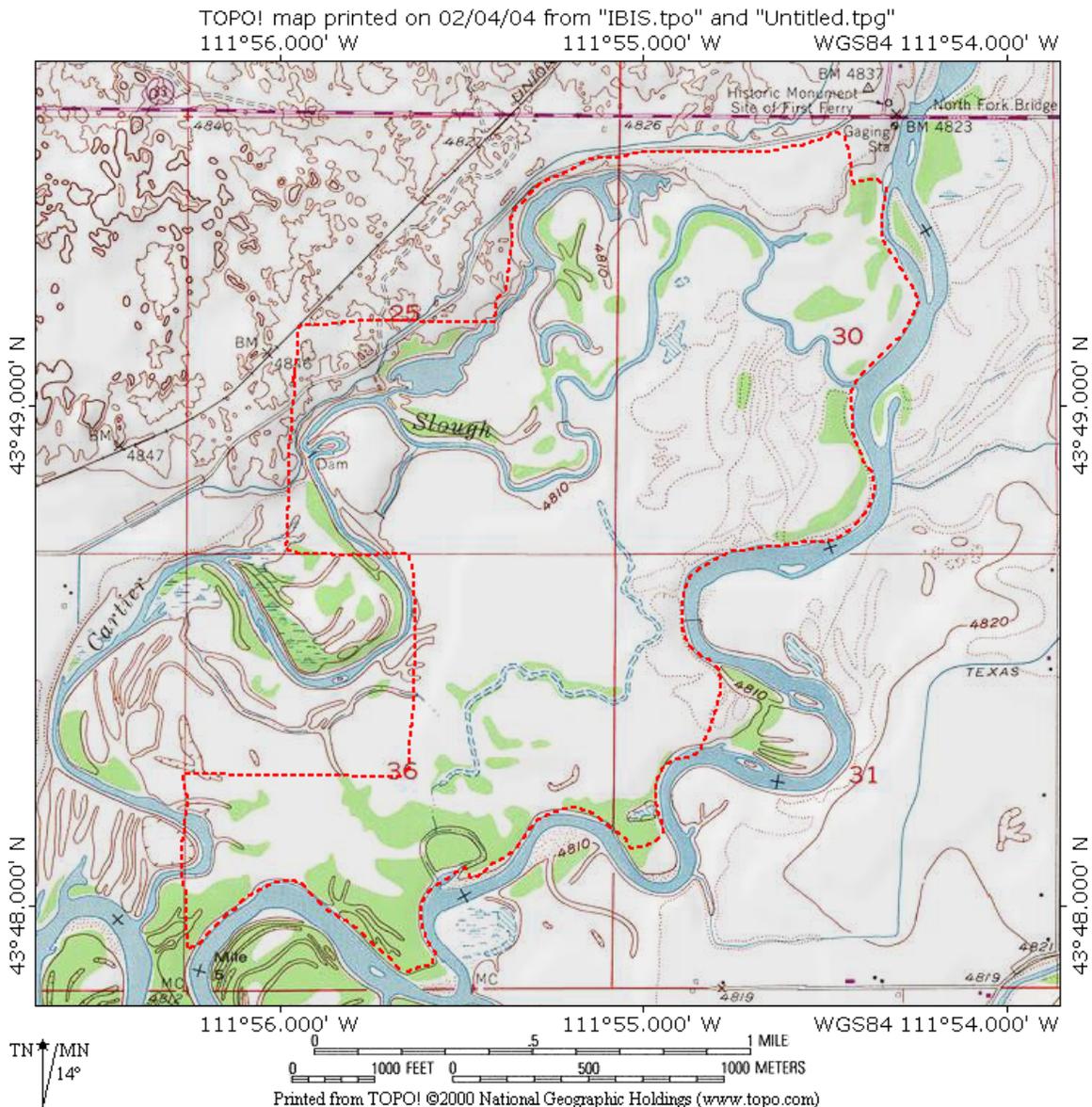
Measurement error and bias: N/A

Needed pilot studies: None may be needed, with the exception of determining the nesting location(s) of Black Terns.

Contact:

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51-11. CARTIER SLOUGH WILDLIFE MANAGEMENT AREA (WMA/IBA)



Boundaries and ownership:

Boundaries: Boundaries are well-marked; East/South – Henry's Fork of the Snake River, North – (wire fence and gravel road) Highway 33

Ownership: U.S. Bureau of Reclamation

Focal species using the site and timing of use:

Canada geese and other waterfowl (mostly Wood Duck) use the area for breeding. The area is used extensively for foraging by large wading birds (Great Blue Heron, Snowy Egret, Black-crowned Night Heron, White-faced Ibis) that are nesting elsewhere. There is a Bald Eagle pair nesting in the area, and an osprey nest that has been active for many years. Waterfowl (Mallard, Northern Pintail, Gadwall, American Wigeon, Green-winged Teal, Cinnamon Teal, Northern Shoveler, Common Goldeneye, American Coot) use area extensively during spring and fall migration, and some overwinter (depending on how

frozen the river and sloughs are). Up to 60 Trumpeter Swans are found here during fall, winter, and/or spring seasons.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation, particularly in large slough at north end of site	none
large waders	emergent vegetation	rest of shoreline
secretive marshbirds	water's edge in large north sloughs	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats along river and slough during spring/fall migration, when flooding ends	rest of shoreline
gulls and terns	all areas, although not common at this site	none

Access to the type 1 and 2 habitat and visibility of the birds:

A canoe is best way to survey most sloughs, but many can also be seen well from land. Along river, canoe anytime, or jet boat if there is enough water in the river. Access to the main slough area, except areas on north side near uplands, is difficult during spring-summer flooding. There are several good places to view birds in the large north sloughs from the brushy edge of the lava rock along north side. Also good viewing from the main dike and water control structure at west end. These sites are along an open public road or easily accessed via a short walk.

All areas within the WMA are accessible by foot. Use of canoes and other non-motorized boats on the sloughs is open to public, and there are several places to slide a canoe in (including primitive boat ramp on north side). For access to Henrys Fork River, there is a developed boat ramp and dock at Beaver Dick County Park, adjacent to the WMA.

Visibility of birds is fair to good from the north lava rock ban, and fair to poor from other land areas (due to flat nature of terrain and dense woody vegetation). Visibility is best from a boat.

Conservation issues:

- The primary conservation problem of this site is infestation of noxious weeds, particularly leafy spurge, and the potential for extensive infestation by purple loosestrife, which is found at low levels on the WMA and surrounding area.
- Pressure to use the area for livestock grazing could increase, resulting in overgrazing and disturbance.
- Recreational use causing disturbance to birds. Game farm pheasants have been stocked on the WMA in recent years, and the high level of hunter activity may be reducing use of the area by migratory waterfowl.
- Residential expansion is increasing in area.

Conservation measures taken, in progress, or proposed:

- Biological control agents have been released to control leafy spurge, thistles, purple loosestrife, and spotted knapweed. Prescriptive goat grazing is also being used to control leafy spurge.
- Through Upper Snake Cooperative Weed Management Area, have released biological controls and used herbicides to treat purple loosestrife upriver of Cartier Slough.
- Restricting public access to foot or equestrian use only.

Past and current surveys:

- Bald Eagle nesting surveys
- Goose nesting platform use

- Wood duck nest box use

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies, using a canoe for access.
- b. Colony counts for nesting large waders.
- c. Census for waterfowl on the open water from either a viewing area (described above) or by boat. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period. Sloughs and river usually frozen in winter.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: Within WMA, access by non-motorized craft only, variable by season depending on water levels (hazardous in June due to flooding, many sloughs go dry in late summer, etc.). The entire area is open to the public, but closed to unauthorized motor vehicle access. Note that part of 'Cartier Slough' proper is on private land.

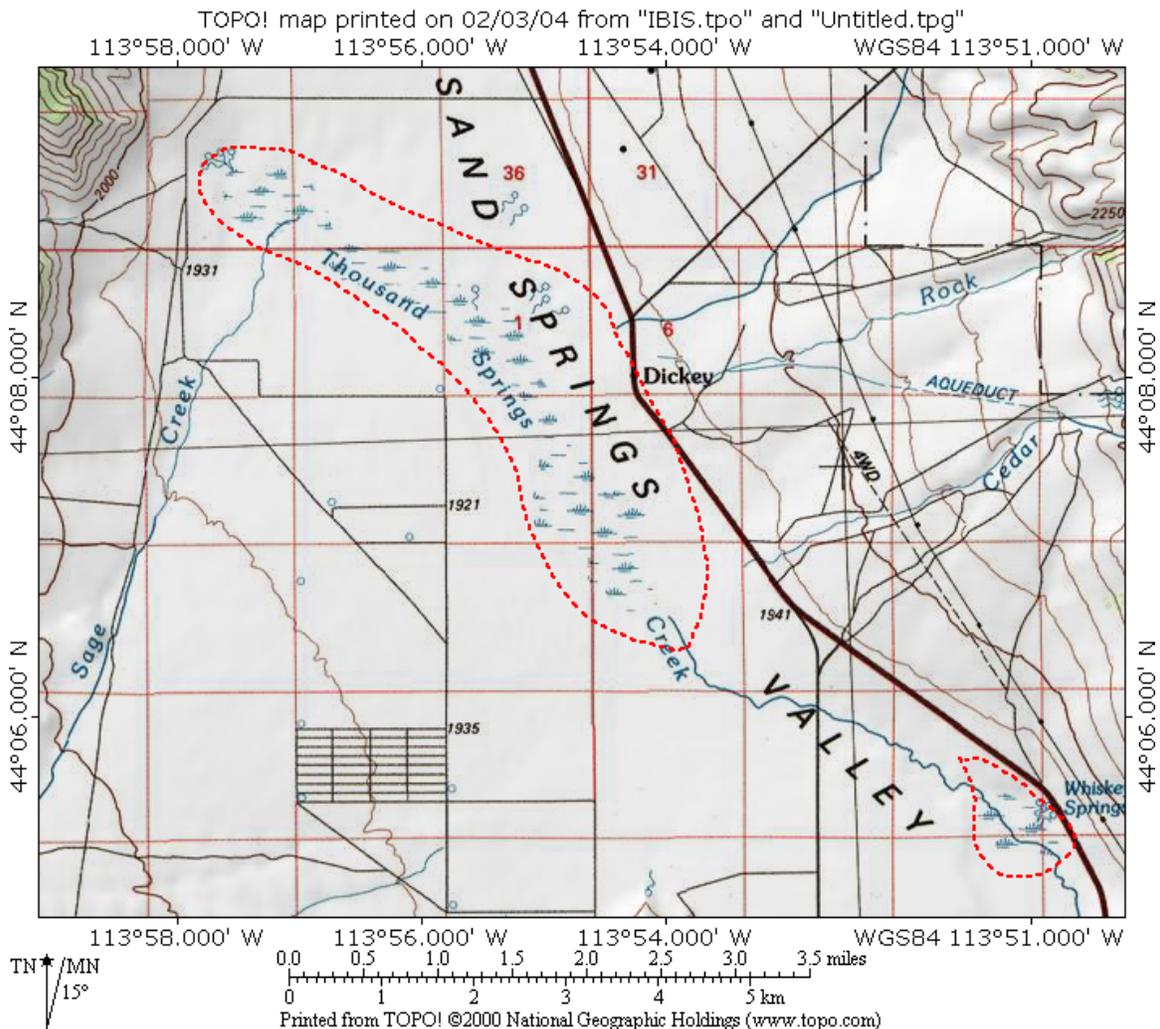
Measurement error and bias: Dense woody vegetation makes observation difficult in many areas. Water level in sloughs varies annually and seasonally, and is dependent on whether certain irrigation wells are pumping. IDFG has no control of the water level, can only hold it temporarily in the north sloughs. There have been years when 80% of the area was flooded until mid-July, others the flooding only lasted a couple weeks. Also, some years the north slough and river freeze early, thus not much use by fall migrants.

Needed pilot studies: None may be needed, although determining best places and times to survey may be helpful.

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51-12. CHILLY SLOUGH (IBA)



Boundaries and ownership:

Boundaries: East – U.S. 93; South – Trail Creek Rd, country roads border both north and west edge of slough; ; some boundaries are clearly marked; IDFG is working on a GIS of this site to show ownership boundaries

Ownership: Bureau of Land Management, Idaho Fish and Game, private

Focal species using the site and timing of use:

Supports breeding populations of waterfowl (Mallard, Northern Pintail, American Wigeon, Gadwall, Redhead, Lesser Scaup, Cinnamon Teal, Ruddy Duck), waterbirds (Pied-billed Grebe, Eared Grebe, American Coot, Sora, Sandhill Crane), shorebirds (Killdeer, Willet, Long-billed Curlew, Wilson's Snipe, Wilson's Phalarope) and Northern Harriers. American Bitterns are also present. During migration species present include waterfowl (those listed above plus Canada Goose, Tundra Swan, Trumpeter Swan, and additional ducks) and other species present during the breeding season.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	cattail marshes, sedge, open water	none
large waders	cattail marshes	grasses
secretive marshbirds	cattail marsh	Water's edge
waterfowl	open water, marshes	none
shorebirds	marshes, sedge, surrounding upland habitat	rest of shoreline

Access to the type 1 and 2 habitat and visibility of the birds:

Canoe access for the South and North Units may be best for surveying waterbirds (has been done in the past). The South Unit may also be viewed by driving or walking the two-track road running from the southern boundary of the South Unit to the visitor pullout from Highway 93 near Whiskey Springs. Many areas of the site can be seen from the shoreline. Visibility of birds varies throughout the site, as emergent vegetation can be an issue.

Conservation issues:

- Overgrazing by livestock on private lands.
- Potential diversion of water from headwater springs which would be a serious issue with spawning rainbow trout.

Conservation measures taken, in progress, or proposed:

- Acquisition of private lands has led to an additional 1,082 acres to BLM and IDFG, for a total of 1,820 acres.

Past and current surveys:

Long-term point count study being established – check with Jerry Gregson

- Five-year (1997-2001) bird inventory of site included point counts and waterfowl brood counts. See "Yeo, J.J. 2002. Avian Community Status in the Chilly Slough Wetland Conservation Area, East Central Idaho 1997-2001. Idaho BLM Technical Bulletin: 02-6."
- Informal surveys and bird-sightings for Chilly Slough over a 20-year period (prior to 1994) reported in "Barnes, L.J. 1994. The birds of Chilly Slough, Idaho. Unpublished report to The Nature Conservancy, Ketchum, Idaho".

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies using a canoe for access.
- b. Census for waterfowl on the open water from either canoe or from shoreline. Point count transects are described in Yeo 2002, and it may be desirable to use same transects if possible.
- c. Area searches for breeding shorebirds in surrounding upland vegetation and cattail marshes (from either shoreline or canoe).
- d. Systematic sampling, probably including the use of playback calls, for secretive marshbirds using a canoe to access marshes.

Selection bias: N/A

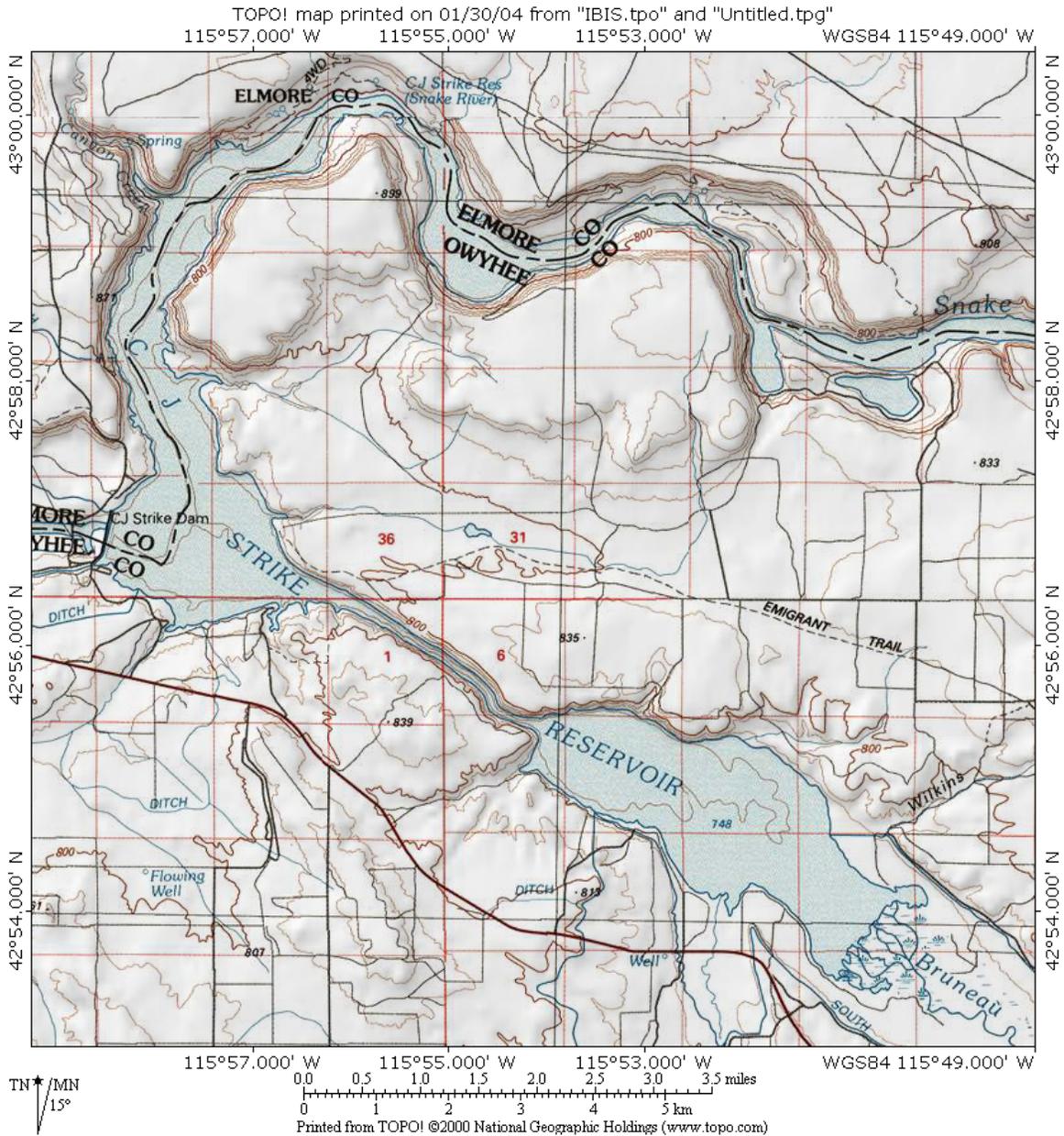
Measurement error and bias: Species using cattail marshes can be hard to detect because of vegetation. Variation in observer ability could be an issue as an observer may become more skilled over time in detecting birds in the emergent vegetation or identification skills may improve.

Needed pilot studies: None needed. Yeo's study provides a good place to start a monitoring plan for this site.

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51-13. C.J. STRIKE RESERVOIR (IBA)/WILDLIFE MANAGEMENT AREA (WMA)



Boundaries and ownership:

Boundaries: From C.J. Strike Dam to end of two arms of reservoir – 24 miles down Snake River arm, and 6.6 miles down Bruneau River arm. Also includes Ted Trueblood area, which is clearly marked.

Ownership: Idaho Power Company, Idaho Department of Fish and Game, Bureau of Land Management, Bureau of Reclamation, Private

Focal species using the site and timing of use:

Reservoir: Breeding area for waterbirds (Western and Clark’s Grebes [up to 900 adults], Pied-billed Grebe, Great Blue Heron, Black-crowned Night Heron, Double-crested Cormorant, Virginia Rail, Sora, American Coot, Ring-billed Gull, California Gull) waterfowl (Canada Goose, Mallard, Cinnamon Teal, Redhead, Gadwall, American Wigeon, Northern Pintail, Northern Shoveler, Green-winged Teal, Blue-winged Teal, Wood Duck, Ruddy Duck, Ring-necked Duck) and shorebirds (American Avocet, Black-necked Stilt, Killdeer, Spotted Sandpiper, Long-Billed Curlew). American White Pelicans present year-round. Caspian Tern and Forster’s Tern present during summer, but not breeding. Large numbers (approx. 100,000) of migrating (particularly spring) waterfowl, as well as shorebirds (Sanderling, Dunlin, Western Sandpiper, Least Sandpiper, Black-bellied Plover, Greater and Lesser Yellowlegs, Short- and Long-billed Dowitcher, Wilson’s and Red-necked Phalarope) and waterbirds (Franklin’s Gull, Bonaparte’s Gull, Sabine’s Gull, Black Tern, White-faced Ibis). Wintering species include waterfowl, gulls (Herring, California, Ring-billed), Great Blue Herons, and grebes (Western, Pied-billed, Horned, and Eared)

Ted Trueblood: Attracts thousands of waterfowl (Tundra Swan, Canada Goose, Greater White-fronted Goose, Snow Goose, Wood Duck, Mallard, Gadwall, Northern Pintail, American Wigeon, Northern Shoveler, Cinnamon Teal, Blue-winged Teal, Green-winged Teal, Redhead, Ring-necked Duck, Greater Scaup, Lesser Scaup, Common Goldeneye, Bufflehead, Hooded Merganser, Ruddy Duck), waterbirds (Horned Grebe, Eared Grebe, Pied-billed Grebe, Western Grebe, Clark’s Grebe, American White Pelican, Double-crested Cormorant, Great Blue Heron, Great Egret, Black-crowned Night Heron, White-faced Ibis, California Gull, Ring-billed Gull, Franklin’s Gull, Herring Gull, Caspian Tern, Forster’s Tern, Black Tern), and shorebirds (Greater Yellowlegs, Lesser Yellowlegs, Dunlin, Least Sandpiper, Long-billed Dowitcher, Common Snipe, Wilson’s Phalarope, Long-billed Curlew, Solitary Sandpiper, Baird’s Sandpiper, Pectoral Sandpiper) during migration and summer. Breeding area for waterfowl, waterbirds (Pied-billed Grebe, American Coot), shorebirds (American Avocet, Black-necked Stilt, Wilson’s Snipe, Spotted Sandpiper, Killdeer), and gulls (Ring-billed and California). Yellow-headed and Red-winged Blackbirds are abundant, Northern Harriers are common, and Soras and Virginia Rails are heard occasionally. Wintering species include Tundra Swans, other waterfowl, Pied-billed Grebes, American Coots, Great Blue Herons, Ring-billed Gulls, and California Gulls.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	Surrounding grassy banks
large waders	breeding colonies, emergent vegetation, mudflats	rest of shoreline, irrigated pastures
secretive marshbirds	emergent vegetation at water's edge or in shallow water	none
waterfowl	open water, edges during breeding season, mudflats, sand bars	none
shorebirds	exposed mudflats, sand and gravel flats during spring/fall migration. Marshy areas, wet pastures, and irrigated agriculture during breeding season.	rest of shoreline
gulls and terns	all areas – open water, mud, sand and gravel flats, etc.	none

Access to the type 1 and 2 habitat and visibility of the birds:

Reservoir: A boat would be necessary for a thorough aquatic survey. Boating is open to the public. Seeing rails and bitterns would be difficult from any observation area, but other species should be observable.

Ted Trueblood: Can be surveyed from shoreline. Large pond (Pond 3) closest to river is easily viewed from the parking area viewing platform at the end of Shaw Lane, either using binoculars or scope. Could also be surveyed from shoreline. Other two ponds (Ponds 1 and 2) are hard to see from parking area, and would require surveying from the banks of the ponds. Ponds are closed to public during waterfowl breeding and brood rearing season (Feb-June). Permission is needed from IDFG and BLM (Lower Snake River District). Rails and bitterns hard to see from any observation area, but other species should be observable.

Conservation issues:

- Degradation of water quality from an increased nutrient load from agriculture and food processing.
- Habitat degradation by excessive grazing.
- Pesticide poisoning of area animals.
- Invasion by exotic plants (Russian olive and tamarisk) and noxious weeds
- Recreational development/overuse, contributing to erosion of shoreline as a result of wave action

Conservation measures taken, in progress, or proposed:

- Proposed: Strictly enforce water quality standards for agriculture and industry.\
- Taken: Only use grazing to improve wildlife habitat.
- Biological and/or chemical controls are being used to control purple loosestrife, Canada thistle, perennial pepperweed, and hoary cress. Idaho Power and BLM have proposed to replace Russian olive and tamarisk with other trees and shrubs.
- The BLM has rip raped a shoreline near a recreation site on C.J. Strike Reservoir, and Idaho Power Company has proposed to riprap some of the eroding shoreline on their land.

Past and current surveys:

- Mid-winter waterfowl counts by IDFG and/or USFWS
- John Doremus surveyed Western and Clark's Grebes in the past, and currently conducts colony counts of Great Blue Heron and Cormorants at one rookery
- IDFG checks goose nest platforms each year
- Idaho Power does/did bird surveys

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Boat may be necessary for the reservoir, but could be done from shoreline for Ted Trueblood.
- b. Colony counts for Great Blue Herons and Double-crested Cormorants.
- c. Census for waterfowl and other waterbirds on the open water from a boat on the reservoir, and from shoreline observation points for Ted Trueblood. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds. Canoe may be necessary to access marshes on the reservoir, but can be done from shoreline for Ted Trueblood.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: Unknown at this time.

Measurement error and bias: Unknown at this time.

Needed pilot studies: Some work may be needed to determine what kind of biases may be present at this site.

Contact:

NAME: John Doremus - BLM
ADDRESS: Lower Snake River District – Four Rivers Field Office
3948 Development Ave., Boise, ID 83705
PHONE: 208/ 384-3333
FAX: 208/ 384-3493
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51-14. DEER FLAT NATIONAL WILDLIFE REFUGE

(Snake River portion of refuge – does not include Lake Lowell)

Boundaries and ownership

Boundaries: 113 miles of river stretching from Canyon-Ada County line in Idaho to Farewell Bend in Oregon.

Ownership: U.S. Fish and Wildlife Service

Focal species using the site and timing of use:

Multiple (101) islands provide habitat for nesting Canada Geese, ducks, herons, other waterbirds, gulls, and secretive marshbirds. During migration waterfowl and shorebirds are present, and waterfowl are also present in winter.

Colonies: Double-crested Cormorant, mixed heron and egret colonies, California Gull

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
waterfowl	open water, edges during breeding season	none
shorebirds	islands, exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

USFWS does not control any of the shoreline. Many areas are open to the public, but there is quite a bit of private land. For access to islands, contact USFWS (Elaine Johnson – see contact info below) for a special use permit (a study proposal will be needed). Visibility of birds is dependent on species, season, and particular island – highly variable.

Conservation issues:

- Introduced plants or animals
- Unreliable water levels
- Development
- Disturbance of birds
- Drought

Conservation measures taken, in progress, or proposed:

- Islands are closed to public entry from February 1st – May 31st.
- Spraying of noxious weeds – in progress
- Prescribed fire to maintain suitable nesting habitat on the islands - proposed
- Nesting platforms have been constructed on many of the islands

Past and current surveys:

- As part of some studies regarding predator losses and river water levels, bird work was done on many of the islands in 1997-1999 (report available).
- Canada goose nesting surveys done on foot every year in April with follow-up in May.
- Aerial winter waterfowl counts done every year in January.

Potential survey methods

Description:

- a. Colony counts for nesting Black-crowned Night Herons, California Gulls, and Double Crested Cormorants
- b. Census for waterfowl and other waterbirds on the open water using a boat or from land. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- d. Census for gulls and terns during waterfowl counts. A boat will be needed for many of the sites.

Selection bias: N/A

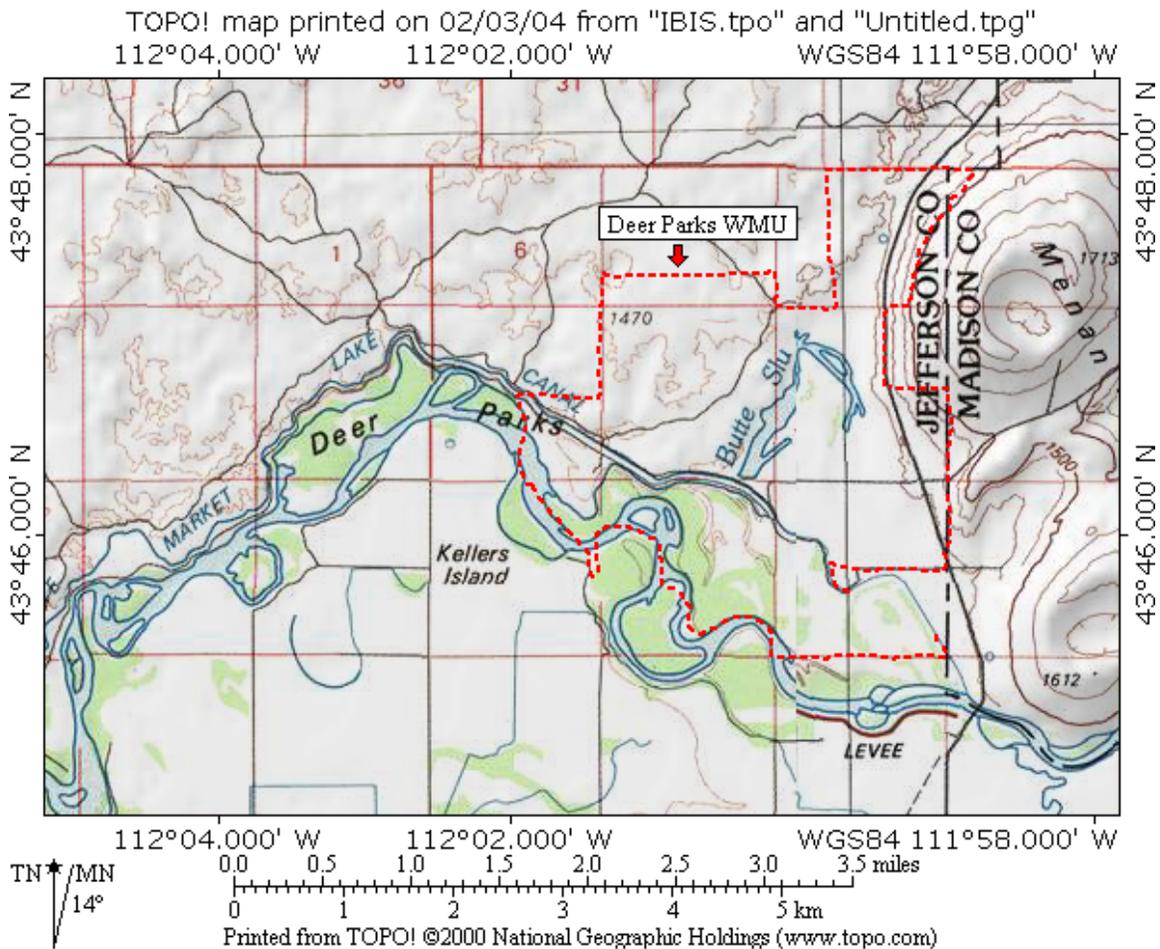
Measurement error and bias: Some islands have very thick vegetation

Needed pilot studies: None may be needed.

Contact:

NAME: Elaine Johnson - USFWS
ADDRESS:
PHONE: 208-467-9278
FAX:
EMAIL: Elaine.Johnson@r1.fws.gov

51-15. DEER PARKS WILDLIFE MITIGATION UNIT (WMU)



Boundaries and ownership:

Boundaries: Boundaries clearly marked

Ownership: Bureau of Land Management

Focal species using the site and timing of use:

Waterfowl (Canada Goose, Trumpeter Swan, Mallard, Northern Shoveler, Ruddy Duck, Northern Pintail, American Wigeon, Green-winged Teal, Cinnamon Teal, Gadwall, Canvasback, Redhead, Scaup), waterbirds (Sandhill Crane, American Coot, Pied-billed Grebe), and Bald Eagles are present during breeding season. Gulls, terns, herons, and rails may also be present, but surveys have not noted this in the past. During migration, the same species are present, with the addition of Snow Geese. During the winter Canada Geese, Trumpeter Swans, Common Goldeneye, Mallards, Great Blue Herons, and Bald Eagles are present.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation	rest of shoreline

secretive marshbirds	water's edge, emergent vegetation	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

The majority of this area is easily accessed by ground personnel. There is a dirt access road along the entire canal, and the Butte Slough can be viewed in its entirety from various observation points. However, there is ample bulrush and cattail that may limit visibility. The Butte Slough can also be accessed by canoe. There are many vantage points from land to the Snake River, but it must be accessed by boat if it is to be done in its entirety. There is a public boat ramp ½ mile south (upstream) of the property. Internal waterways are well isolated and protected by tree cover of the cottonwood bottoms, but foot access is available.

Conservation issues:

- There is no imminent change to adjacent areas that will impinge upon the conservation of species, however increased pressure on public lands does appear to affect short term use.
- As this is mitigation land, there is a strong effort to improve habitat for wildlife.

Conservation measures taken, in progress, or proposed:

- IDFG has begun habitat improvements by creating permanent cover, controlling noxious weeds, improving native biodiversity of plant species in lands to improve nesting habitat, and creating food and cover areas for increased wildlife use.

Past and current surveys:

- Weekly waterfowl surveys during fall and spring migration, and bimonthly waterfowl surveys the rest of the year
- Nest searches and brood counts for waterfowl
- Nest drags for nesting waterfowl have been conducted in the past
- Nesting Bald Eagle surveys
- Point counts for passerines during breeding season

Potential survey methods

Description:

- Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies.
- Census for waterfowl and other waterbirds on the open water from shoreline, and from canoe along river. Use pre-established waterfowl observation points (4 total) for Butte Slough area.
- Area searches for migrating shorebirds from observation points near Type 1 habitat.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds from shoreline.

Selection bias: N/A - with proper planning and development of studies, all areas are accessible

Measurement error and bias: As with selection bias, with proper planning, all areas will be similarly visible. There is potential personnel bias. This area is monitored by a wildlife technician, and there is routine turnover with no overlap. Due to this, observer bias is always a risk, and there is no opportunity for training or coordination between incoming and outgoing employees.

Needed pilot studies: None may be needed, as waterfowl surveys are done routinely. Surveys of other waterbirds likely can be incorporated into current waterfowl surveys.

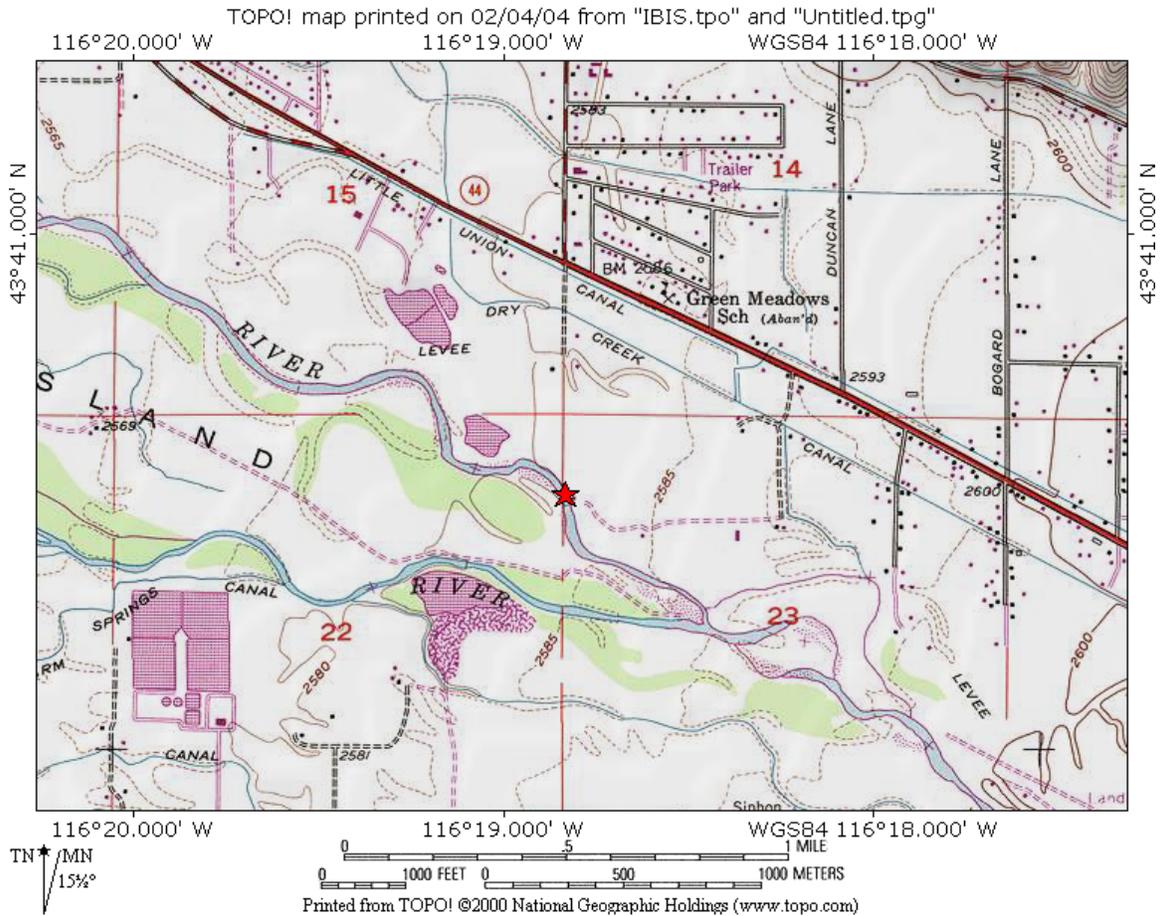
Contact:

NAME: John O'Neill - IDFG
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PHONE: 208-525-7290
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OR

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PHONE: 208-754-4435
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MAIL: pohearn@idfg.state.id.us

51-16. EAGLE ISLAND (IBA)



Boundaries and ownership:

Boundaries: Geographic coordinates - 43° 40' N 116°19'W

Directions - Boise – junction of highway 55 and State St.(highway 44). Head south on dirt road off of State St., directly across from highway 55 junction to Boise River.

Ownership: State and Private

Focal species using the site and timing of use:

Colonies: Great Blue Heron (>50 pairs)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
large waders	breeding colonies, emergent vegetation	rest of shoreline

Access to the type 1 and 2 habitat and visibility of the birds:

Accessible from dirt road. Birds should be quite visible from the shoreline.

Conservation issues:

- Recreational development; overuse is a potential problem

- Disturbance of birds is potentially a problem
- Residential/Commercial development is a potential problem

Conservation measures taken, in progress, or proposed: None

Past and current surveys: Nothing that we aware of

Potential survey methods

Description:

Colony counts for nesting Great Blue Herons

Selection bias: N/A

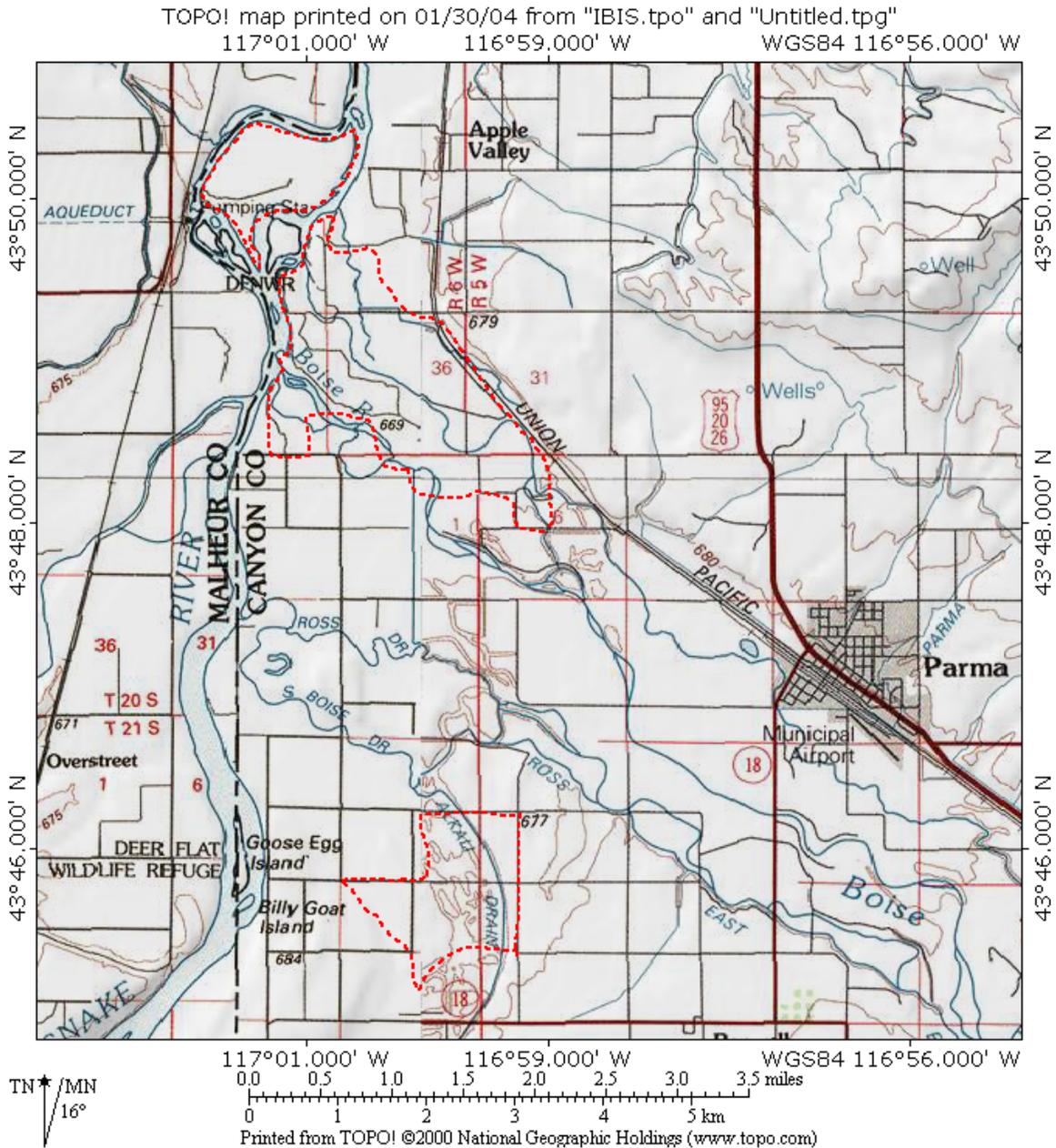
Measurement error and bias: N/A

Needed pilot studies: None needed

Contact:

NAME: Jon Curd – Golden Eagle Audubon Society/BLM
ADDRESS: 1503 Clear Creek Road, Boise, ID 83709
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208/ 378-8504 (h)
EMAIL: jon_curd@blm.gov

51-17. FORT BOISE WILDLIFE MANAGEMENT AREA (WMA/IBA)



Boundaries and ownership:

Boundaries: West – Snake River; North – Snake River/Old Fort Boise Rd.; East – Snake River/Old Fort Boise Rd./railroad tracks); South (roughly) – Boise River/Sharp Lane

Ownership: Idaho Department of Fish and Game

Focal species using the site and timing of use:

During the spring and/or summer, waterbirds (Pied-billed Grebe, Western Grebe, American White Pelican, Double-crested Cormorant, Great Blue Heron, Black-crowned Night Heron, Great Egret, Sora, Virginia Rail, American Coot, Forster's Tern, Caspian Tern, Ring-billed Gull), waterfowl (Canada Goose, Snow

Goose, Greater White-fronted Goose, Mallard, Gadwall, Wood Duck, Common Goldeneye, Northern Pintail, American Wigeon, Canvasback, Redhead, Ruddy Duck, Northern Shoveler, Cinnamon and Blue-winged Teal, and others), shorebirds (Killdeer, American Avocet, Black-necked Stilt) are present; most of which breed on the WMA. Common and Black Tern species have been seen in ponds north of Old Fort Boise Rd. Additional shorebirds seen during migration include: Marbled Godwit, Long-billed Curlew, Willet, Greater and Lesser Yellowlegs, Long- and Short-billed Dowitcher, Stilt Sandpiper, Baird's Sandpiper, Pectoral Sandpiper, Solitary Sandpiper, and Dunlin (The Intermountain West Regional Shorebird plan lists this as a shorebird site).

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation, open water	rest of shoreline, uplands
secretive marshbirds	water's edge, emergent vegetation	none
waterfowl	open water, edges during breeding season	uplands
shorebirds	exposed mudflats in creeks, channels, and wetlands during spring/fall migration	rest of shoreline, and uplands
gulls and terns	all areas, especially shallow water areas; terns particularly in ponds N of Old Fort Boise Rd. during migration	none

Access to the type 1 and 2 habitat and visibility of the birds:

This site is open to the public, although certain areas are closed from Feb 1 – July 31. Access permission may be granted by the area manager (Clair Kofoed). Birds can be viewed quite well from dike roads adjacent to the wetlands during the early part of the breeding season. Visibility is difficult once the vegetation, particularly phragmites, grows up. Vehicle viewing is preferred to surveys on foot, to decrease disturbance to nesting birds.

Conservation issues:

- Recreational development/overuse
- Excessive or irresponsible hunting
- Disturbance of birds
- Drought and water quality (silt and chemical pollution)
- Residential/commercial development

Conservation measures taken, in progress, or proposed:

None known at this time.

Past and current surveys:

- Waterfowl brood counts conducted by area manager
- Upland bird brood counts conducted by area manager
- An area bird list has been compiled

Potential survey methods

Description:

- a. Census for waterfowl on the open water from shoreline. Late summer or fall counts may be better than breeding season counts, as waterfowl are more easily detected during this period. However, largest number of waterfowl present in March and April

- b. Area searches for migrating shorebirds from observation points near Type 1 habitat, particularly in March and April.
- c. Systematic sampling, probably including the use of playback calls, for secretive marshbirds from shoreline.
- d. Census for gulls and terns during waterfowl counts.

Selection bias: N/A – should be able to survey all areas fairly well

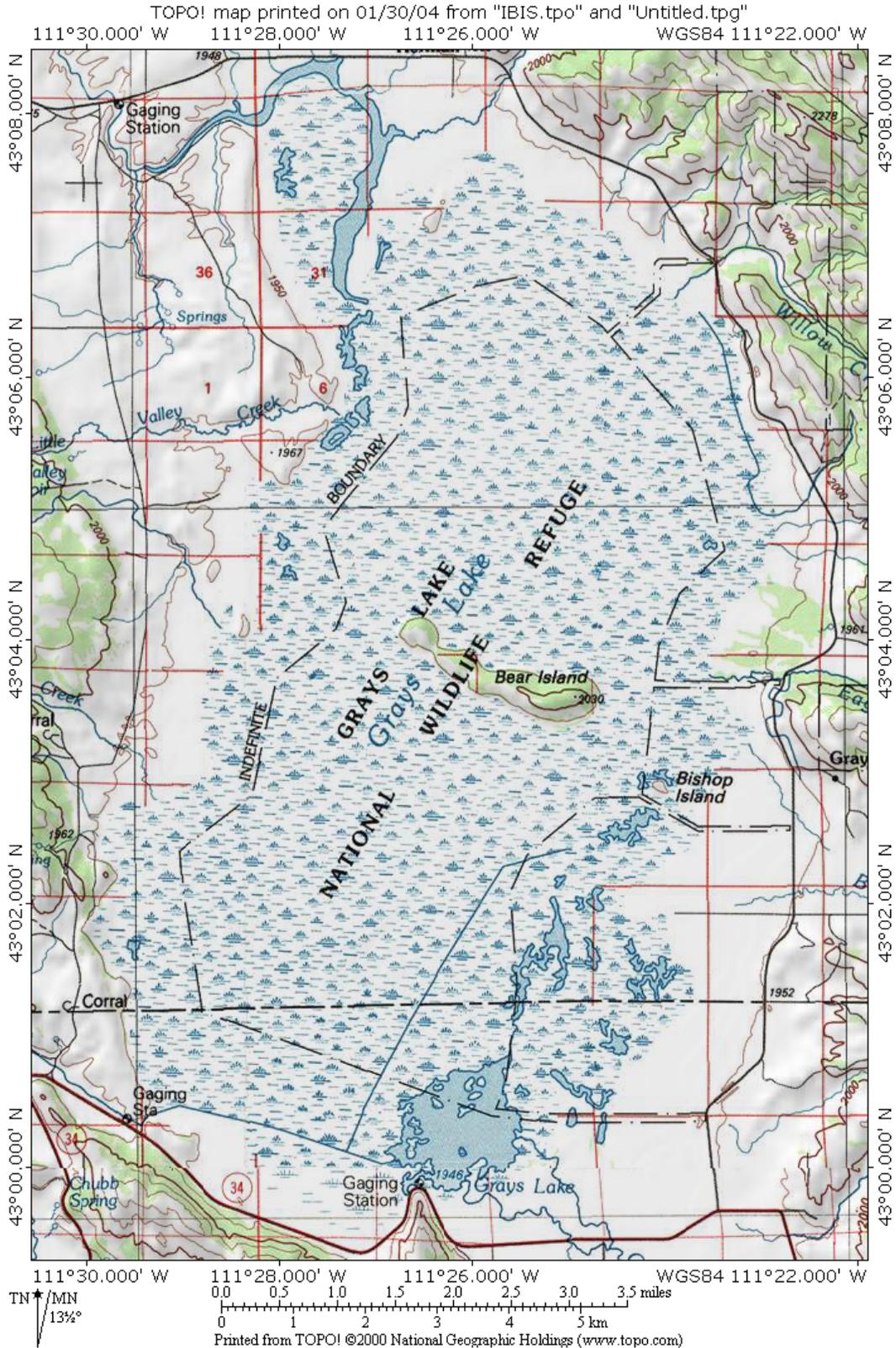
Measurement error and bias: Vegetation along edges of impoundments can make visibility quite difficult. There are a few open areas around each impoundment that provide only viewing spots for these impoundments.

Needed pilot studies: None may be needed

Contact:

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51-18. GRAYS LAKE NATIONAL WILDLIFE REFUGE (IBA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked; South – ID 34, East/North – Grays Lake Road, West – West Side Rd.

Ownership: U.S. Fish and Wildlife Service, Fort Hall Irrigation District, Private

Focal species using the site and timing of use:

Largest breeding concentration of Sandhill Cranes (250 pairs) in the world. Numerous waterfowl species nest here, including Trumpeter Swans, as well as shorebirds (Killdeer, Long-billed Curlew, Willet, Spotted Sandpiper, Wilson’s phalarope, Wilson’s Snipe), waterbirds (American Coot, Virginia Rail, Sora, American Bittern; plus colonial species listed below), Peregrine Falcons, and Northern Harriers. During migration, shorebirds (Greater Yellowlegs, American Avocet, Sandpipers) are abundant.

Colonies: Eared Grebe (15-20 nests), Western Grebe, White-faced Ibis (up to 2,000 birds), Franklin’s Gull (up to 10,000 birds), Black Tern, Forster’s Tern

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, emergent vegetation	wet meadows
large waders	breeding colonies, emergent vegetation	wet meadows
secretive marshbirds	emergent vegetation	none
waterfowl	open water, emergent vegetation	none
shorebirds	exposed mudflats during spring/fall migration	wet meadows
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds: Canoe will probably be necessary to access many areas, or by foot. This is a very large area with very little access other than canals. Aerial surveys may be necessary to determine locations and sizes of colonies on the refuge. Grasslands largely accessible.

Conservation issues:

- Introduced noxious weeds are a problem, which could become more serious.
- The dissected ownership pattern is a major problem; many [land]owners could sell to developers. There are too many small landowners to easily develop cooperative management plans with.
- The Fort Hall Irrigation District could drain more water from the marsh or drain it earlier in the year.
- Renewed gold mining on Caribou Mountain could lead to increased sedimentation on the refuge.
- The main portion of the marsh is managed through agreement with the Irrigation District; the agreement could be withdrawn.

Conservation measures taken, in progress, or proposed:

- Chemical, mechanical, and biological control of noxious weeds.
- Altered grazing regime and research project to manage livestock in a way to improve wildlife habitat.
- Buy land when available.
- Grow crops and hay for cranes and geese.
- Working with Irrigation District to improve water regime for wildlife.

Past and current surveys:

- Colonial waterbird surveys have been conducted in the past. Currently appears to be very little activity because of drought.

- Surveys for Trumpeter Swans and Sandhill Cranes
- Have done aerial surveys for ducks and geese in the past. Funding not available currently to continue this.

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe will be necessary for access.
- b. Colony counts for nesting ibis, gulls, and terns. Aerial surveys will likely be necessary to at least determine location and size of any colonies in the area.
- c. Census for waterfowl on the open water using aerial surveys.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds from the road and from a canoe along channels.
- f. Census for gulls and terns during waterfowl counts

Selection bias: N/A

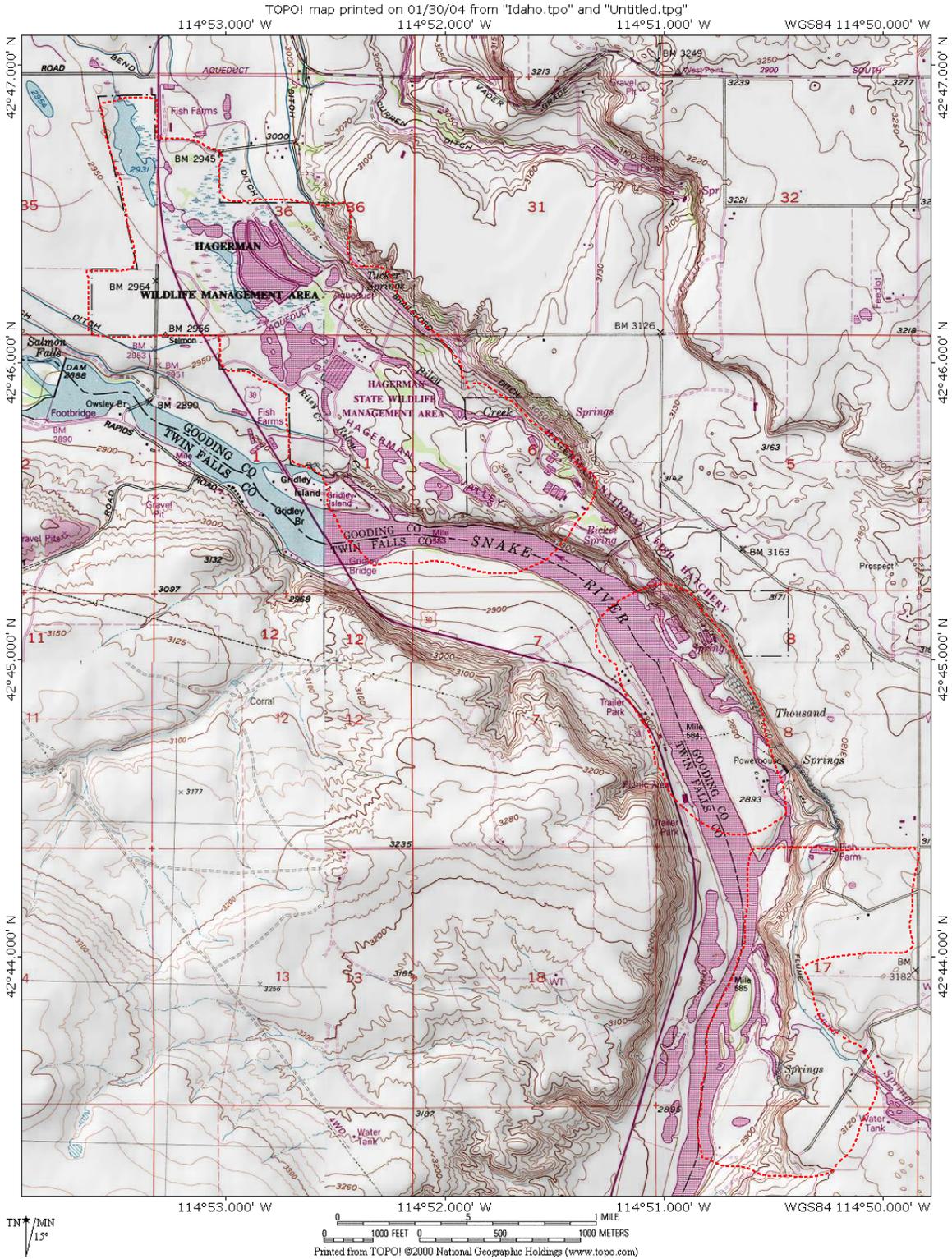
Measurement error and bias: N/A

Needed pilot studies: Design aerial surveys for colony counts and waterfowl counts. Determine protocol for establishing playback stations for marshbird surveys. Very extensive area with limited accessibility.

Contact:

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51-19. HAGERMAN WILDLIFE MANAGEMENT AREA (WMA/IBA)



Boundaries and ownership:

Boundaries: This site includes four parcels (not quite contiguous) along 5 miles of the Snake River: 1) Hagerman WMA, 2) Hagerman National Fish Hatchery, 3) Thousand Springs Preserve, and 4) "Heron Island". Heron Island is on south/west side of Snake River, other three on north/east side of river. All boundaries are well-marked.

Ownership: Idaho Department of Fish and Game, U.S. Fish and Wildlife Service, The Nature Conservancy

Focal species using the site and timing of use:

Healthy population of breeding waterfowl (Mallard, Cinnamon Teal, Green-winged Teal, Gadwall, Redhead, Ruddy Duck, Canada Goose), Yellow-headed Blackbirds, and Northern Harriers. During spring and summer, waterbirds (American Coot, Pied-billed Grebe, Western Grebe, American Bittern, Virginia Rail, Sora, California Gull, Double-crested Cormorant, Forster's Tern), shorebirds (Black-necked Stilt, American Avocet, Long-billed Curlew), Northern Harriers, and Yellow-headed Blackbirds are common. During migration, Common Loons, Tundra Swans, and other shorebirds can be seen. Large numbers of wintering waterfowl (25,000-55,000; most species), Bald Eagles (15-20), and Northern Harriers.

Colonies(on Heron Island): Great Blue Heron (±80 pairs), Black-crowned Night Heron (200 pairs), Great, Snowy, and Cattle Egrets (5-10 pairs each)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
waterfowl	open water, edges during breeding season	none
secretive marshbirds	water's edge along creek and ponds	none
shorebirds	exposed mudflats/earthen shorelines and shallow portions of ponds	rest of shoreline
gulls and terns	all areas, but primarily Anderson and Riley ponds	none

Access to the type 1 and 2 habitat and visibility of the birds:

Hagerman WMA: Access is good. Most areas can be surveyed on foot, by binoculars, from the dikes surrounding ponds. Anderson #2 pond may be best surveyed using a row boat/canoe. Visibility varies by season.

Rest of IBA: Access is good, particularly by boat. Visibility varies by species/season, and emergent vegetation could be a problem in mid-summer. Can also view birds from the Ritter Island shoreline. Canyon rim shoreline should be avoided as it has very heavy brush and poison ivy. Preserve is open to the public, but subject to preserve hours (particularly Ritter Island). Contact preserve (208-536-6797) for hours of operation.

Conservation issues:

- Introduced plants/animals: cheatgrass, European Starling, House Sparrow.
- Recreational development/residential development potential high on adjacent land.
- Springs completely dependent on Snake River Plains aquifer, which is highly susceptible to groundwater contamination, overpumping and drought.
- Invasion of purple loosestrife

Conservation measures taken, in progress, or proposed:

- All the land nominated is in the hands of federal, state and private conservation groups.

- Land is well-protected long-term, so potential for long-term studies is high. TNC will work to protect the cold-water spring systems as opportunity arises.
- TNC will be building a wetland system at the base of Blind Canyon to treat the City of Jerome sewage return water and create wildlife habitat.
- IDFG has initiated a bio-control program (beetles) to reduce purple loosestrife on Hagerman WMA.

Past and current surveys:

- Christmas Bird Counts - conducted annually
- Hagerman WMA has many years of USFWS style waterfowl monitoring
- Hagerman WMA has a general species inventory list that includes species not included in "focal species" section of this description.

Potential survey methods

Description:

- Nest searches by canoe for grebes and other waterbirds nesting in the emergent vegetation in small colonies.*
- Colony counts for nesting herons and egrets
- Census for waterfowl on the open water using a boat. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- Census for gulls and terns during waterfowl counts

Selection bias: N/A

Measurement error and bias: Heavy riparian vegetation may be a problem. It would be best to use a skilled birder or birders. The density of the wetlands/cattail areas would most likely be difficult to assess especially for secretive species such as rails.

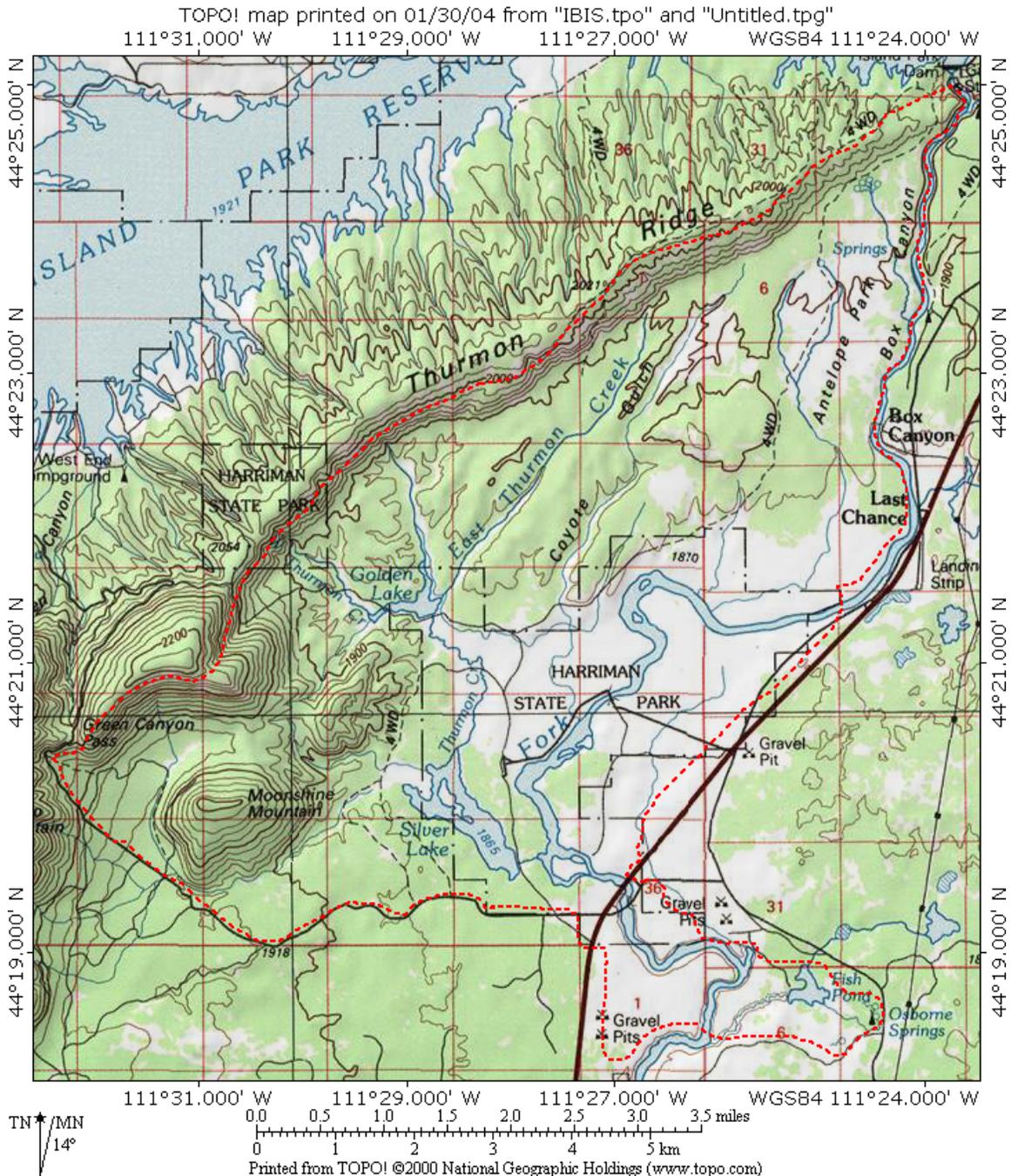
Needed pilot studies: None may be needed, although determining best places and times to survey may be helpful.

Contact:

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51-20. HARRIMAN WILDLIFE REFUGE (IBA)



Boundaries and ownership:

Boundaries: West – top of Thurmon Ridge, East – Henry's Fork, North – Dam, South – Green Canyon Road

Ownership: Idaho Department of Parks and Recreation, USDA Forest Service (Caribou-Targhee National Forest)

Focal species using the site and timing of use:

Trumpeter Swans are most prevalent species, and are present year-round (up to 3,000 birds in winter, fewer during breeding season). During the summer, waterfowl (multiple species), waterbirds (American White Pelican, Eared Grebe, Red-necked Grebe, American Bittern, Great Blue Heron, Snowy Egret, Black-crowned Night Heron, Virginia Rail, Sora, American Coot, Sandhill Crane), shorebirds (Killdeer, American Avocet, Willet, Spotted Sandpiper, Long-billed Curlew, Wilson's Snipe, Wilson's Phalarope), and gulls can be found. A breeding pair of Great Grey Owls, as well as 6 breeding pairs of Bald Eagles, are found at this location. Spring and Fall migrants include Common Loons, Western Grebes, waterfowl, shorebirds (Mountain Plover, Greater Yellowlegs, Solitary Sandpiper), and Caspian Terns.

Colonies: Forster's Tern

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation in Silver and Golden Lakes	Henrys Fork, marshes, flooded pastures
large waders	emergent vegetation, flooded and dry pastures	rest of shoreline
secretive marshbirds	water's edge of Silver and Golden Lakes; pasture marshes	none
waterfowl	open water, edges during breeding season (Golden and Silver Lakes, and Henrys Fork)	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	breeding colonies, Golden and Silver Lakes	all other areas

Access to the type 1 and 2 habitat and visibility of the birds:

All areas can be accessed by foot. Park trails give access to all areas, though it is limited to non-motorized traffic. Boating is prohibited on Silver and Golden Lakes due to their status as Waterfowl Sanctuaries. No permission is needed to view birds. Visibility of species is ideal in the spring months during the peak migration (May).

Conservation issues:

- Past problems with Mountain pine bark beetle, which has impacted the Lodge pole pine forest.
- Noxious weeds are a problem
- Because Henrys Fork, that runs through the refuge, runs through resort housing areas, there is a potential for water pollution problems.
- Potential for over-fishing problems
- Preservation of established Trumpeter Swan nesting sites on Golden and Silver Lakes, and shorebird nesting areas along the Henrys Fork are of primary management concern.

Conservation measures taken, in progress, or proposed:

- Annual noxious weed inventory is completed to monitor the introduction of any unwanted plant species.
- Fish and Game monitors and implements fishing regulations.
- Nesting areas are protected by area closures.

Past and current surveys:

- Trumpeter Swan surveys conducted primarily in mid-winter via aerial and ground surveys.

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies.
- b. Colony counts for nesting Forster's Terns.
- c. Census for waterfowl on the open water primarily for shoreline using a scope.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: Portions of the park are closed to public use during spring to protect nesting areas. Surveys of these areas would likely have to be done by IDFG personnel.

Measurement error and bias: None known at this time

Needed pilot studies: None may be needed.

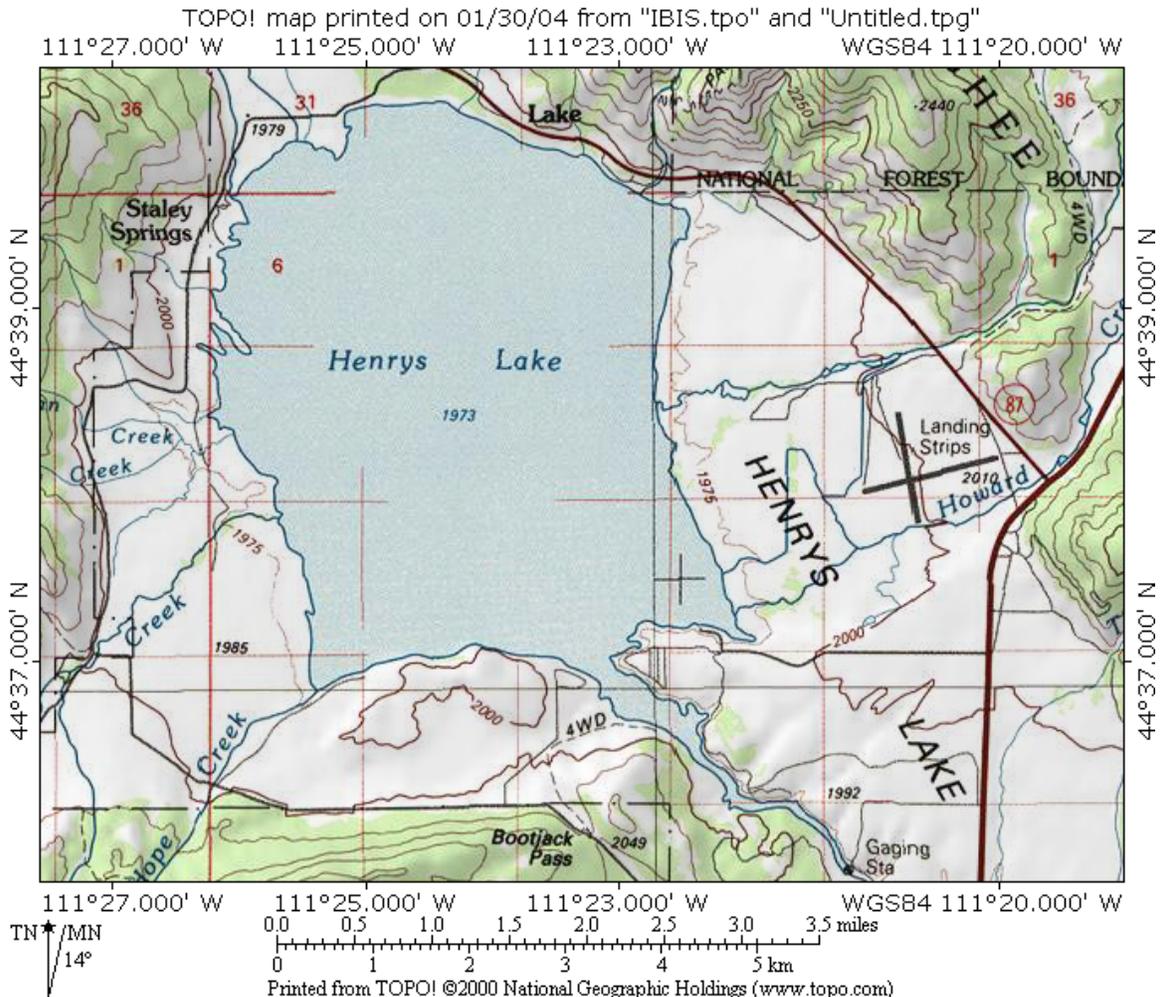
Contact:

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51-21. HENRYS LAKE



Boundaries and ownership:

Boundaries: North (roughly) – ID 87 and North/Northwest FR 055, south and east shoreline boundaries to mouth of Henrys Fork

Ownership: Bureau of Land Management, private

Focal species using the site and timing of use:

Nesting waterfowl (Lesser Scaup, Bufflehead, Barrow's Goldeneye, Redhead, Mallard, Cinnamon Teal, Blue-winged Teal, American Wigeon, Gadwall, Ring-necked Duck, Northern Shoveler, Canada Goose) and waterbirds (Red-necked Grebe, Pied-billed Grebe, Sandhill Crane). Other species present during the summer include waterbirds (Ring-billed Gull, California Gull, Franklin's Gull, Sora, Caspian Tern, Double-crested Cormorant, American White Pelican) and shorebirds (Wilson's Snipe, Killdeer, Wilson's Phalarope, Spotted Sandpiper, Long-billed Curlew). Migrant Common Loons, Red-breasted Mergansers, and Caspian Terns also common. Bald Eagles nest within 5 miles of the lake and use the lake during the winter.

Colonies: Great Blue Heron (on adjacent private property under conservation easement), Eared Grebe, and possibly Western Grebe

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Everything is quite visible. Nesting Red-necked Grebes best seen from bay at south side of Bill Frome County Park. A dirt road along the west side of the lake provides excellent observation areas.

Conservation issues:

- Recreational use (boaters and fisherman – no water skiing).
- Illegal take of fish eating species, mainly pelicans and cormorants.
- Loss of shoreline habitat due to development.

Conservation measures taken, in progress, or proposed:

- TNC is currently working on conservation easements to protect grizzly bear foraging and corridor habitat that surrounds the lake, including the Henry's Lake outlet and Targhee creek areas. The protection of these areas would decrease the loss of shoreline and wetland habitat for all species.

Past and current surveys:

- Possibly some private surveys from residents along the lake.
- Teton Regional Land Trust intends to conduct a Great Blue Heron nestling count in Spring 2004

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe may be necessary for access.
- b. Census for waterfowl and other waterbirds on the open water from the shoreline or motor boat.
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- d. Systematic sampling, probably including the use of playback calls, for secretive marshbirds. There is not a lot of appropriate habitat at this location, so special surveys for marshbirds may not be a priority.
- e. Census for gulls and terns during waterfowl surveys

Selection bias: N/A

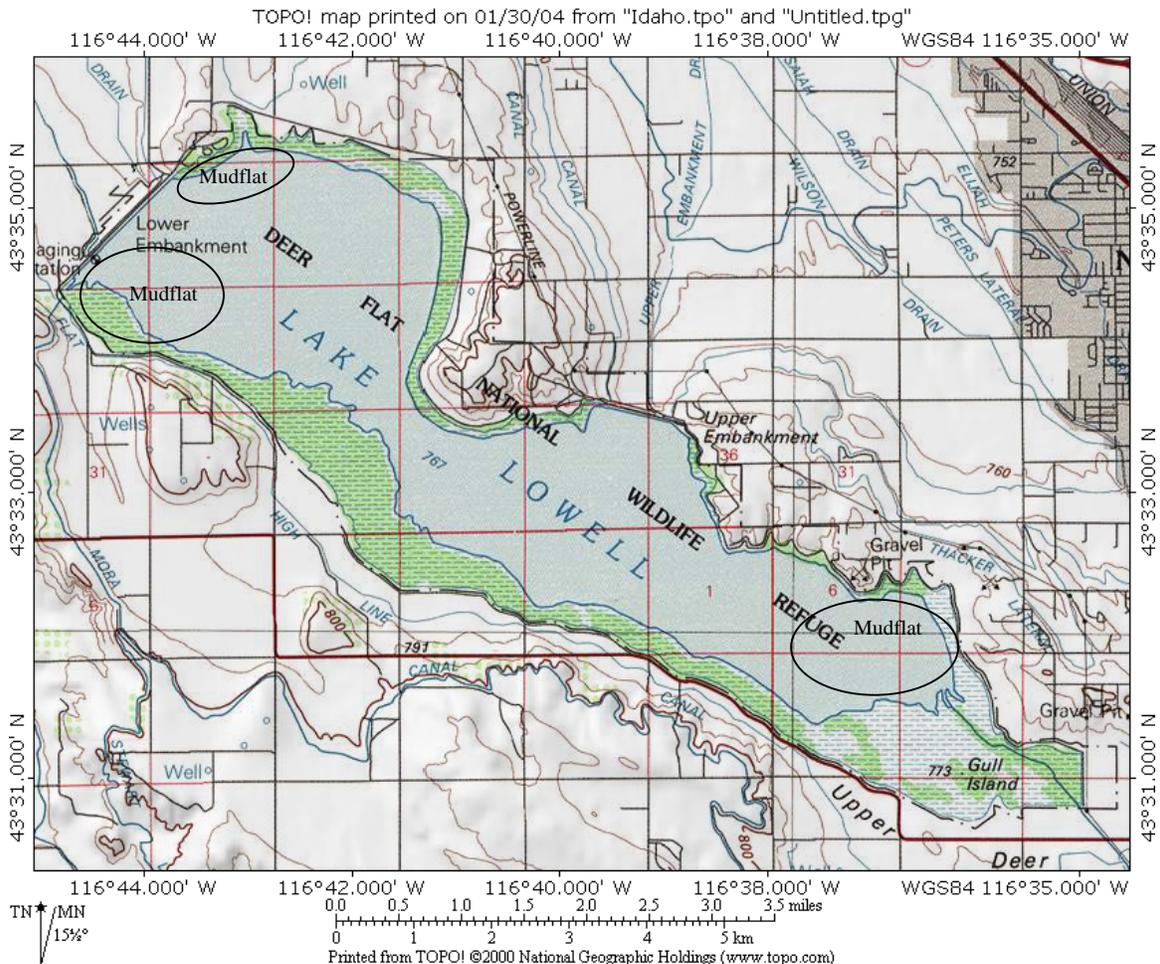
Measurement error and bias: N/A

Needed pilot studies: None may be needed, although may be useful in determining places/times to survey different groups of birds.

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51-22. LAKE LOWELL (IBA)



Boundaries and ownership:

Boundaries: This site encompasses Lake Lowell and the surrounding shoreline inside Deer Flat National Wildlife Refuge. Habitats include open water in the middle of the lake and marsh along the sides of the lake. Open mudflats are found primarily at the SE end of the lake and the NW lower embankment when the lake water level is low.

Ownership: U.S. Bureau of Reclamation (lake itself – controls water level), U.S. Fish and Wildlife Service (surrounding land and manages surface uses of lake)

Focal species:

Shorebirds (Pectoral, Least, Baird's, Solitary, Spotted, and Stilt Sandpipers, Marbled Godwit, Long-billed Dowitcher) in late summer and fall. The Intermountain West Regional Shorebird Plan names this as one of only 2 sites (other is American Falls Reservoir) in Idaho with greater than 5000 shorebirds in more than half years surveyed (Peak = 10,000-20,000). Wintering and nesting Bald Eagle populations. Exceptional numbers of waterfowl during migration and winter (especially Canada Goose and Mallard). Nesting geese and shorebirds (American Avocet, Black-necked Stilt, Spotted Sandpiper). Gulls, terns, Black-crowned Night Herons, Double-crested Cormorants, and American White Pelicans present during

summer, but probably not nesting (gulls, herons and cormorants have bred here in the past, but not during the last few years).

Colonies: Western Grebe, Clark's Grebe, Great Blue Heron

Location of Type 1 and Type 2 habitat: Location of birds varies with the water level and season.

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge, except during very low water	none
waterfowl	open water, emergent vegetation, edges during breeding season	none
shorebirds	exposed mudflats at SE tip & at NW lower embankment (also NE) during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to Type 1 and Type 2 habitat and visibility of the birds: Open water can be accessed by boat and marshes can be accessed by canoe. Lake is too large to survey entirely by canoe. There are seven access points from the roads and there is a patrol road along the SE side of the Lake. Shoreline sites are accessible (mostly) to the general public; boat access is open after 15 April. Visibility is good for open water or exposed mudflat counts by boat or from access points. Visibility is poorer in emergent vegetation, particularly late spring/summer, but can be improved by using a canoe for access.

Conservation issues:

- Highly fluctuating water levels, and no minimum conservation pool for nesting birds.
- Introduced plants or animals
- Over-extraction of groundwater
- Recreational development/overuse resulting in disturbance of birds
- Drought
- Potentially problem with contaminants

Conservation measures taken, in progress, or proposed:

None in progress or proposed at this time.

Past and current surveys:

- Refuge staff conduct mid-winter waterfowl counts by small plane.
- Idaho Bird Observatory conducts Bald Eagle nesting surveys (mean = 2 nests/year) and colony counts for Great Blue Herons (mean = 20-25 nests/year) and grebes. IBO does not intend to continue monitoring herons and grebes in 2004.
- Christmas Bird Count conducted annually

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. A canoe is necessary for access. Surveys will be hard to standardize as timing of grebe nesting is highly dependent on water levels and growth of emergent vegetation (could range from May to July).
- b. Colony counts for nesting Great Blue Herons.
- c. Census for waterfowl on the open water using a boat. Winter counts by plane may be the only really feasible method.

- d. Area searches for migrating shorebirds from observation points near Type 1 habitat. August and September are the most important months for shorebirds, although this is dependent upon water levels.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds using a canoe to access marshes. May also be able to conduct surveys from the shoreline
- f. Census for gulls and terns during waterfowl counts

Selection bias: Not applicable unless a systematic sampling approach is taken for the secretive marshbirds. However, access to the South side (where most birds are) and east side is very difficult, especially at higher water levels.

Measurement error and bias:

- a. Error and bias are negligible for nest searches and colony counts. However, detecting/counting grebes can be difficult.
- b. Error and bias are probably negligible for area searches for migrating shorebirds, although this needs field verification. However, identification skills and abundance estimation may be a problem.
- c. Error and bias are negligible for waterfowl counts in late summer or winter, but could be relatively high during the breeding season because of cryptic nesting birds
- d. Error and bias are unknown for secretive marshbirds.
- e. Error and bias are negligible for gulls and terns if a census is possible.

Needed pilot studies:

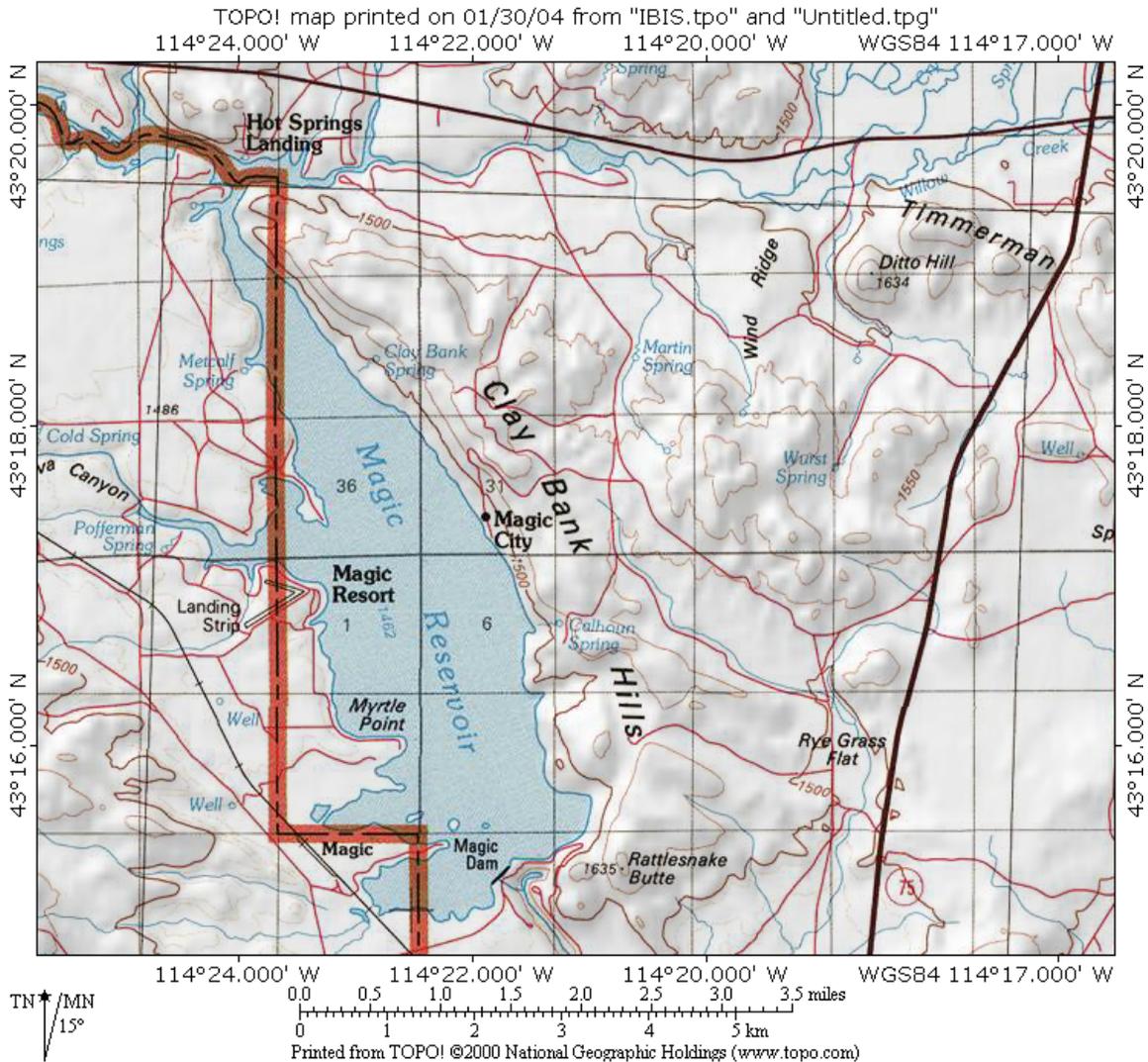
Few needed. This is a good site to test protocols for groups of species. A site visit is recommended to assess the error associated with making counts from observation points for migrating shorebirds.

Contact:

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or Refuge Manager, 208-467-9278

51-23. MAGIC RESERVOIR (IBA)



Boundaries and ownership:

Boundaries: Historical shoreline of the reservoir (includes numerous acres that have been dry in recent years, but support breeding colonies of gulls, waterfowl, and shorebirds).

Ownership: Bureau of Land Management, Private

Focal species using the site and timing of use:

During the breeding season, waterfowl (Canada Goose, Mallard, Common Merganser), waterbirds (Great Blue Heron, California Gull, Ring-billed Gull, Caspian Tern), and shorebirds (Killdeer, American Avocet, Long-billed Curlew, Spotted Sandpiper, Willet) nest here. Common Loon, Western and Clark's Grebes are also seen during the summer, but are not known to breed.

During migration, greater than 2,000 waterfowl (Trumpeter and Tundra Swan, Canada Goose, Ross' Goose, Mallard, Gadwall, Northern Pintail, American Wigeon, Northern Shoveler, Cinnamon Teal, Blue-winged Teal, Green-winged Teal, Canvasback, Redhead, Ring-necked Duck, Lesser Scaup, Surf and White-winged Scoter, Common and Barrow's Goldeneye, Bufflehead, Hooded Merganser, Common

Merganser, Red-breasted Merganser, Ruddy Duck), numerous waterbirds (Common Loon, Yellow-billed and Pacific Loons, Horned Grebe, Red-necked Grebe, Eared Grebe, Pied-billed Grebe, Western Grebe, Clark's Grebe, Double-crested Cormorant, Great Blue Heron, Great Egret, Black-crowned Night-Heron, Sandhill Crane, White-faced Ibis, American Coot, California and Ring-billed Gull, Black Tern, Bonaparte's Gull, Forster's Tern, Caspian Tern), and approximately 100+ shorebirds (Killdeer, American Avocet, Black-necked Stilt, Greater and Lesser Yellowlegs, Willet, Spotted Sandpiper, Long-billed Curlew, Western Sandpiper, Least Sandpiper, Long-billed Dowitcher, Wilson's Snipe, Wilson's and Red-Necked Phalarope) are here.

During the winter months, only Canada Geese and Mallards remain on the reservoir.

Colonies: California Gull, Ring-billed Gull, Caspian Tern (~2,000 pairs total)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water	none
large waders	shallow shoreline water, emerging mudflats	rest of shoreline
waterfowl	open water, edges during breeding season	none
shorebirds	emerging mudflats and sand loams around entire reservoir during breeding/summer season, mudflats at NW and NE used regularly during spring/fall migration	rest of shoreline
gulls and terns	breeding colonies on southwest end, sandy loams during Sphinx moth hatching, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Reservoir is open to the public and is easily accessed from the west side of the reservoir either by vehicle, foot, or by boat (late spring/summer). Birds can be viewed from several places along the northwest end of the reservoir, all along the west side (vehicle may be driven the entire length), and on the sandy loam of the west side. The south end of the reservoir can be viewed easily from the dam. An observer should be able to survey the entire reservoir from the west side, although there are a few viewing areas on the northeast side if necessary. Shorebirds are best observed in late summer and early fall on both sides of north end of the reservoir as the mud flats grow larger. A scope is necessary for most of the reservoir, although birds close to the edge may be seen with binoculars. Visibility is very good for all species throughout the reservoir.

Conservation issues:

- Drought issues are a problem.
- Recreational off-road use is potentially a serious problem, particularly for ground-nesting species on the sandy loam areas.
- Construction of roads on adjacent private land for housing development poses a potential threat to nesting Long-billed Curlews, and other ground-nesting birds.

Conservation measures taken, in progress, or proposed:

None at this time

Past and current surveys:

Caspian Tern banding by Al Larson

Potential survey methods

Description:

- a. Colony counts for nesting California Gull, Ring-billed Gull, and Caspian Tern. Complete counts are possible, walking transects with 5-6 observers.
- b. Census for waterfowl and other waterbirds on the open water by boat would be most accurate/effective. Census could also be done from shoreline with scopes. If surveys are conducted for early spring migrants (Feb-March), a snowmobile would be necessary.
- c. Nest searches for ground-nesting shorebirds and waterfowl on the sandy loams adjacent to the reservoir.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.

Selection bias: N/A – the entire reservoir is visible and accessible.

Measurement error and bias: Observer error and bias is a potential issue, as identification of shorebirds can be difficult and identification skills likely will improve over time.

Needed pilot studies: None needed.

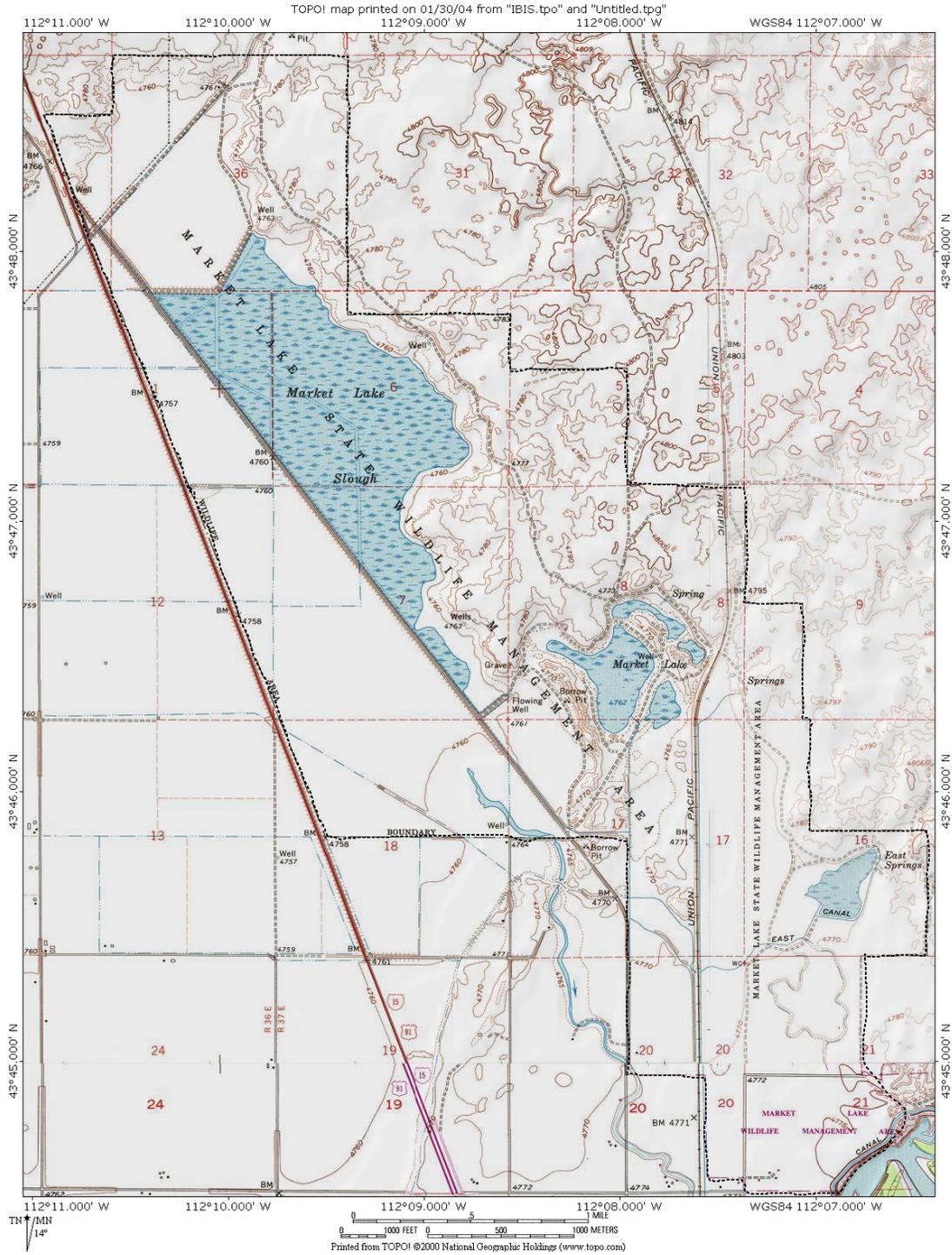
Contact:

NAME: Jon Curd – Golden Eagle Audubon Society/BLM
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OR

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51-24. MARKET LAKE WILDLIFE MANAGEMENT AREA (WMA/IBA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked

Ownership: Idaho Department of Fish and Game

Focal species using the site and timing of use:

During summer, many waterfowl (Lesser Scaup, Redhead, Green-winged Teal, Cinnamon Teal, Blue-winged Teal, Gadwall, Mallard, American Wigeon), waterbirds (American Bittern, Virginia Rail, Sora, Caspian Tern, American Coot, Western Grebe, Clark’s Grebe, Pied-billed Grebe, California Gull) and shorebirds (Black-necked Stilt, American Avocet, Willet) are present. Also has nesting Northern Harriers, Long-billed Curlews, Black Terns and Yellow-headed Blackbirds. Spring staging area for 50,000-150,000 ducks, 400 Canada Geese, 40,000 Snow Geese, 1,000 Tundra Swans, and 150 shorebirds (Red-necked Phalarope; Intermountain West Regional Shorebird Plan lists Market Lake WMA as a shorebird site). There is a Peregrine Falcon hack/nesting tower on the WMA. Fall staging area for 50 American White Pelicans and shorebirds (Black-bellied Plover, American Golden-plover).

Colonies: Eared Grebe, Black-crowned Night Heron (25 birds), Snowy Egret (30 birds), Great Egret, Cattle Egret, White-faced Ibis (500-1000 birds), Ring-billed Gull, Franklin’s Gull (800-1200 birds), Forster’s Tern

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Quite a few roads traverse the WMA, so have good vantage points from the roads. Some are open to the public year-round, while others would require permission from the WMA manager during the nesting season. Colonial species, such as Franklin’s Gull and White-faced Ibis, are not very visible from the roads. Would need a boat to access the colony areas.

Conservation issues:

- Noxious weed species are present, including Canada thistle, Musk thistle, Russian knapweed, field bindweed, and whitetop.
- The water output of springs is 25% that of the output in the 1970’s.
- Potential predator problems
- Recurring deaths of waterfowl and gulls during breeding season in one marsh impoundment. Cause has yet to be determined.

Conservation measures taken, in progress, or proposed:

- Biological, mechanical, and chemical methods are used to control and eliminate noxious weeds.
- Currently investigating the potential to purchase water in reservoir system for use in the marshes.
- Predator control measures have been taken in the past.

Past and current surveys:

- No standard surveys since 1993 when colonial waterbird survey was conducted by Chuck Trost.
- Waterfowl nesting surveys are conducted when feasible.

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies from a canoe if water levels are high. Could also be done with chest waders.
- b. Colony counts for nesting herons, egrets, ibis, gulls, and terns. Canoe or airboat is necessary for access. Airboat creates a lot of disturbance and therefore may not be an ideal method. Canoe should work well.
- c. Census for waterfowl on the open water by aerial surveys. Difficult to census from land, as area is flat with little elevated observation points. If hack tower is not being used by birds, observations could potentially be made from there.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds. Points may be established along dike access roads quite easily.
- f. Census for gulls and terns during waterfowl counts

Selection bias: Access to some areas may be a problem because of varying water levels, as well as emergent vegetation

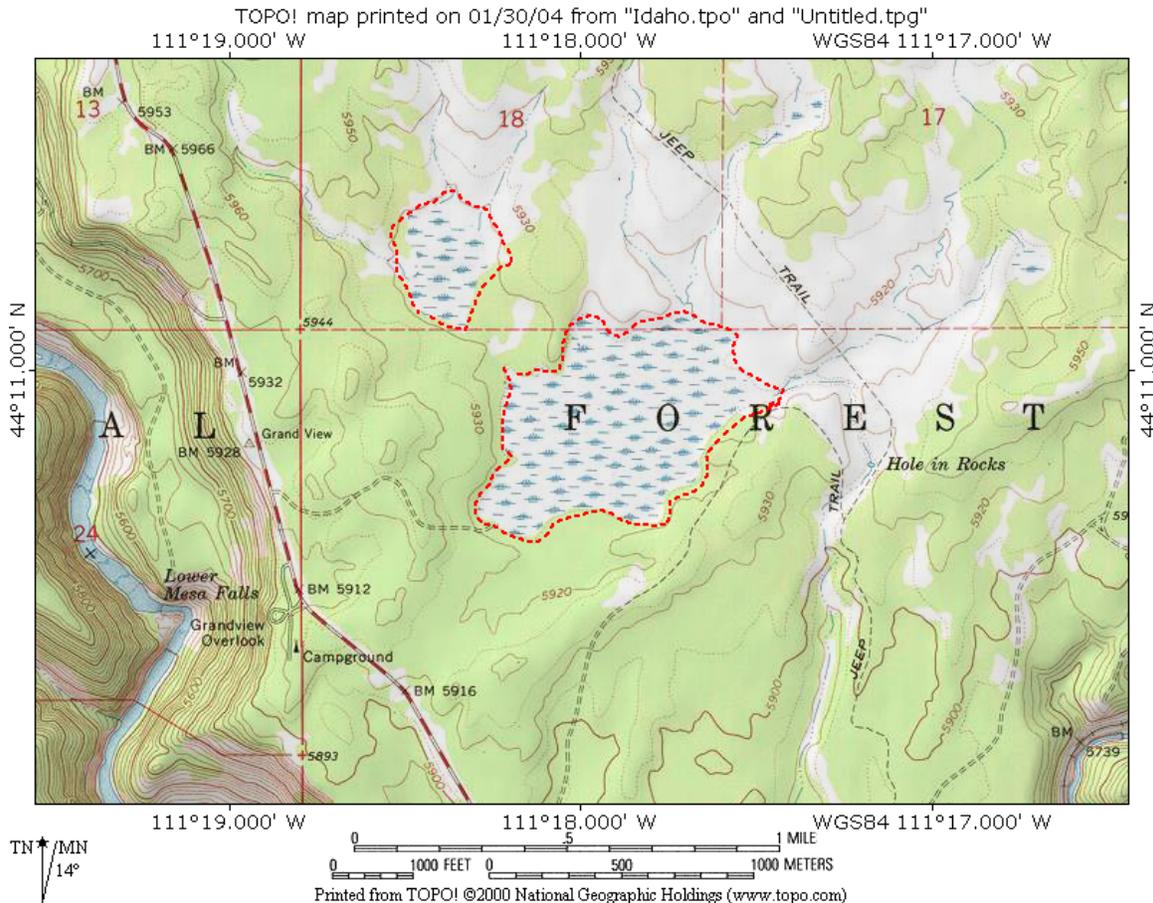
Measurement error and bias: Emergent vegetation may be an issue.

Needed pilot studies: None may be needed.

Contact:

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51-25. MESA MARSH (IBA)



Boundaries and ownership:

Boundaries: Flat marsh located directly east of Highway 47 from Mesa Falls. Approximately 0.25-0.5 miles over land to marsh.

Ownership: USDA Forest Service

Focal species using the site and timing of use:

Breeding waterfowl (Trumpeter Swan, Canada Goose, Northern Pintail, Blue-winged Teal, Cinnamon Teal, American Wigeon, Northern Shoveler, Ring-necked Duck, Common Merganser, Ruddy Duck), waterbirds (Sandhill Crane, Eared Grebe, Sora, Black Tern) and Bald Eagles can be found at this site. Staging area, particularly in spring, for Sandhill Cranes. Common Loons, American Avocets, and Wilson's Phalaropes can be found during migration.

Colonies: Western Grebe, Great Blue Heron

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation	none
large waders	breeding colonies in small ponds adjacent to marsh and on marsh island, emergent vegetation	rest of shoreline

secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Area is easily accessed, and birds are visible from the shoreline. Birds can be viewed from upland areas along shoreline, which is raised above the marsh, and from the small dam. Access by boat shouldn't be necessary, and likely wouldn't aid in detecting birds. Surveys early in the season, and early in the day, are probably best as lily pads in the marsh make visibility a little difficult later in the season/day.

Conservation issues:

- In extreme dry years, grazing may have negative impact on marsh vegetation, and increase disturbance to birds, however grazing does help keep the vegetation vigorous.
- Past timber harvest has impacted tree nesting habitat and wildlife security around the marsh.
- Waterfowl hunting occurs while there are sensitive species using the marsh.

Conservation measures taken, in progress, or proposed:

- Roads have been closed leading into the marsh.
- The location of the marsh is not advertised nor promoted.

Past and current surveys:

- Trumpeter Swan surveys – (Trumpeter Swan Society)
- Monitoring has been conducted in the past – check with current Ashton Ranger District Biologist for details

Potential survey methods

Description:

- Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies from shoreline.
- Colony counts for nesting Great Blue Herons.
- Census for waterfowl on the open water from the shoreline.*
- Area searches for migrating shorebirds from observation points near Type 1 habitat.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds. This can be done from the shoreline.
- Census for gulls and terns during waterfowl counts.

Selection bias: N/A

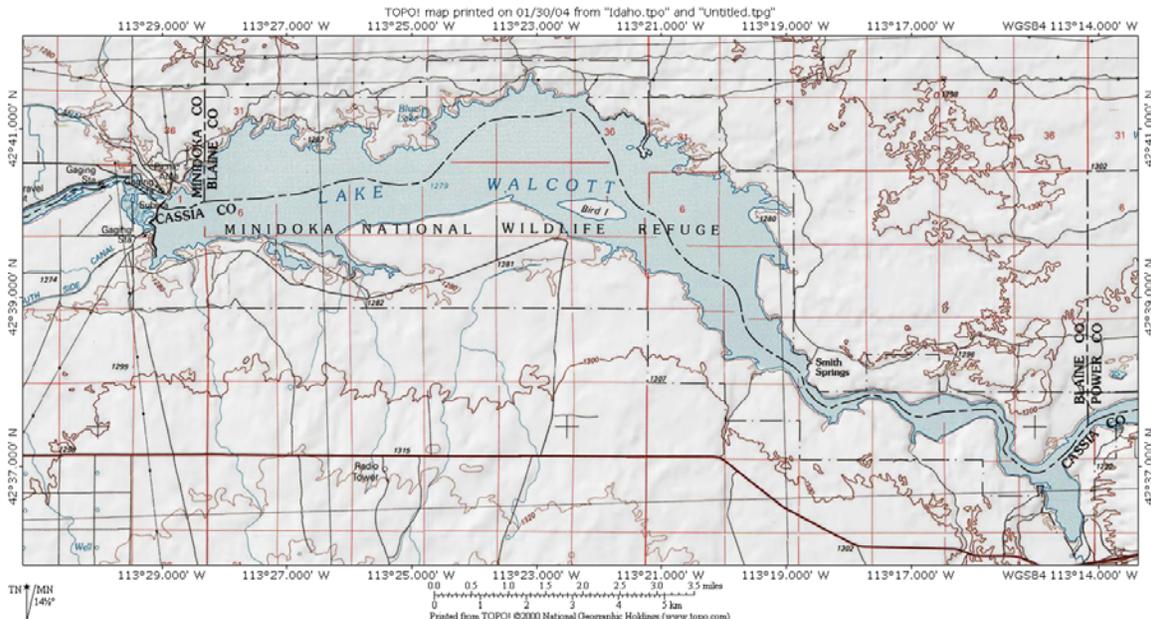
Measurement error and bias: Vegetation may be an issue, depending on when surveys are conducted. Overall should not be a problem.

Needed pilot studies: None needed

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51-26. MINIDOKA NATIONAL WILDLIFE REFUGE (IBA)



Boundaries and ownership:

Boundaries: The refuge covers 19 miles on both side of Lake Walcott

Ownership: U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, Idaho Department of Public Lands, and Idaho Department of Parks and Recreation operates a state park on the refuge.

Focal species using the site and timing of use:

Nesting species (not including colonial species listed below) include waterfowl (Mallard, Gadwall, Northern Shoveler, American Wigeon, Ring-necked Duck, Redhead, Green-winged Teal, Cinnamon Teal, Blue-winged Teal, Common Goldeneye, Canada Geese, among others), waterbirds (Pied-billed Grebe, American Bittern, Sora, American Coot), and shorebirds (Long-billed Curlew, Willet, Spotted Sandpiper, Killdeer, American Avocet, Wilson's Snipe). Thousands of molting ducks (as high as 100,000) in late summer and fall. In the fall and spring, big loafing flocks of gulls are present, mainly Ring-billed Gulls and Franklin's Gulls (can have 10,000), some shorebirds, and several Trumpeter Swans and Common Loons. Also considered a migratory shorebird site by the Intermountain West Regional Shorebird Plan. Bald Eagles found here in the winter.

Colonies:

South Shore - American White Pelican (500-600 pairs), Snowy Egret (10-20), Cattle Egret, Black-crowned Night Heron (20-30), California Gull (600-700), Great Blue Heron (<30 pairs), Double-crested Cormorant (600-700 pairs), Caspian Tern

Tule Island - Western and Clark's Grebes (about 2:1 ratio; 200-400 nests total). Similar number of nests a couple miles upriver (Bonanza bar colony)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none

waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds: All surveys must be done from the shoreline or from the air. Boat access is not permitted, as it is highly disruptive to the nesting birds. Colonial nesters can be seen and surveyed from the shore, although not all of the colony can be seen. Gull flocks in spring and fall come into the area after dark and leave early, and are far away, which makes species determination difficult.

Conservation issues:

- Introduced annual and perennial plants. Especially grasses, which have lowered natural plant diversity and consequently affected (reduced) animal diversity.
- An increased fire frequency due to introduced cheatgrass.
- Past grazing has reduced the native riparian trees and shrubs.
- Potential disturbance to nesting/molting birds if boating area is expanded.

Conservation measures taken, in progress, or proposed:

- Grazing discontinued in 1995 on most of refuge.
- Native grasses planted after wildfires, where possible.
- Lake is zoned to keep boats away from nesting colonies and waterfowl molting areas.
- Unfenced areas are being fenced to prevent grazing from trespassing livestock.
- Working with BLM to develop stock watering areas off the refuge.

Past and current surveys:

- Aerial surveys for waterfowl are conducted 2-3 times each summer and fall depending on funding. Many years no surveys are done. Currently waterbird surveys are conducted once a month for several sections of the refuge
- Colony counts for herons, egrets, gulls, terns, pelicans, and cormorants are conducted ever 2-3 weeks throughout breeding season by Mike Fisher.
- Point counts have been conducted in the past, but have not been run since 2001. Counts were run on foot, and vegetation transects are present at each point count site.
- Bald Eagle nest monitored by IDFG and refuge staff.

Potential survey methods

Description:

- Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Grebe colony east of the island can be counted from observation points on a hill adjacent to the highway.
- Colony counts for nesting herons, egrets, gulls, pelicans, terns, and Double Crested Cormorants from the shoreline. This is likely not a complete nest count, but is standardized. Overflights may be necessary to get colony sizes, but ground-based might work later in summer.
- Census for waterfowl on the open water from shoreline when possible; otherwise, aerial surveys are recommended (particularly during molting period when ducks are in the eastern end of the refuge).
- Area searches for migrating shorebirds from observation points near Type 1 habitat. However, there is very little mud flat habitat available on a regular basis, so shorebird surveys may not be warranted.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- Census of spring and fall gull concentrations from the ground. Birds move on and off the refuge roost sites in deep, open water far from shore during early morning and late evening. May not be possible to get a good species breakdown

Selection bias: Although all colonial birds can be counted from shore, only part of the colony can be seen. Boat surveys are too disruptive and are therefore not permissible. Aerial photographs of the colonies may reduce this selection bias.

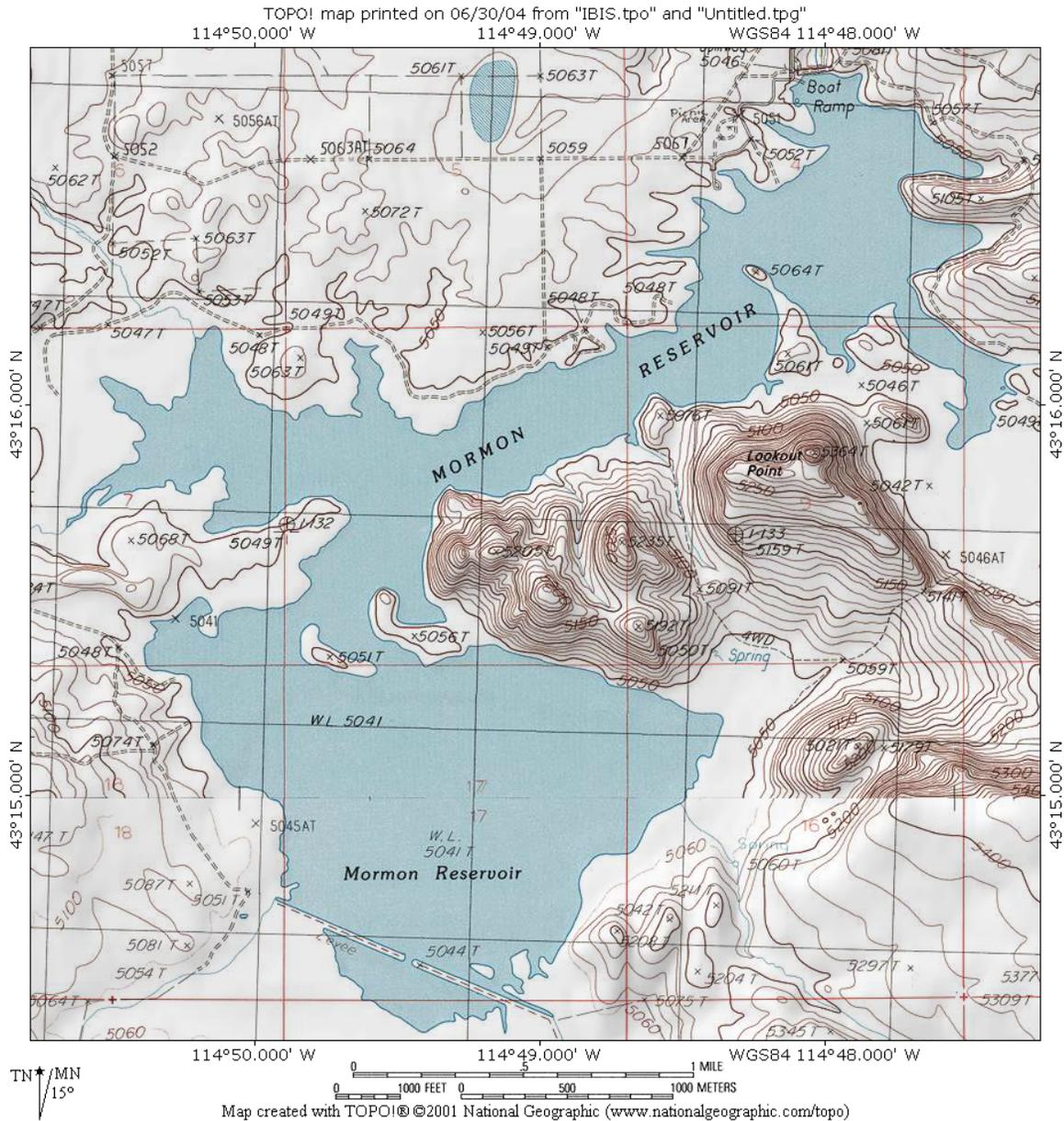
Measurement error and bias: Gull species during migration seasons may be hard to discern for reasons mentioned above under survey methods.

Needed pilot studies: Because surveys have been conducted in the past, no pilot studies may be necessary.

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51-27. MORMON RESERVOIR



Boundaries and ownership:

Boundaries: Shoreline of reservoir

Ownership: Bureau of Land Management, Idaho Department of Fish and Game, Private

Focal species using the site and timing of use:

Numerous waterfowl, waterbirds (California Gull, Ring-billed Gull), and shorebirds (American Avocet, Black-necked Stilt, Willet, Killdeer, Spotted Sandpiper) present during the spring/summer months.

Colonies: California and Ring-billed Gull (3,000+ nests historically)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & shoreline	none
large waders	shoreline	none
waterfowl	open water, edges during breeding season	none
shorebirds	shallow water in south end of reservoir	rest of shoreline
gulls	breeding colonies in SW arm of reservoir	all areas

Access to the type 1 and 2 habitat and visibility of the birds:

Sportsman's access available at northern end of reservoir. Boat would be necessary to survey birds if accessing reservoir from the north end. Most birds are congregated in southern end of reservoir. South end is accessible by unimproved roads through private and BLM property. Gull colony is not surrounded by water, so access to the colony is excellent, and visibility of the reservoir is good.

Conservation issues:

- Predation may be a problem on the gull colony, as the island is no longer surrounded by water, presumably a result of drought
- Drought may be a serious problem

Conservation measures taken, in progress, or proposed:

- None known at this time

Past and current surveys:

- Gull colony survey by Chuck Trost in the past

Potential survey methods

Description:

- a. Colony counts for nesting California and Ring-billed Gulls.
- b. Census for waterfowl and other waterbirds on the open water from the shoreline and/or from a boat.
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat.

Selection bias: N/A

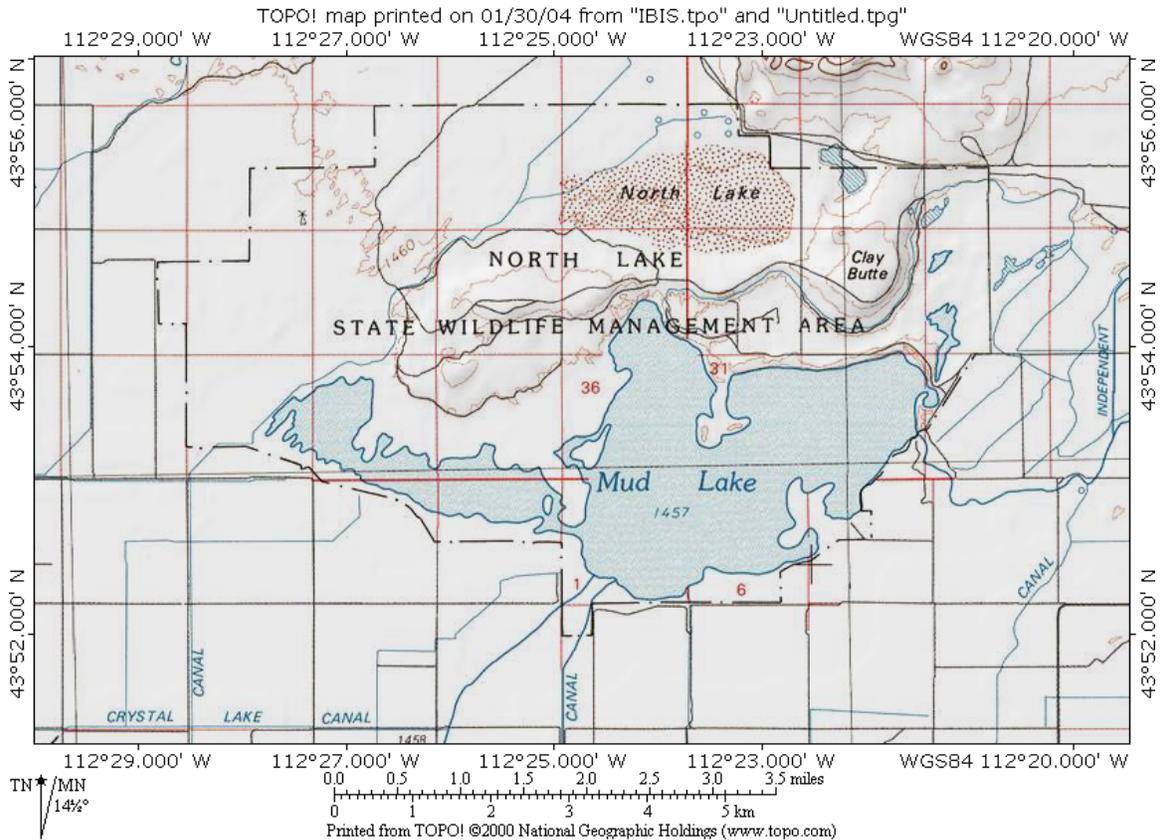
Measurement error and bias: N/A

Needed pilot studies: None needed

Contact:

NAME:
ADDRESS:
PHONE:
FAX:
EMAIL:

51-28. MUD LAKE WILDLIFE MANAGEMENT AREA (WMA/IBA)



Boundaries and ownership:

Boundaries: Boundaries are marked, but some are not very obvious

Ownership: Idaho Department of Fish and Game; one portion leased from Idaho Department of Lands

Focal species using the site and timing of use:

Mud Lake produces 1000's of waterfowl (Canada Goose, Mallard, Northern Pintail, Gadwall, Northern Shoveler, American Wigeon, Cinnamon Teal, Ruddy Duck), waterbirds (Pied-billed Grebe, American Coot, American Bittern, Sandhill Crane, Black Tern, Forster's Tern, plus colonial nesters listed below), shorebirds (Killdeer, Wilson's Snipe, Long-billed Curlew, Willet, American Avocet, Black-necked Stilt, Wilson's Phalarope) and gulls (California, Ring-billed) every year and provides habitat for up to 160,000 migrating waterfowl (list of breeding waterfowl plus Snow Goose, Tundra and Trumpeter Swans) and waterbirds (Common Loon). Nesting pair of Peregrine Falcons are on site, and American White Pelicans can be observed spring through fall. Also considered a migratory shorebird site by the Intermountain West Regional Shorebird Plan.

Colonies: Eared Grebe, Western Grebe, Clark's Grebe, Double-crested Cormorant (70+ nests), Great Blue Heron, Black-crowned Night Heron, Snowy Egret, Great Egret, Cattle Egret, White-faced Ibis (400+ pairs), Franklin's Gull (600 birds)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Multiple roads around impoundments, which provide good viewing access on the east side of the lake. Spotting scope will be necessary for much of the area. Will need to use a boat (canoe, small boat, airboat) to survey some areas, particularly for the west side of the lake, but there are boat ramps available. Cormorant colony and Franklin's Gull colony are very visibly from shoreline roads.

Conservation issues:

- Serious infestation of Russian knapweed on the WMA
- Increasing public use of the WMA and demands for additional/different recreational activities could increase disturbance to the birds.
- Minor overgrazing/over-browsing were issues
- Predation is a potential problem

Conservation measures taken, in progress, or proposed:

- Grazing is no longer allowed on the WMA, although a small amount of trespass grazing occurs each year
- IDFG has been trying to control the knapweed problem. Some areas have been burned, mowed, and treated with herbicides. Some areas have been reseeded in an attempt to reclaim treated areas.
- Mud Lake WMA Management Plan
- Predator control measures have been taken in the past.

Past and current surveys:

- Nest searches and brood counts for waterfowl have been conducted the last 2 out of 3 years
- Ibis and gull colonies have been surveyed in the past

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies, using a canoe for access.
- b. Colony counts for nesting herons, egrets, Franklin's Gulls, and Double Crested Cormorants. Some survey work can be done from shoreline, others may require a canoe.
- c. Census for waterfowl on the open water using a boat. Some observation can be done from the shoreline as well. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds. A canoe or small boat is necessary for access.
- f. Census for gulls and terns during waterfowl counts

Selection bias: N/A

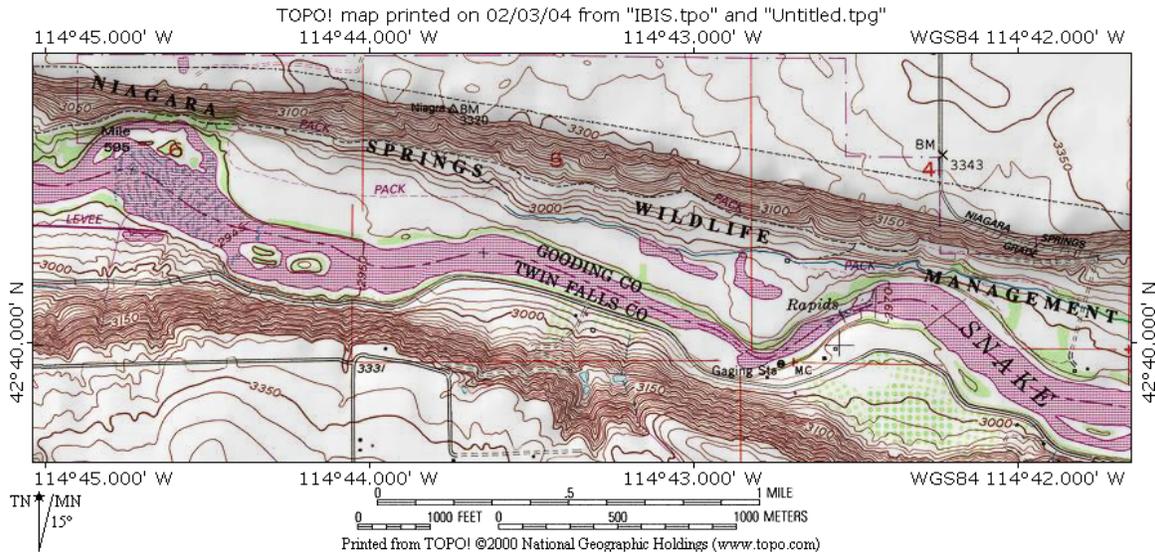
Measurement error and bias: No issues known at this time.

Needed pilot studies: None may be needed.

Contact:

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51-29. NIAGARA SPRINGS WILDLIFE MANAGEMENT AREA (WMA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked.

Ownership: Idaho Department of Fish & Game, Idaho Department of Parks and Recreation

Focal species using the site and timing of use:

Primarily waterfowl, both during breeding and wintering seasons. Wintering species include waterbirds (Black-crowned Night Heron, Double-crested Cormorant) and waterfowl (Canada Goose, American Wigeon, Mallard, Lesser Scaup, Ring-necked Duck, Bufflehead, Redhead, Common and Barrow's Goldeneye). Other waterbirds (American Bittern, Great Blue Heron, Cattle Egret, Snowy Egret, White-faced Ibis, Sandhill Crane, American White Pelican, Virginia Rail, Sora, and Caspian Tern) and shorebirds (Killdeer, Long-billed Curlew, Willet, Wilson's Snipe) can also be found here during the breeding season. Waterfowl and shorebirds (Marbled Godwit, Greater and Lesser Yellowlegs, Spotted Sandpiper, Long-billed Dowitcher, Western Sandpiper, Baird's Sandpiper, and others) are found here during migration.

Location of type 1 and 2 habitat within the site: Some ponds on the west end are seasonal. They are dependent upon irrigation runoff, which generally occurs from about mid April to mid October.

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation, irrigation ditch, and 4 miles of Snake River shoreline	none
large waders	open water/emergent vegetation	rest of shoreline
secretive marshbirds	water's edge along creek and ponds	none
waterfowl	open water, edges during breeding season	none
shorebirds	pond shorelines and shallow portions of ponds	rest of shoreline
gulls and terns	along Snake River	none

Access to the type 1 and 2 habitat and visibility of the birds:

This site is open to the public and easily accessed. Ponds can be surveyed from shoreline, but Snake River portions may be better surveyed by boat.

Conservation issues:

- Invasion by purple loosestrife.

Conservation measures taken, in progress, or proposed:

- IDFG has initiated a bio-control program (beetles) to reduce the loosestrife.

Past and current surveys:

- Waterfowl surveys (USFWS-style) have been conducted here for many years
- Have an unofficial species list which includes additional species not listed in "focal species" section of this description.

Potential survey methods*Description:*

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe may be necessary.
- b. Census for waterfowl on the open water using a boat for Snake River portions, and view from shoreline for ponds.
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: N/A

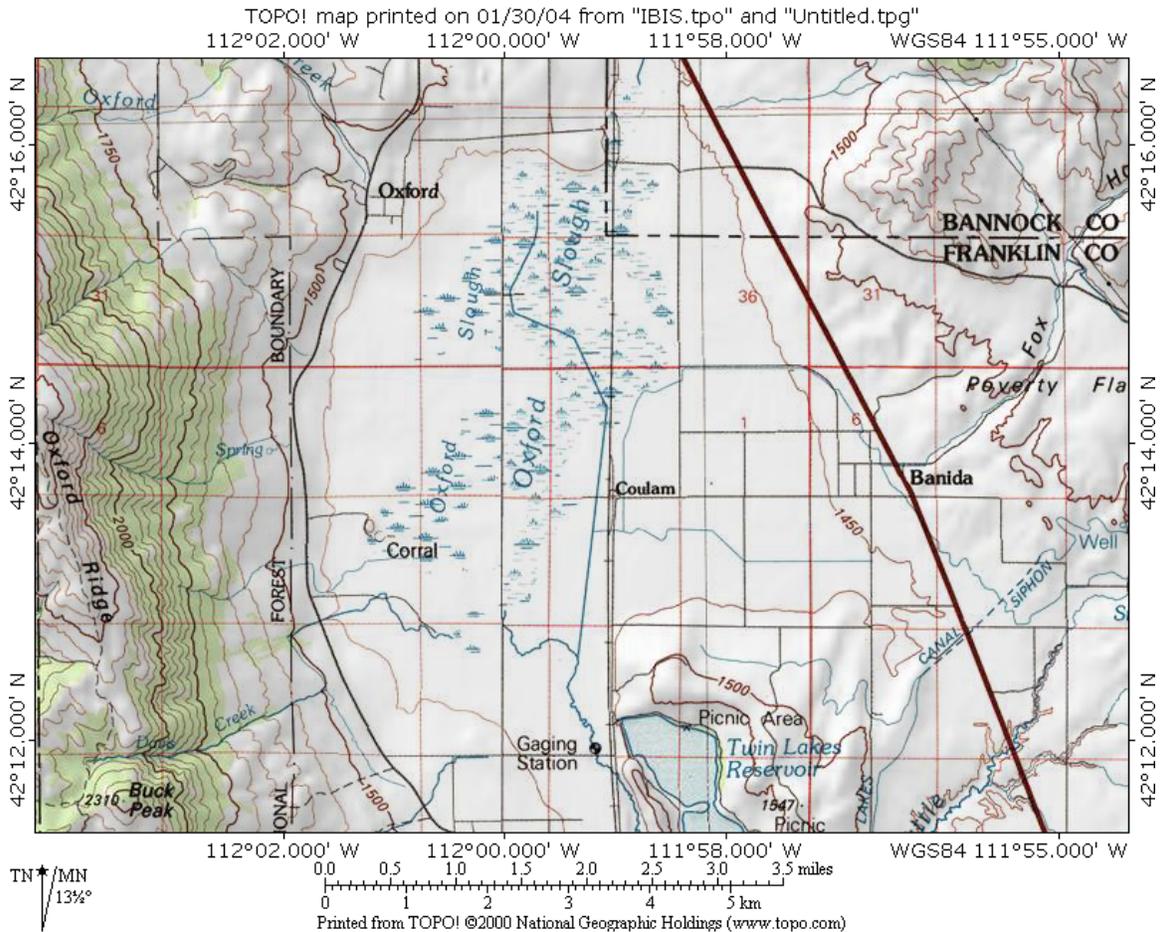
Measurement error and bias: It would be best to use a skilled birder or birders. Waterbird density along the Snake would most likely be difficult to assess.

Needed pilot studies: None needed

Contact:

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51-30. OXFORD SLOUGH (IBA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked with signs.

Ownership: U.S. Fish and Wildlife Service; Cooperative farmer farms and has the area

Focal species using the site and timing of use:

Nesting site for numerous waterfowl, particularly redheads. Northern Harriers and Long-billed Curlews breed in the area. Also a minor staging area for Common Loons and Sandhill Cranes (300-400 cranes may be present in the fall). Trumpeter Swans are occasionally observed. Good rail habitat.

Colonies: Eared Grebe, Great Blue Heron, Black-crowned Night Heron, Snowy Egret, Cattle Egret, White-faced Ibis, Franklin's Gull, Black Tern

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation	flooded fields
large waders	breeding colony in center of area, emergent vegetation, White-faced Ibis can be found in flooded fields	none

secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring migration	flooded fields
gulls and terns	breeding colonies, all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Interior of the marsh is accessible via a series of channels. Canoe is definitely necessary to survey this area. There is a good vantage point on the west side of the slough in the town of Oxford. Flight counts could be made from this point.

Conservation issues:

- Introduced noxious weeds.
- In 1996 someone shot about 50 Franklin’s Gulls and White-faced Ibis. The shooting did not occur during the waterfowl season or during any other hunting season.

Conservation measures taken, in progress, or proposed:

- Boundary has been fenced and signed.
- Grazing has been discontinued.
- A cooperative farming program provides short grass foraging areas for geese and cranes, tall grass areas for nesting waterfowl, and grain crops for fall staging geese and cranes.

Past and current surveys: A few surveys from road N of Slough. May be going now.

Potential survey methods

Description:

- Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe is necessary for access.
- Colony counts for nesting herons, egrets, ibis, gulls, and terns. Flight counts can be done from an observation point in town, or direct counts can be made by entering the marsh either on foot (from west side) or by canoe.
- Census for waterfowl on the open water by aerial survey. Boat may be possible, although visibility is not good for a large portion of the site.
- Area searches for migrating shorebirds from observation points on road near Type 1 habitat. Alkaline ponds attract lots of shorebirds if they are flooded in spring.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds. This will probably need to be done from a canoe.
- Census for gulls and terns during waterfowl counts

Selection bias: None if aerial surveys used.

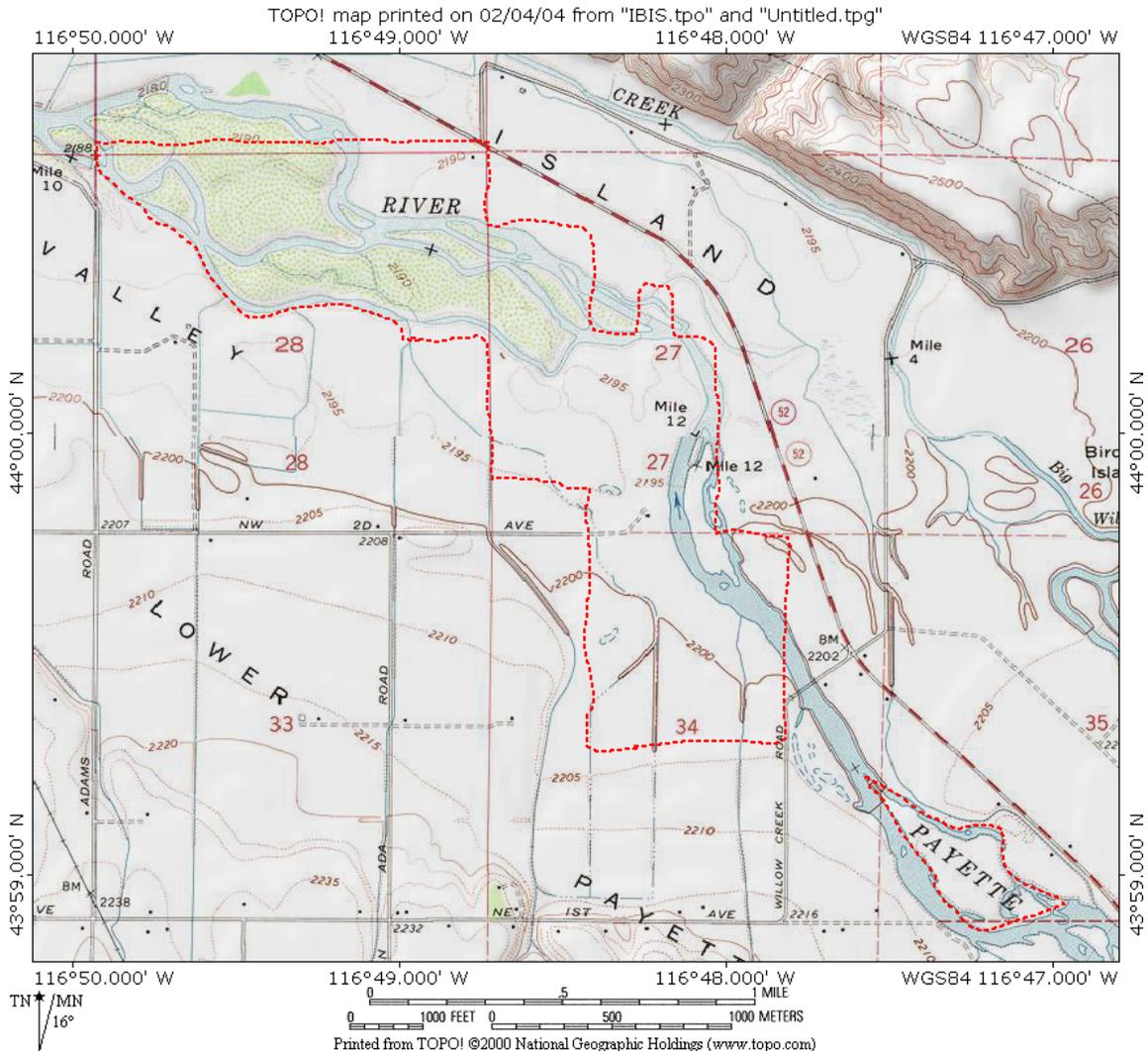
Measurement error and bias: N/A

Needed pilot studies: Aerial survey design.

Contact:

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 PHONE: 208/ 847-1757
 FAX: 208/
 EMAIL: rob_bundy@fws.gov

51-31. PAYETTE RIVER WILDLIFE MANAGEMENT AREA (WMA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked

Ownership: Idaho Department of Fish & Game

Focal species using the site and timing of use:

Waterfowl (Canada Goose, Mallard, Wood Duck, Gadwall, Northern Pintail, American Wigeon, Green-winged and Cinnamon Teal, Common Goldeneye, Lesser Scaup, Redhead) and waterbirds (Pied-billed Grebe, Virginia Rail, American Coot) use this area during the breeding season. Waterfowl (over 1,000 White-fronted Geese and other waterfowl), waterbirds (Snowy Egret, Great Blue Heron, Black-crowned Night Heron, American Bittern, American White Pelican, and others), and shorebirds (Long-billed Curlew, Semipalmated Plover, Spotted Sandpiper, Greater and Lesser Yellowlegs, Long-billed Dowitcher, Western Sandpiper, Wilson's Snipe; Intermountain West Regional Shorebird Plan lists this as shorebird site) use the area during migration. Sandhill Cranes use the area in spring. Bald Eagles are common winter residents.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Most areas are accessible to the public, with the exception of some nesting area closures. Access to nesting areas would require permission from the WMA manager. Birds in ponds can be viewed by scope or binoculars from the shoreline. The river section of the WMA would be best surveyed by small boat/canoe.

Conservation issues:

- Housing and residential development may have major impacts on the area
- Farming on nearby parcels of land is also a potential problem

Conservation measures taken, in progress, or proposed:

- Managed for waterfowl production – large numbers of Canada Goose platforms and Wood Duck boxes; one of the densest goose populations in lower 48, and one of densest Wood Duck populations in Idaho

Past and current surveys:

- Have a bird inventory list for the WMA

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Canoe may be necessary for access.
- c. Census for waterfowl on the open water by foot for pond areas and by boat for river areas. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- d. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: Some areas are closed to the public. With permission for access to these areas, there should be no selection bias.

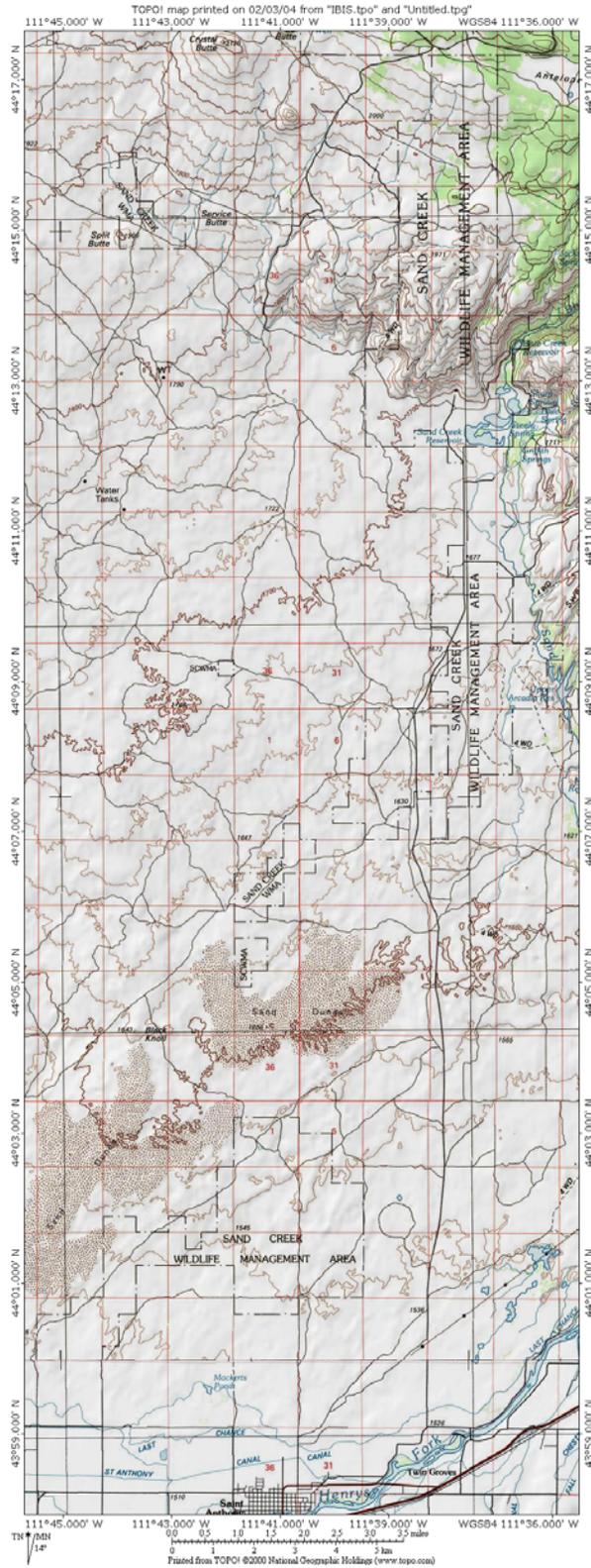
Measurement error and bias: Observer skills is a potential error/bias

Needed pilot studies: None may be needed.

Contact:

NAME: Tim Shelton - IDFG
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51-32. SAND CREEK WILDLIFE MANAGEMENT AREA (WMA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked. Sand Creek consists of two distinct parts: Sand Creek Ponds and Chester Wetlands.

Ownership: Idaho Department of Fish & Game, Bureau of Land Management, Idaho Department of Lands. Wetland areas are owned and managed solely by IDFG.

Focal species using the site and timing of use:

Breeding area for various waterfowl (including Canada Geese and Trumpeter Swans), Sandhill Cranes, and Osprey. Also attracts a variety of waterbirds (Common Loon, Western and Pied-billed Grebe, Great Blue Heron, Black-crowned Night Heron, Snowy Egret), shorebirds (Willet, Long-billed Curlew), and Bald Eagles during the summer. During migration, all the above species are present plus Common Loons and marshbirds. During the winter, waterfowl (ducks, Canada Geese, Trumpeter Swans) and Bald Eagles can be found along the river (ponds of the WMA are generally dry or frozen during winter).

Location of type 1 and 2 habitat within the site: The following information is for the Sand Creek Ponds only. This information is not available yet for Chester Wetlands, as it has been recently acquired by IDFG.

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation, riparian areas, pond outlets and inlets	rest of shoreline, upland grain fields
secretive marshbirds	cattail areas around ponds, except along dikes	none
waterfowl	open water, edges during breeding season	none
shorebirds	areas around ponds away from dikes	rest of shoreline
gulls and terns	open water areas, especially Ponds 1-4	all other areas

Access to the type 1 and 2 habitat and visibility of the birds:

Sand Creek Ponds: Most survey work can be done from the shoreline, and all ponds can be accessed by (or by full-sized vehicles if necessary). The best places to view most birds are from the dikes. More secretive species may require a canoe, especially on Pond 4, which is the largest pond. Canoes can be used on ponds after July 1, and no motors are allowed on the ponds at any time. Public use of any type is prohibited until after July 1 on ponds with active Trumpeter Swan nests. However, exceptions may be made for appropriate survey work with permission from IDFG.

Chester Wetlands: A canoe may be necessary to access some of the ponds. Access may be restricted to accommodate the nesting bald eagles and any nesting trumpeter swans. Since most of the ponds are small, shoreline access would be best way to survey. The IDFG owns the property and consequently controls access.

Conservation issues:

- Since IDFG owns the property and the water rights, threats in that regard are minimal for the Sand Creek Ponds. However, development is possible on the adjacent private lands to the east and south that could affect future use by wildlife.
- Development was a major threat to Chester Wetlands, as the property was slated for subdivision into a housing development.
- Water rights are also a big issue for Chester Wetlands since there is some question as to how much is actually associated with the property.

Conservation measures taken, in progress, or proposed:

- The acquisition of the Chester Wetlands by IDFG significantly reduced the threats of development significantly. Some of the adjacent properties have gone into conservation easements on the north side, but development could happen on the west and south.

Past and current surveys:

Sand Creek Ponds:

- A duck brood survey was conducted in the late 1980's
- Goose production surveys are completed annually
- A trumpeter swan nesting production survey is completed annually.
- The above surveys are conducted from the dikes of each pond and in late June and early July.

Chester Wetlands: No waterbird surveys have been conducted. However, some survey work is planned for Spring 2004, and winter swan and eagle use surveys have been initiated.

Potential survey methods:

Sand Creek Ponds:

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies from the shoreline. Some areas may require a canoe, such as Pond 4.
- b. Census for waterfowl on the open water from the shoreline
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.
- f. Census for gulls and terns during waterfowl counts.

Selection bias: Some ponds and some areas around them may be restricted during specific time periods. However, the IDFG does own and manage the property and therefore, can make special provisions as appropriate for wildlife survey work. It would seem that selection bias would be minimal.

Measurement error and bias: Emergent vegetation may be a problem in Pond 4 at times. However, these ponds are relatively small and should not present significant concerns.

Chester Wetlands:

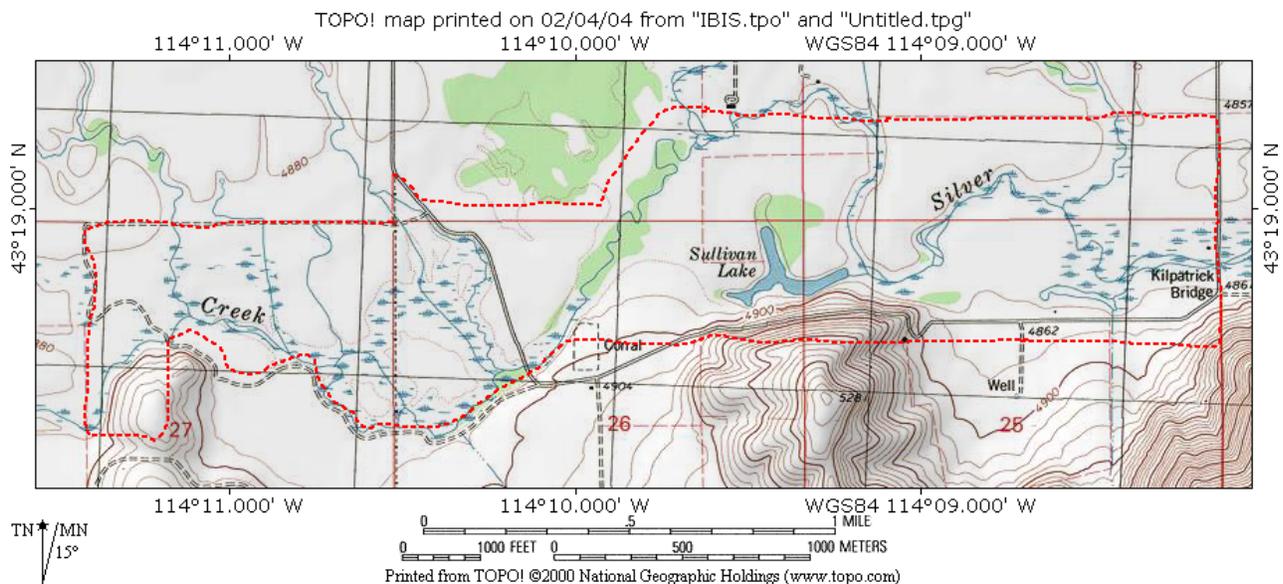
Surveys may be the same as Sand Creek Ponds, but because no work has been done to date, pilot studies will be needed first. However, all surveys likely can be done from shoreline or by canoe.

Needed pilot studies: None may be needed for the Sand Creek Ponds section of the WMA, but pilot studies will probably be needed for Chester Wetlands as no work has been done at this site yet.

Contact:

NAME: Dennis Aslett - IDFG
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FAX: 208-532-7604
EMAIL: daslett@idfg.state.id.us

51-33. SILVER CREEK PRESERVE (IBA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked

Ownership: The Nature Conservancy

Focal species using the site and timing of use:

During the breeding season, waterfowl (Canada Goose, Mallard, Gadwall, American Wigeon, Green-winged Teal, Cinnamon Teal, Canvasback, Redhead, Common Merganser), waterbirds (Pied-billed Grebe, Sandhill Crane, Great Blue Heron, Virginia Rail, Sora, American Coot, Caspian Tern, Ring-billed Gull, California Gull), and shorebirds (Killdeer, Long-billed Curlew, Willet, Spotted Sandpiper, Wilson's Phalarope, Wilson's Snipe) are present; majority of which are breeding on the preserve. During migration there are multiple species of waterfowl, and during spring migration one may also see Long-billed Dowitchers, Willets, Greater and Lesser Yellowlegs, Solitary Sandpipers, and American Avocets.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation	rest of shoreline
secretive marshbirds	water's edge, emergent vegetation	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats during spring/fall migration	rest of shoreline
gulls and terns	all areas, although not abundant on preserve	none

Access to the type 1 and 2 habitat and visibility of the birds:

Most waterfowl can be observed from stream banks, trails, and along roads, although canoes would be useful for monitoring some creek areas (mostly Type II habitat). The area is easily accessible to the public through a series of established trails. There are a couple good vantage points from along the road that may be best for surveying ponds and large water areas. Off-trail work would require permission from Bill Barker or preserve staff. Visibility is easier in Fall/Winter when vegetation is dormant.

Conservation issues:

- Water quality/ quantity - water usage in the surrounding areas that are being developed is a problem. Areas in close proximity (Bellevue and south of Bellevue) are developing rapidly, which affects the water usage and water recharge areas.

Conservation measures taken, in progress, or proposed:

- Designated nature preserve, so protected from development
- Conservation easements.
- County/state cooperation with the Nature Conservancy to preserve the watershed.

Past and current surveys:

- Christmas Bird Counts
- Raptor surveys in adjoining areas
- Bird banding took place over a two-year period in the past

Potential survey methods*Description:*

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. Most of this can be done from the stream bank, although a canoe may be helpful on some reaches of the creek.
- b. Census for waterfowl and other waterbirds on the open water from the stream bank or nearby roads. Additional viewing of streams can be done by canoe.
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- d. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.

Selection bias: N/A

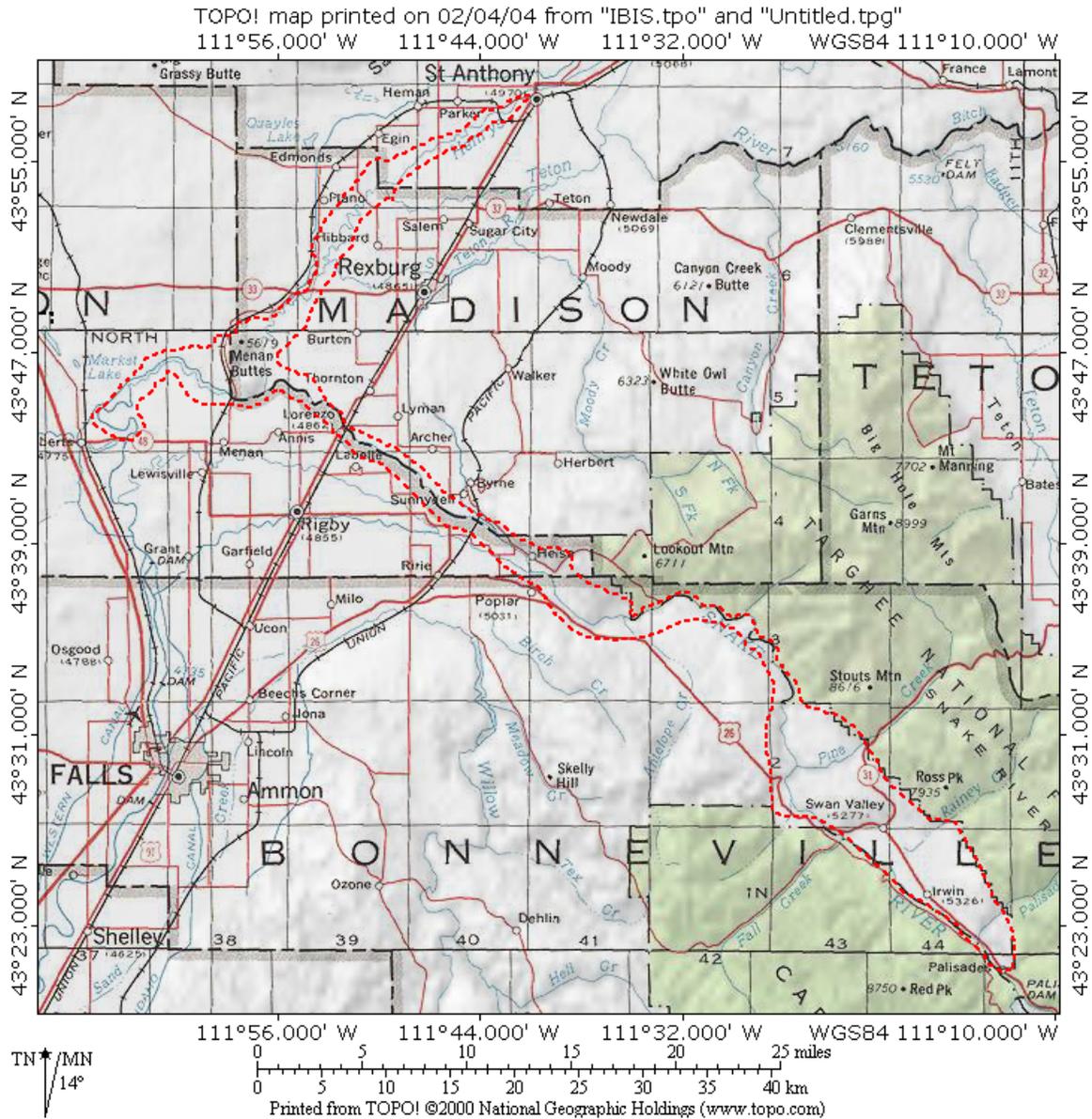
Measurement error and bias: Lack of experienced birders presents a potential bias, although there are a significant number of amateur birders willing and excited to be involved in monitoring.

Needed pilot studies: None are needed.

Contact:

NAME: Bill Barker -The Nature Conservancy
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FAX:
EMAIL: bbarker@tnc.org

51-34. SNAKE RIVER AREA OF CRITICAL ENVIRONMENTAL CONCERN (IBA)



Boundaries and ownership:

Boundaries: South Fork from Palisades Dam to the confluence with the Henry's Fork, the Henry's Fork from the confluence to St. Anthony, and the main stem (Snake River) from the confluence south to Lewisville Knolls

Ownership: Bureau of Land Management, USDA Forest Service, Private (many in conservation easements)

Focal species using the site and timing of use:

The Snake River ACEC produces over half of Idaho's Bald Eagles, one third of the Bald Eagles in the Greater Yellowstone Ecosystem, supporting 23 nesting territories. It also supports the largest Bald Eagle

winter roost in the GYE. Three Peregrine Falcon eyries have established along the South Fork since 1991. The main Snake River and the Henrys Fork are significant migration and wintering areas for thousands of swans, geese, and ducks (Mallard, Common Merganser, Northern Pintail, Wood Duck, American Goldeneye). Shorebirds (Killdeer, Spotted Sandpiper, Red-necked Phalarope, Wilson’s Snipe), waterbirds (Double-crested Cormorant, Sandhill Crane, Sora, Great Egret, Black-crowned Night Heron), and waterfowl are present during the summer and migration.

Colonies: Great Blue Heron (13 rookeries)

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats and gravel bars	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Difficult to access some areas because of private ownership and areas that are roadless. There are some access points (contact Karen Rice for details), and many parts of the site can be surveyed by boat. However, navigation problems likely exist (log jams, etc.). Visibility of waterbirds is quite good.

Conservation issues:

- Dams
- Irrigation diversions
- Levees
- Private resort, subdivision, and agricultural development
- Noxious weed invasion
- Excessive livestock grazing
- Increasing recreational use

All of which have fragmented and degraded this ecosystem

Conservation measures taken, in progress, or proposed:

- The use of federal land within the Snake River ACEC is managed under the Snake River Activity/ Operations Plan which keys in on acceptable limits of recreation and livestock grazing; limits riparian vegetation degradation, and protects wildlife habitat with emphasis on threatened and endangered species.
- Congress designated this area as a Land and Water Conservation Fund Project in 1992.
- To date 17 fee title acquisitions and 12 conservation easement acquisitions have been purchased by the BLM.
- In addition, BLM has worked with the IDFG and the BPA to acquire five river parcels in fee title. The acquisition of key parcels in the ecosystem from willing sellers preserves the integrity and ecological values of the rivers.
- The BLM participates with an interagency noxious weed control team, which has implemented an aggressive biological control program to abate noxious weed invasion.
- As a result of new cottonwood ecology research and the record flood of 1997, the Bureau of Reclamation has made an effort to release water to mimic pre-dam floods to facilitate cottonwood seedling establishment along the rivers to perpetuate valuable wildlife habitat.

Past and current surveys:

- Bald Eagle monitoring by BLM (breeding season) and IDFG (mid-winter aerial survey)

- Peregrine Falcon nest monitoring
- Aerial mid-winter survey for waterfowl by IDFG
- Yellow-billed Cuckoo monitoring is in planning

Potential survey methods

Description:

- a. Colony counts for nesting Great Blue Herons.
- b. Census for waterfowl on the open water using a boat and/or from access points along shoreline. Late summer or winter counts may be better than breeding season counts, as waterfowl are more easily detected during this period.
- c. Area searches for migrating shorebirds from observation points, or from a boat, near Type 1 habitat.

Selection bias: Access issues because of ownership may be a problem.

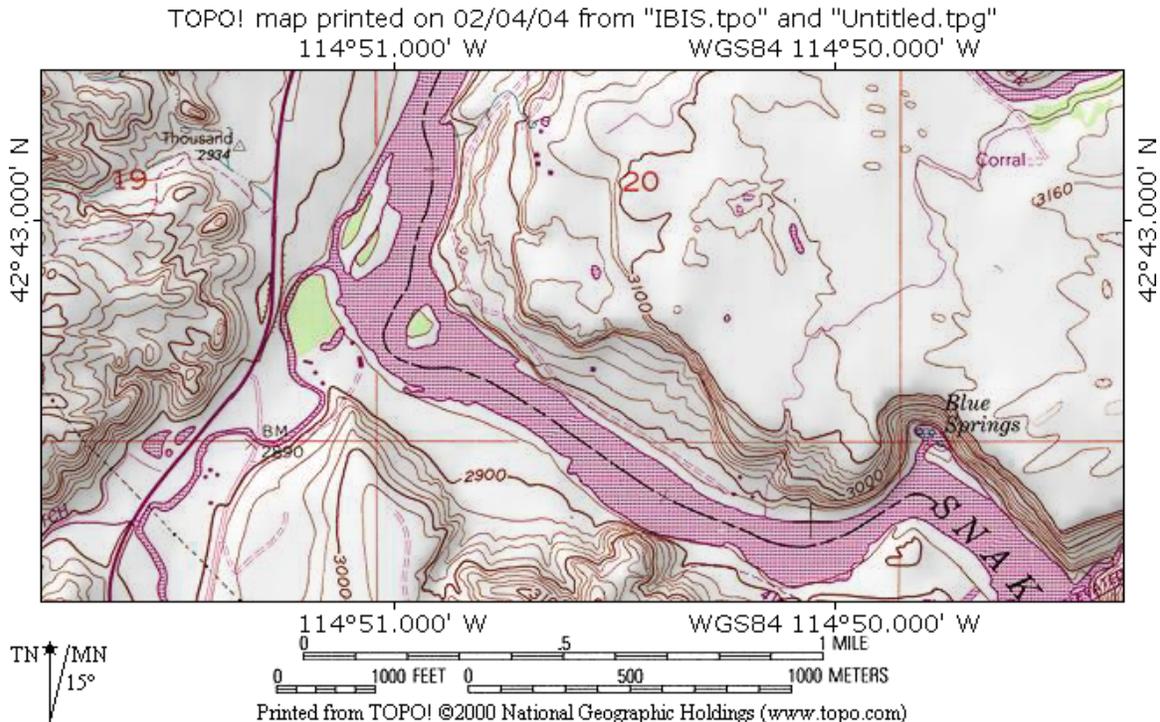
Measurement error and bias: N/A – very little, if any, emergent vegetation to hinder visibility.

Needed pilot studies: Determine how and where to survey as this is a very extensive area and access issues exist.

Contact:

NAME: Karen Rice, BLM
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PHONE: 208-524-7549
FAX: 208-524-7505
EMAIL: krice@id.blm.gov

51-35. SNAKE RIVER ISLAND WILDLIFE HABITAT AREA (IBA)



Boundaries and ownership:

Boundaries: T.8S, R.14E, sec 19

Ownership: Idaho Dept. of Fish and Game

Focal species using the site and timing of use:

Historically has supported an impressive rookery of the species listed below. The rookery may have been inactive for a few years, possibly a result of disturbance. In 2004, two active Great Blue Heron nests were located on the island.

Colonies: Great Blue Heron (80 pairs), Black-crowned Night Heron (200 pairs), Snowy Egret (10 pairs), Cattle Egret (10 pairs).

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
large waders	breeding colony on island	rest of shoreline

Access to the type 1 and 2 habitat and visibility of the birds:

Island is visible from the shoreline, and potentially accessible by boat.

Conservation issues:

- Russian Olives are trying to invade the island. The wet nature of the soil probably inhibiting their expansion.
- Disturbance of the birds from nearby housing development is potentially a serious problem. Rookery may have been inactive the last couple of years because of disturbance, and surveys are needed to determine if the rookery has moved to a nearby island/shoreline.

Conservation measures taken, in progress, or proposed:

- Proposed?: Survey the island to determine if Russian Olives are invading.
- Proposed?: Chemically treat the mature Olive and pull out the young saplings.

Past and current surveys:

- Informal surveys in the past conducted by The Nature Conservancy
- Surveys will be conducted in Spring 2004 to determine if herons and egrets have relocated the rookery to a nearby site

Potential survey methods

Description: Colony counts for nesting herons and egrets

Selection bias: N/A

Measurement error and bias: N/A

Needed pilot studies: Survey of nearby islands and shoreline to determine if rookery has relocated nearby.

Contact:

NAME:

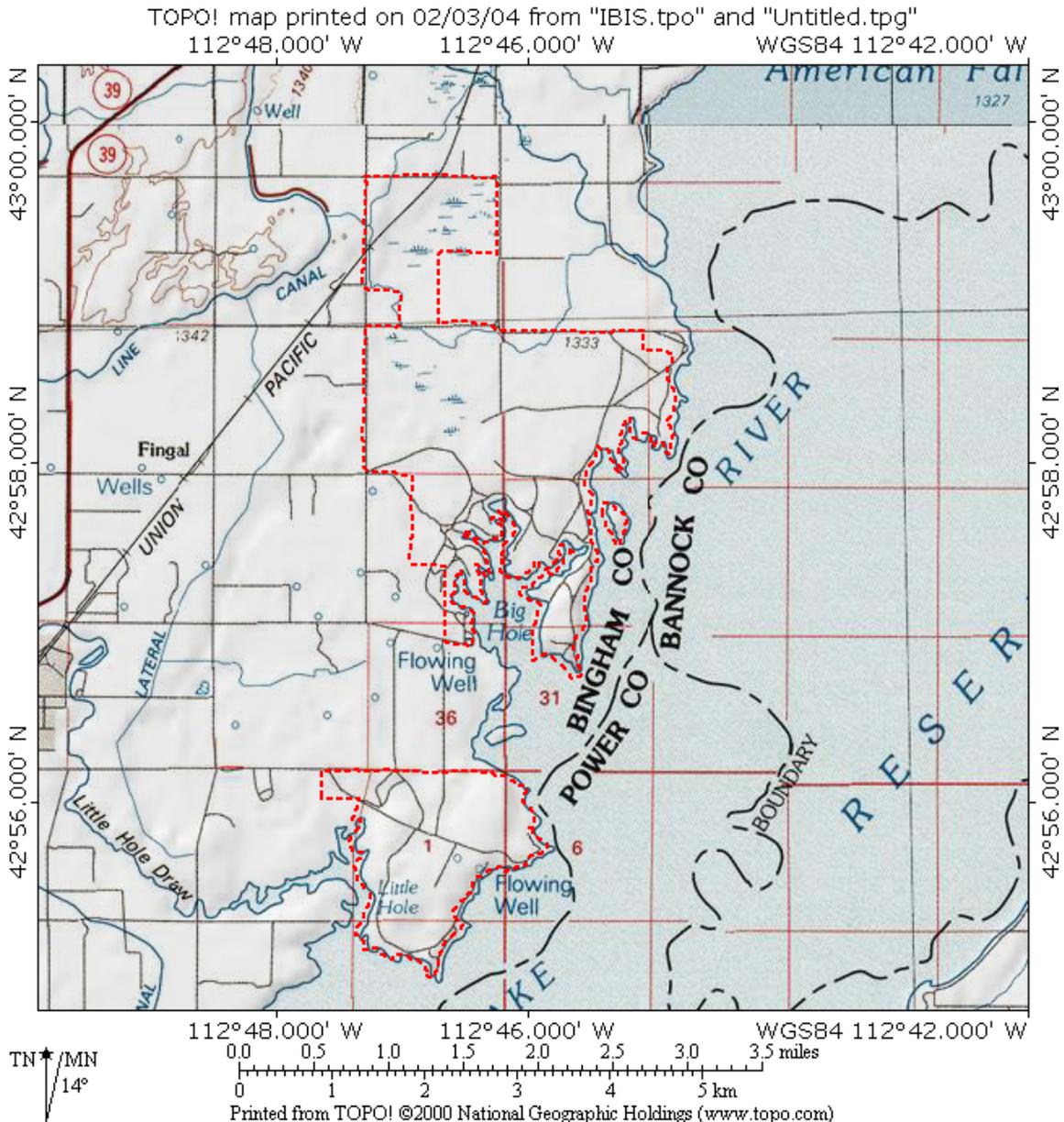
ADDRESS:

PHONE:

FAX:

EMAIL:

51-36. STERLING WILDLIFE MANAGEMENT AREA (WMA)



Boundaries and ownership:

Boundaries: Boundaries are clearly marked

Ownership: Idaho Department of Fish and Game, Bureau of Reclamation

Focal species using the site and timing of use:

Common species during the breeding season include waterbirds (Sora, Virginia Rail, Western Grebe, Herring Gull, California Gull, Franklin's Gull, Forster's Tern, Great Blue Heron, Black-crowned Night Heron, Snowy Egret, White-faced Ibis), waterfowl (Canada Goose and multiple duck species), shorebirds (American Avocet, Black-necked Stilt, Killdeer, Willet, Long-billed Curlew, Wilson's Snipe, Wilson's Phalarope), Northern Harriers, Marsh Wrens, and Red-winged and Yellow-headed Blackbirds. Area is

used by multiple waterfowl species (Snow Goose, Tundra Swan, Canada Goose, and many duck species) during migration. Wintering area for Bald Eagles, Canada Geese, Red-winged and Yellow-headed Blackbirds, and several species of ducks.

Location of type 1 and 2 habitat within the site:

Extensive wetlands in the following sections of the WMA: Orth, Plunkett, Thompson, American Game, Vanderford, and Johnson

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation, particularly on the Orth segment in the North and South ponds, as well as Wells pond	rest of shoreline
secretive marshbirds	water's edge of all ponds, but more prevalent in the Johnson pond complex	none
waterfowl	open water, edges during breeding season; in late winter concentrate in Johnson pond, a portion of main Orth pond, and small Thompson pond (remain open during winter)	none
shorebirds	exposed mudflats during spring/fall migration, particularly in Orth ponds	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

All areas are easily accessible to the public and visible from shoreline. There is a viewing blind on the Johnson pond. All of the ponds, including Johnson, can be viewed from a variety of locations along the shore. In many cases, a vehicle could be driven up to the pond and observations made from there. The waterfowl and shorebirds are easily visible. The more secretive marsh birds that utilize emergent vegetation are much more difficult to spot. All ponds have some portion in emergent vegetation. Vehicle and boat access, as part of a sanctioned survey effort, could be arranged by contacting Dean Rose (contact info below).

Conservation issues:

- Drought is an issue impacting quantity of water.
- Russian olive invasion has been a problem.
- An unusually high magpie population was suggested as a reason for 2.9% waterfowl nesting success. The magpies were linked to the high density of Russian olive trees.
- Because of the "island" effect of the WMA within an intensively farmed and grazed landscape, the question of whether or not the WMA was a "predator sink" was raised.

Conservation measures taken, in progress, or proposed:

- Russian olive invasion has been addressed by an aggressive removal effort. Yearly spraying is done to control seedlings. As a result, once trees were removed, the magpie population declined and waterfowl nesting success rose to 36%.
- A low-intensity predator management program is in place on the WMA. Passive and active management techniques are used.

Past and current surveys:

- Nest searches for waterfowl and assessment of goose nesting success (chain drags, foot searches) – Spring through late Summer. Chain drag surveys are conducted every 5 years.
- Vehicle counts for breeding waterfowl pairs and broods – Spring through late Summer

Annual reports on waterfowl productivity are available at the Regional IDFG Office

Potential survey methods

Description:

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies.
- b. Census for waterfowl and other waterbirds on the open water from walking the shoreline or from vehicle at observation points.
- c. Area searches for migrating shorebirds from observation points near Type 1 habitat.
- e. Systematic sampling, probably including the use of playback calls, for secretive marshbirds. These can be done from the shoreline around various impoundments.
- f. Census for gulls and terns during waterfowl counts

Selection bias: N/A

Measurement error and bias: Should be negligible. Drought may affect the amount of open water and mud flats available to the birds, but vegetation is fairly stable.

Needed pilot studies: None

Contact:

NAME: Dean Rose - IDFG
ADDRESS: 1345 Barton Rd., Pocatello, ID 83204
PHONE: 208-232-4703
FAX: 208-233-6430
EMAIL: drose@idfg.state.id.us

51-37A. TETON COUNTY (COOKE/WARM CREEK)

Boundaries and ownership:

Boundaries: Boundary information available from Teton Regional Land Trust

Ownership: Private – under conservation easements

Focal species using the site and timing of use:

Waterfowl and Sandhill Cranes nest on this site. Because this site was re-vegetated in Spring 2003, other waterbirds will likely be present in Spring 2004.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	shorelines
large waders	emergent vegetation	shorelines
waterfowl	open water, edges during breeding season	none

Access to the type 1 and 2 habitat and visibility of the birds:

Fully accessible to Teton Regional Land Trust personnel. Creek is too shallow for canoe, but can be surveyed from shoreline. Visibility of birds is good in open water, but poor along edges because of emergent vegetation.

Conservation issues:

- Cattle grazing may be an issue in the future

Conservation measures taken, in progress, or proposed:

- Site is under conservation easement, and was re-vegetated in Spring 2003.
- Cattle are currently excluded.

Past and current surveys:

- Waterfowl brood counts
- Waterbird surveys

Potential survey methods

Description

- a. Nest searches for waterfowl and waterbirds nesting in emergent vegetation by walking shoreline.
- b. Census for waterfowl and other waterbirds on the open water from shoreline using a scope.
- c. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.

Selection bias: N/A

Measurement error and bias: Emergent vegetation may be an issue.

Needed pilot studies: None may be needed.

Contact:

NAME: Robert A. Cavallaro, Stewardship Director
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FAX: 208-354-8940
EMAIL: rob@tetonlandtrust.org

51-37B. TETON COUNTY (FOSTER’S SLOUGH/UPPER TETON RIVER)

Boundaries and ownership:

Boundaries: Foster’s slough watershed including Upper Teton River (details available from Teton Regional Land Trust)

Ownership: Private – under conservation easement

Focal species using the site and timing of use:

Breeding species include waterfowl, shorebirds (Long-billed Curlew, Willet, Wilson’s Snipe, Wilson’s phalarope), waterbirds (Sora, Virginia Rail, Sandhill Crane, American Coot), and meadow and wetland/riparian nesting passerines including Savannah Sparrow, Western Meadowlark, Common Yellowthroat, and Yellow-headed Blackbird. Black Terns and gulls are present during migration, and Trumpeter Swans use the area during migration and winter.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	breeding colonies, emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats, meadows/grasslands	rest of shoreline
gulls and terns	all areas	none

Access to the type 1 and 2 habitat and visibility of the birds:

Full access is available to Teton Regional Land Trust personnel. Access by canoe is good and shoreline observation points exist. Visibility of birds is good along shoreline and in open water. Emergent vegetation can be a problem.

Conservation issues:

- Invasive weeds are a problem

Conservation measures taken, in progress, or proposed:

- Area is under conservation easement, and therefore protected for wildlife

Past and current surveys:

- Waterfowl surveys
- Brood counts and nest drags for waterfowl
- Surveys for Long-billed Curlew and Willets during breeding season
- Sandhill Crane roost counts

Potential survey methods

Description

- Nest searches for waterfowl and waterbirds nesting in emergent vegetation. Canoe is necessary on the river and lower Foster Slough, while a scope from the shoreline may be used for ponds.
- Nest searches for ground-nesting curlews, snipe, and phalaropes in surrounding wet meadows and grasslands.
- Area searches for migrating shorebirds along the upper Teton River using a canoe for access.
- Systematic sampling, probably including the use of playback calls, for secretive marshbirds.

Selection bias: N/A

Measurement error and bias: Emergent vegetation is a real problem in some areas. Ability to detect birds is an issue.

Needed pilot studies: None needed

Contact:

NAME: Robert A. Cavallaro, Stewardship Director
ADDRESS: Teton Regional Land Trust
P.O. Box 247, Driggs, ID 83422
PHONE: 208-354-8939
FAX: 208-354-8940
EMAIL: rob@tetonlandtrust.org

51-37C. TETON COUNTY (LAZY K MARSH)

Boundaries and ownership:

Boundaries: Boundary information available from Teton Regional Land Trust

Ownership: Private - under conservation easements

Focal species using the site and timing of use:

Breeding waterfowl (Mallard, Gadwall, American Wigeon), waterbirds (Sandhill Crane, Sora, Virginia Rail, American Coot, Pied-billed Grebe), shorebirds (Black-necked Stilt [in 2003], Wilson's Phalarope). Fall staging area for up to 400 Sandhill Cranes. Waterbirds present during spring migration.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water & emergent vegetation	none
large waders	emergent vegetation	rest of shoreline
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	emergent vegetation	rest of shoreline

Access to the type 1 and 2 habitat and visibility of the birds:

Full access is available to Teton Regional Land Trust personnel. Birds are visible by scope along dikes surrounding ponds and by walking NE shoreline. Emergent vegetation makes visibility of some species difficult.

Conservation issues:

- Invasive weeds are an issue

Conservation measures taken, in progress, or proposed:

- This site is under conservation easement and is managed for wildlife.

Past and current surveys:

- Several years of informal and formal waterfowl surveys (brood counts, etc.)
- Several years of informal and formal waterbird counts

Potential survey methods

Description

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation from the dike, using a scope, and walking NE shoreline.
- b. Area searches for nesting Sandhill Cranes and shorebirds.
- c. Census for waterfowl on the open water from dike, using a scope.
- d. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.

Selection bias: N/A

Measurement error and bias: Emergent vegetation is an issue, and will likely hinder detection of some species.

Needed pilot studies: None needed.

Contact:

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P.O. Box 247, Driggs, ID 83422
PHONE: 208-354-8939
FAX: 208-354-3940
EMAIL: rob@tetonlandtrust.org

51-37D. TETON COUNTY (SUNDOWN RANCH)

Boundaries and ownership:

Boundaries: Boundary information available from Teton Regional Land Trust; includes two ponds and river corridor/sloughs

Ownership: Private - under conservation easements

Focal species using the site and timing of use:

Shorebirds (Long-billed Curlew, Willet, Wilson's Phalarope, Wilson's Snipe), waterfowl, waterbirds (Sandhill Crane, herons) are found here during the summer and likely breeding. Sandhill Cranes are also here during migration. Trumpeter Swans use the area during winter.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	breeding colonies, open water & emergent vegetation	none
secretive marshbirds	water's edge	none
waterfowl	open water, edges during breeding season	none
shorebirds	exposed mudflats, wet meadows/grasslands	rest of shoreline

Access to the type 1 and 2 habitat and visibility of the birds:

Fully accessible to Teton Regional Land Trust personnel. Visibility moderate to good on created open water, and difficult along river.

Conservation issues:

- Home site development
- Invasive weeds are a problem

Conservation measures taken, in progress, or proposed:

- This property is under conservation easement, and TRLT is working on starting management for wildlife
- Edges of Trumpeter Pond will be re-vegetated in spring 2004. Presence of waterbirds is anticipated to change (i.e., increase) as a result.

Past and current surveys:

- Passerine surveys

Potential survey methods

Description

- a. Nest searches for grebes and other waterbirds nesting in the emergent vegetation in small colonies. A canoe is necessary for the river portion, whereas ponds may be surveyed by walking edges.
- b. Census for waterfowl on the open water by canoe on the river and from shoreline of ponds.
- c. Nest searches for ground-nesting curlews, snipe, and phalaropes in surrounding wet meadows and grasslands.
- d. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.

Selection bias: N/A

Measurement error and bias: Emergent vegetation is a problem, particularly on Curlew Pond.

Needed pilot studies: None needed.

Contact:

NAME: Robert A. Cavallaro, Stewardship Director
ADDRESS: Teton Regional Land Trust
P.O. Box 247, Driggs, ID 83422
PHONE: 208-354-8939
FAX: 208-354-8940
EMAIL: rob@tetonlandtrust.org

51-37E. TETON COUNTY (TETON CREEK/SIX SPRINGS COMPLEX)

Boundaries and ownership:

Boundaries: Boundary information available from Teton Regional Land Trust

Ownership: Private – under conservation easements

Focal species using the site and timing of use:

Breeding species include waterfowl, shorebirds (Long-billed Curlew, Willet, Wilson's Snipe, Wilson's phalarope), waterbirds (Sora, Virginia Rail, Sandhill Crane, American Coot), and Yellow-headed Blackbirds. Sandhill Cranes are also found here during migration.

Location of type 1 and 2 habitat within the site:

Functional Group	Type 1 Habitat	Type 2 Habitat
waterbirds	open water, emergent vegetation	none
large waders	emergent vegetation, wet meadows	shoreline
secretive marshbirds	cattail marshes, flooded wetlands	none
waterfowl	open water, flooded wetlands and marshes during breeding season	none
shorebirds	wet meadows, flooded wetlands	shoreline

Access to the type 1 and 2 habitat and visibility of the birds:

Fully accessible to Teton Regional Land Trust personnel. Spring (June) flooding makes access difficult. Visibility of birds is good along river, but more difficult within sloughs because of emergent vegetation.

Conservation issues:

- Invasive weeds are a problem
- Cattle grazing on part of the property, although it is controlled
- Presence of individuals fishing in the area may lead to disturbance of birds

Conservation measures taken, in progress, or proposed:

- Under conservation easement, and managed for wildlife
- Area is closed to fishing during spawning season (open in July) to reduce disturbance
- TRLT is working on creating brooding habitat

Past and current surveys:

- Sandhill Crane roost counts
- Waterfowl brood counts
- Waterbird surveys

Potential survey methods

Description:

- a. Nest searches for waterfowl and waterbirds nesting in emergent vegetation and flooded wetlands.
- b. Census for waterfowl and other waterbirds on open water of creek in late summer. Creek cannot be efficiently navigated by canoe, so walking the creek may be only alternative for surveying.
- c. Nest searches for ground-nesting curlews, snipe, and phalaropes in surrounding wet meadows and grasslands.
- d. Systematic sampling, probably including the use of playback calls, for secretive marshbirds.

Selection bias: Not applicable if counts are done in late summer along creek

Measurement error and bias: Emergent vegetation and access limitations during flooding (June) are issues.

Needed pilot studies: None may be needed, although a pilot study to determine appropriate survey timing may be helpful.

Contact:

NAME: Robert A. Cavallaro, Stewardship Director
ADDRESS: Teton Regional Land Trust
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Stratum 2: Southern Idaho

Boundaries and ownership:

Boundaries: This stratum includes all other wetland areas in BMR-51

Ownership: Bureau of Land Management (majority), State of Idaho, U.S. Forest Service, Bureau of Indian Affairs, Bureau of Reclamation, Department of Energy, National Park Service, military, and private

Focal species using the site and timing of use: All focal species for BMR-51

Location of type 1 and 2 habitat within the site:

Type I Habitat:

(all lakes >300 acres in size are listed below)

<u>Lake Name</u>	<u>IDFG Region</u>	<u>Lake Name</u>	<u>IDFG Region</u>
Alexander Reservoir	Southeast	MacKay Reservoir	Upper Snake
Anderson Ranch Reservoir	Magic Valley	Milner Lake	Magic Valley
Arrowrock Reservoir	Southwest	Mormon Reservoir	Magic Valley
Bear Lake	Southeast	Mountain Home Reservoir	Southwest
Cedar Creek Reservoir	Magic Valley	Mountain View Lake	Southwest
Chesterfield Reservoir	Southeast	Murtaugh Lake	Magic Valley
Cleveland Reservoir	Southwest	North Lake	Upper Snake
Crane Creek Reservoir	Southwest	Oneida Narrows Reservoir	Southeast
Daniels Reservoir	Southeast	Paddock Valley Reservoir	Southwest
Fish Creek Reservoir	Magic Valley	Palisades Reservoir	Upper Snake
Fraser Reservoir	Southwest	Ririe Reservoir	Upper Snake
Island Park Reservoir	Upper Snake	Ross Lake	Southwest
Juniper Basin Reservoir	Southwest	Rough Lake	Southwest
Juniper Lake	Southwest	Salmon Falls Creek Reservoir	Magic Valley
Little Camas Reservoir	Magic Valley	Sheridan Reservoir	Upper Snake
Little Wood Reservoir	Magic Valley	Twin Lakes Reservoir	Southeast
Lower Goose Creek Reservoir	Magic Valley	Upper Salmon Falls Reservoir	Magic Valley
Lower Salmon Falls Reservoir	Magic Valley	Wilson Lake Reservoir	Magic Valley
Lucky Peak Reservoir	Southwest		

Type II Habitat:

Numerous lakes and ponds scattered throughout the region.

Access to the type 1 and 2 habitat and visibility of the birds: access and visibility depends on the site and varies widely across the region.

Past and current surveys:

Potential survey methods

Description: Potentially all types of survey methods would apply over the region - aerial, ground (foot, motor vehicle), boat

Selection bias:

Measurement error and bias:

Needed pilot studies:

Appendix E1. Aquatic Focal Species for BMR-51

Species:	Initiative	Class. Level	Season(s)
Red-throated Loon - <i>Gavia stellata</i>	Waterbird	NB	M
Pacific Loon - <i>Gavia pacifica</i>	Waterbird	NB	M
Common Loon - <i>Gavia immer</i>	Waterbird		BMW
Pied-billed Grebe - <i>Podilymbus podiceps</i>	Waterbird	4	BW
Horned Grebe - <i>Podiceps auritus</i>	Waterbird		BMW
Red-necked Grebe - <i>Podiceps grisegena</i>	Waterbird		B
Eared Grebe - <i>Podiceps nigricollis</i>	Waterbird	2	BW
Western Grebe - <i>Aechmophorus occidentalis</i>	Waterbird	3	BW
Clark's Grebe - <i>Aechmophorus clarkii</i>	Waterbird	3	BW
American White Pelican - <i>Pelecanus erythrorhynchos</i>	Waterbird	2	BMW
Double-crested Cormorant - <i>Phalacrocorax auritus</i>	Waterbird	4	BW
American Bittern - <i>Botaurus lentiginosus</i>	Waterbird	3	B
Great Blue Heron - <i>Ardea herodias</i>	Waterbird	4	BW
Great Egret - <i>Ardea alba</i>	Waterbird	2	BW
Snowy Egret - <i>Egretta thula</i>	Waterbird	4	B
Cattle Egret - <i>Bubulcus ibis</i>	Waterbird	4	B
Green Heron - <i>Butorides virescens</i>	Waterbird	4	BW
Black-crowned Night-Heron - <i>Nycticorax nycticorax</i>	Waterbird	3	BW
White-faced Ibis - <i>Plegadis chihi</i>	Waterbird	2	B
Tundra Swan - <i>Cygnus columbianus</i>	Waterfowl	NB	MW
Trumpeter Swan - <i>Cygnus buccinator</i>	Waterfowl		BW
Greater White-fronted Goose - <i>Anser albifrons</i>	Waterfowl	NB	M
Snow Goose - <i>Chen caerulescens</i>	Waterfowl	NB	M
Ross' Goose - <i>Chen rossii</i>	Waterfowl	NB	MW
Canada Goose - <i>Branta canadensis</i>	Waterfowl	4	BW
Wood Duck - <i>Aix sponsa</i>	Waterfowl	3	BW
Green-winged Teal - <i>Anas crecca</i>	Waterfowl	4	BW
Mallard - <i>Anas platyrhynchos</i>	Waterfowl	4	BW
Northern Pintail - <i>Anas acuta</i>	Waterfowl	3	BW
Blue-winged Teal - <i>Anas discors</i>	Waterfowl	3	B
Cinnamon Teal - <i>Anas cyanoptera</i>	Waterfowl	2	BW
Northern Shoveler - <i>Anas clypeata</i>	Waterfowl	4	BW
Gadwall - <i>Anas strepera</i>	Waterfowl	2	BW
Eurasian Wigeon - <i>Anas penelope</i>	Waterfowl	NB	MW
American Wigeon - <i>Anas americana</i>	Waterfowl	4	BW
Canvasback - <i>Aythya valisineria</i>	Waterfowl	3	BMW

Species:	Initiative	Class. Level	Season(s)
Redhead - <i>Aythya americana</i>	Waterfowl	2	BW
Ring-necked Duck - <i>Aythya collaris</i>	Waterfowl	3	BMW
Greater Scaup - <i>Aythya marila</i>	Waterfowl	NB	MW
Lesser Scaup - <i>Aythya affinis</i>	Waterfowl	4	BW
Harlequin Duck - <i>Histrionicus histrionicus</i>	Waterfowl		B
Long-tailed Duck - <i>Clangula hyemalis</i>	Waterfowl	NB	MW
Surf Scoter - <i>Melanitta perspicillata</i>	Waterfowl	NB	MW
White-winged Scoter - <i>Melanitta fusca</i>	Waterfowl	NB	MW
Common Goldeneye - <i>Bucephala clangula</i>	Waterfowl		BW
Barrow's Goldeneye - <i>Bucephala islandica</i>	Waterfowl		BW
Bufflehead - <i>Bucephala albeola</i>	Waterfowl	3	BW
Hooded Merganser - <i>Lophodytes cucullatus</i>	Waterfowl		BW
Common Merganser - <i>Mergus merganser</i>	Waterfowl	4	BW
Red-breasted Merganser - <i>Mergus serrator</i>	Waterfowl	NB	MW
Ruddy Duck - <i>Oxyura jamaicensis</i>	Waterfowl	2	BW
Osprey - <i>Pandion haliaetus</i>	Landbird	3	B
Bald Eagle - <i>Haliaeetus leucocephalus</i>	Landbird	1	BW
Northern Harrier - <i>Circus cyaneus</i>	Landbird	2	BW
Peregrine Falcon - <i>Falco peregrinus</i>	Landbird	1	BM
Virginia Rail - <i>Rallus limicola</i>	Waterbird	3	BW
Sora - <i>Porzana carolina</i>	Waterbird	4	B
American Coot - <i>Fulica americana</i>	Waterbird	4	BW
Sandhill Crane - <i>Grus canadensis</i>	Waterbird	3	B
Black-bellied Plover - <i>Pluvialis squatarola</i>	Shorebird	NB	M
American Golden-Plover - <i>Pluvialis dominica</i>	Shorebird	NB	M
Snowy Plover - <i>Charadrius alexandrinus</i>	Shorebird	3	BM
Semipalmated Plover - <i>Charadrius semipalmatus</i>	Shorebird	NB	M
Killdeer - <i>Charadrius vociferus</i>	Shorebird	3	BW
Black-necked Stilt - <i>Himantopus mexicanus</i>	Shorebird	2	B
American Avocet - <i>Recurvirostra americana</i>	Shorebird	3	B
Greater Yellowlegs - <i>Tringa melanoleuca</i>	Shorebird	NB	MW
Lesser Yellowlegs - <i>Tringa flavipes</i>	Shorebird	NB	MW
Solitary Sandpiper - <i>Tringa solitaria</i>	Shorebird	NB	M
Willet - <i>Catoptrophorus semipalmatus</i>	Shorebird	2	B
Spotted Sandpiper - <i>Actitis macularia</i>	Shorebird	4	BW
Whimbrel - <i>Numenius phaeopus</i>	Shorebird	NB	M
Long-billed Curlew - <i>Numenius americanus</i>	Shorebird	2	B
Marbled Godwit - <i>Limosa fedoa</i>	Shorebird	NB	M
Sanderling - <i>Calidris alba</i>	Shorebird	NB	M

Species:	Initiative	Class. Level	Season(s)
Semipalmated Sandpiper - <i>Calidris pusilla</i>	Shorebird	NB	M
Western Sandpiper - <i>Calidris mauri</i>	Shorebird	NB	M
Least Sandpiper - <i>Calidris minutilla</i>	Shorebird	NB	M
Baird's Sandpiper - <i>Calidris bairdii</i>	Shorebird	NB	M
Pectoral Sandpiper - <i>Calidris melanotos</i>	Shorebird	NB	M
Dunlin - <i>Calidris alpina</i>	Shorebird	NB	M
Stilt Sandpiper - <i>Calidris himantopus</i>	Shorebird	NB	M
Long-billed Dowitcher - <i>Limnodromus scolopaceus</i>	Shorebird	NB	M
Short-billed Dowitcher - <i>Limnodromus griseus</i>	Shorebird	NB	M
Wilson's Snipe - <i>Gallinago delicata</i>	Shorebird	3	BW
Wilson's Phalarope - <i>Phalaropus tricolor</i>	Shorebird	1	B
Red-necked phalarope - <i>Phalaropus lobatus</i>	Shorebird	NB	M
Franklin's Gull - <i>Larus pipixcan</i>	Waterbird	3	BM
Bonaparte's Gull - <i>Larus philadelphia</i>	Waterbird	NB	BM
Ring-billed Gull - <i>Larus delawarensis</i>	Waterbird	4	BW
California Gull - <i>Larus californicus</i>	Waterbird	2	BMW
Herring Gull - <i>Larus argentatus</i>	Waterbird	NB	MW
Thayer's Gull - <i>Larus thayeri</i>	Waterbird	NB	MW
Glaucous-winged Gull - <i>Larus glaucescens</i>	Waterbird	NB	MW
Glaucous Gull - <i>Larus hyperboreus</i>	Waterbird	NB	MW
Sabine's Gull - <i>Xema sabini</i>	Waterbird	NB	M
Caspian Tern - <i>Sterna caspia</i>	Waterbird	4	B
Common Tern - <i>Sterna hirundo</i>	Waterbird		B
Arctic Tern - <i>Sterna paradisaea</i>	Waterbird	NB	M
Forster's Tern - <i>Sterna forsteri</i>	Waterbird	3	B
Black Tern - <i>Chlidonias niger</i>	Waterbird	2	B
Belted Kingfisher - <i>Ceryle alcyon</i>	Landbird	3	BW
American Crow - <i>Corvus brachyrhynchos</i>	Landbird	4	BW
Tree Swallow - <i>Tachycineta bicolor</i>	Landbird	4	B
Violet-green Swallow - <i>Tachycineta thalassina</i>	Landbird	4	B
Marsh Wren - <i>Cistothorus palustris</i>	Landbird	2	BW
Common Yellowthroat - <i>Geothlypis trichas</i>	Landbird	4	B
Song Sparrow - <i>Melospiza melodia</i>	Landbird	4	BW
Swamp Sparrow - <i>Melospiza georgiana</i>	Landbird	NB	MW
Red-winged Blackbird - <i>Agelaius phoeniceus</i>	Landbird	4	BW
Yellow-headed Blackbird - <i>Xanthocephalus xanthocephalus</i>	Landbird	3	BW

Classification levels: 1 – Highest Priority, 2 – Moderate Priority, 3 – Low Priority, 4 – No Priority, NB – Non-breeder

Appendix E2. Preparation of Site Descriptions

1. **Boundaries and ownership** – This is a brief description of who owns the land. If special permission or permits are needed to access the site, note this. Include local contact names and phone numbers, if appropriate. **Briefly describe the habitat at the site (to be completed in final draft).**
2. **Focal species using the site and timing of use** – Identify which of the focal species are found at the site. Observers should record information regarding the timing or season of use (e.g., spring migration) and estimated numbers of birds using the site, if known.
3. **Location of Type 1 and 2 habitat within the site** - Describe Type 1 and Type 2 habitat boundaries within the site. It may be useful to group species into functional groups (e.g., migrating shorebirds, secretive marshbirds).
4. **Access to Type 1 and 2 habitat and the visibility of the birds** – Describe access to the site, including observation points, boat access and permission requirements. If complete access is possible, note this. Describe problems with seeing all birds during a survey, if any. If visibility is different for different species note this (e.g., large waders are easily detected, but distances are too great to accurately identify smaller waders).
5. **Conservation Issues** - Describe any conservation issues/problems pertinent to the site. These may include site-specific issues, such as predation pressure at a tern colony, or issues that are common to many aquatic sites (e.g., significant recreational use).
6. **Conservation measures taken, in progress, or proposed** – As a follow-up to Item 5, describe any projects or measures taken to remedy the issues mentioned above. Also include any projects/measures that are on-going or have been proposed.
7. **Past and current surveys** – Briefly describe past or current surveys at the site. Provide survey means, if available; however, do not spend a lot of time analyzing the data.
- 8a. **Potential survey methods: *description*** – Discuss the surveys methods appropriate for each species or functional group at the site and recommend the best method(s). Consider access, visibility and past survey results in your recommendation. Consider differences in survey methods among seasons, if appropriate. Bear in mind, however, that the final decision regarding the season for monitoring will be made at a larger scale. Consider when during the day surveys should be conducted. In general, all surveys in a site should be made during a single period. Timing of surveys is especially important at tidal sites but may be important at other sites due to the sun or other factors. Note that if the number of birds present varies rapidly, as is often the case with tidal areas, then the survey period should be brief. Otherwise, surveyors may gradually learn when surveys will yield the highest counts and may be tempted to visit at these times.
- 8b. **Potential survey methods: *selection bias*** – Discuss the potential for selection bias in the proposed survey methods. See text in (“Components of Accuracy”) in the body of this report for definition of selection bias. If the entire site can be surveyed completely, there is no selection bias and “not applicable” can be entered. If a subsample of the site is sampled, discuss reasons why the portion sampled may not be representative of the total site. Provide recommendations for minimizing potential selection bias.
- 8c. **Potential survey methods: *measurement error and bias*** – Discuss the potential for measurement error and bias in your proposed survey methods. See text in “Preparation of site

descriptions” in the body of this report for definitions of these terms. If most of the birds present at the time of the survey are counted, then measurement error and bias will be minimal. If many birds may be missed because of poor visibility or access problems, then measurement error and bias are important considerations. Discuss ways to minimize error and/or bias, if known.

9. **Needed Pilot Studies** – Identify what information is needed before a sampling plan could be devised for each site. For each site, if all the information above is known, a pilot study is not needed for the site.

10. **Contact** – Identify local contact name and phone number of individual who is familiar with the site and has provided the site description information for IBIS. These are generally state and federal agency personnel who have nominated the site as an Important Bird Area (IBA), or are responsible for the management of that particular site (e.g., Wildlife Management Areas, National Wildlife Refuges).

Appendix F. Survey Protocols

COLONIAL WATERBIRDS

Applicable Excerpts Taken/Modified From:

Breeding Season Survey Techniques for Seabirds and Colonial Waterbirds throughout North America. Steinkamp, M., B. Peterjohn, V. Byrd, H. Carter, and R. Lowe

(see <http://www.mp2-pwrc.usgs.gov/cwb/manual> for complete manual and references)

Introduction

For a continent-wide monitoring program to succeed, it is essential that methods be developed and agreed upon that are consistent and comparable. This manual is the first step towards standardizing monitoring methods for breeding colonial waterbirds in continental North America. Standardized methods also need to be developed for monitoring populations outside of the breeding season and for monitoring habitats at multiple geographic and temporal scales. This manual synthesizes information from existing monitoring programs and the literature on seabird and colonial waterbird surveys for estimating breeding populations, examines the weaknesses and strengths of each technique, the habitats and species best suited for specific techniques, and wherever possible, describes approaches for estimating detection probabilities associated with each method. The methods proposed by this manual are for developing reliable, comparable estimates of population size to establish trend information. While this manual addresses only breeding season methodologies, there is a recognized need for information on methodologies for estimating numbers of colonial waterbirds outside of the breeding season. We have not included methods for measuring other population parameters such as growth rates and reproductive success during the breeding season, nor have we included methods for estimating numbers during migration or for monitoring changes within waterbird habitats. A separate manual will address these methods. For the purposes of this manual, colonial waterbirds are defined as those birds represented by the families listed below:

Family Species

Ardeidae herons, egrets, bitterns

Threskiornithidae ibises

Pelicanidae pelicans

Phalacrocoracidae cormorants

Laridae skuas, gulls, terns

Data Recording

It is vital to record observer, year, month, date and breeding phenology (nest courtship/building, egg laying, incubation, hatching/chick-rearing, fledging), and detection probability for interpretation of the counts and to allow comparisons over time and space.

Timing of Counts/Breeding Phenology

Specific recommendations are provided with each method described below. In general, the most effective time to count nests is during the mid- to late incubation stage of nesting, recognizing that even if counts are conducted at the peak of the nesting season, the total number of nests attempted over the entire breeding season are underestimated. The mid-to-late incubation stage is the most desirable because disturbance during early incubation or nest building stages can cause nest desertion.

Disturbance

The effect of observer disturbance on the breeding success of colonial waterbirds remains a controversial topic. Carney and Sydeman (1999) conducted a partial summary of the available literature on the topic. Nisbet (2000) challenged some of their conclusions. While disturbance is a potential problem at every colony, each species may react differently depending upon the source and proximity of the disturbance and the birds' ability to acclimate to it. A number of factors contribute to defining acceptable levels of

disturbance at a colony, including status as a listed species of management concern, proximity of potential predators that will prey upon the eggs or chicks if the adults leave the nests, weather conditions that will lead to the deaths of chicks or developing embryos in relatively short periods of time, and the behavioral traits of the species. In general, acceptable levels of disturbance should not cause the individual adults to leave nests for a period of time that places young or eggs at risk. This time will differ for species, breeding phenology, site characteristics, and survey date but factors to consider are weather conditions (e.g., exposing young or eggs to heat stress or cold), and presence of predators (e.g. gulls present to take eggs). In large colonies where only a portion of the adults will leave their nests due to the presence of observers, the surveys should be completed within 2 hours. A review of the literature on disturbance of colonial waterbirds should be performed prior to designing a monitoring program. Appendix C provides a short list of the more recent literature on disturbance to waterbirds.

Preparatory Work – Before you Conduct a Survey (From Bibby et al. 2000)

Before conducting a survey, two factors need to be recorded:

(1) A description of the study area should be documented. Aerial photographs can be used as a base-map to mark locations of colonies, or a GPS can be used to record locations and then geographic coordinates entered into a mapping program, such as ARC-VIEW.

(2) A description of the breeding colony must be provided. A colony is defined as a single location supporting breeding birds located close enough in distance to interact socially (Gochfield 1980). For each colony, record colony name (including previous/historic names), location (descriptive and geographic reference), land ownership, detailed description of the site, including geology and vegetation, access instructions, including landowner name and address, GPS coordinates delineating the boundary (if possible), history of counts, difficulties encountered while counting, and any other notes. If the colony is expanding or shrinking in size, or is located on unstable habitats that may shift in response to storms or other conditions (such as sand/gravel bars in a river), then the GPS coordinates should be provided every time the colony is surveyed. While all of this information will not fit on a field form, it is important to have a detailed description of each site that can be linked to field sheets for that particular site. The amount of information will depend upon the size and complexity of the colony site. If transects are needed, their locations should be indicated (possibly accompanied by GPS coordinates) in the colony description. If a survey requires viewing the colony from multiple sites or through the use of multiple methods (i.e. aerial survey combined with a ground count), then each viewing should be described including recording obvious landmarks.

Choosing a Survey Method

We have divided this portion of the manual into methods pertaining to species groups based on nesting behavior and nesting habitats, and have listed the recommended standardized methods for each group. More detailed protocols may need to be developed for each monitoring program using the general concepts in the manual but gearing the specifics of the survey, appropriately.

TREE AND SHRUB NESTING SPECIES

Double-crested Cormorant, Great Blue Heron, Great Egret, Snowy Egret, Cattle Egret, Green Heron, Black-crowned Night Heron, White-faced Ibis

I. Ground Surveys

Counts conducted from the ground tend to provide the most reliable estimates of numbers of breeding individuals. The preferred method is to conduct strip transects through the colony, a method that also readily allows for a determination of the precision associated with the counts. This method is not appropriate under all circumstances, however. Strip transects may create an unacceptable level of disturbance to the nesting birds in some colonies, because the presence of people within the colony for a long period of time may produce excessive predation or abandonment of the nests. When disturbance to the nesting birds must be minimized, a nest count during the non-breeding season provides an alternative approach for estimating population size for single-species colonies or mixed colonies where the nests of each species can be readily identified. For mixed colonies supporting species whose nests

cannot be readily identified after the birds have left the colony, a perimeter count during the breeding season combined with a nest count during the non-breeding season is the preferred approach for establishing population size. For colony sites with dense vegetation that hides most nests from the perimeter and are impenetrable on the ground, such as those located on small mangrove islands, flight-line counts provide the only method for developing an index to population size. Flight-line counts only provide an index to population size and are not directly comparable to the estimates of total population size derived from the other methods, so their use should be avoided under most circumstances. Aerial surveys should be strongly considered as an alternative to flight-line counts for these colonies if they are composed of light-colored species.

Purpose: Population estimation with precision. An ability to detect $\geq 20\%$ changes in the numbers of birds within colonies, along transects, or visible from the perimeter between years.

Target Population: The breeding population of each species present in the colony.

Timing of Counts: Within the geographic area or interest, counts should be conducted during the same stage of the breeding cycle. For example, if you are counting White Ibis in the Great Basin, it is best to conduct your surveys during the incubation period. During incubation, it is assumed that one of the parents will remain at the nest (Earnst et al. 1998). During the chick-rearing period, both parents may be away from or at the nest and making it difficult to determine the number of breeding pairs. The nesting stage during which to conduct counts should be determined based on the nesting habitat and the species.

Parameter: The number of active nests for each species present in the colony.

Survey Design:

Strip Transects - When considering strip transects of colonies, the first decision is whether to attempt counting every nest within the colony or to sample only a portion of the colony and extrapolate from this sample to an estimate of the total population. Under most circumstances, complete counts should be conducted in colonies totaling 100 or fewer pairs. Complete counts can be conducted for colonies in the range of 100-500 nests, assuming that sufficient personnel are available to conduct the survey with relatively minimal disturbance to the birds, preferably spending less than one hour in the colony and disturbing birds from individual nests for less than 10 minutes. However, sampling may also be conducted in colonies of this size. For colonies in the range of 500-1,000 nests, complete counts should be conducted only when available personnel can complete the census within one hour; otherwise, the colony should be sampled. Sampling is the preferred approach for most colonies in excess of 1,000 nests.

Strip Transects/Complete nest counts - The objective of these surveys is to accurately count every nest in the colony without double-counting individual nests. Simply walking a single unmarked transect and counting every nest may be an appropriate method for many small colonies composed of 50 or fewer pairs. Such simple survey methods may also be employed for larger colonies under exceptional circumstances, such as colonies located along narrow riparian corridors. But if all nests are not visible from a single transect, then the more complicated process of marked transect lines must be used. Complete nest counts necessitate that transects are established at intervals allowing every nest to be viewed from one line and no double counting to occur. The transect lines should be created during the non-breeding season to minimize disturbance to the nesting birds, preferably in late summer or early autumn when the nest visibility is similar to the conditions during the breeding season. Transects established during winter may prove to be inadequate when the habitats are fully vegetated. These transects should be marked with plastic flagging or some other fairly permanent marker at intervals that will easily allow the surveyor to follow each line through the habitat. The same transects should be used annually, although new lines may have to be established as colony size increases or shifts location, or if

the vegetation density changes over time. The outer-most transect lines should always be located beyond the current perimeter of the colony. Transect width will vary with the density of the vegetation; transects may be only 2-5 m wide in dense habitats, but widths of 30-60+ m are possible in open woodlands. Transect width can vary within a colony, especially when the vegetation density is heterogeneous, and should be dictated by the observer's ability to see the next transect line in order to accurately determine the boundaries of the strip being surveyed. Transect length is dictated by colony size, and should always provide a complete cross-section of the colony. Transect length may expand or contract to reflect changes in colony size.

Whether an observer chooses to count nests within both strips bordering a transect line or only one of the strips will depend upon factors such as the vegetation height and density, nest density, species composition, and the need to minimize disturbance to the nesting birds. When multiple observers are conducting the survey, the decision on how to count along each transect line should be made before entering the colony. For nests located in trees or shrubs that extend over the transect boundary, the nests should be counted only when the base of the supporting tree/shrub is located within the strip, regardless of the actual position of the nest.

Strip Transects/Sample Sites - These procedures require knowledge of the size of the entire colony in order to develop an appropriate sampling scheme. This information can be obtained from aerial photographs or from the ground, and should be updated each time the colony is surveyed. Standard colonial waterbird surveys use either 20% or 40% coverage as the basis for extrapolating the entire colony size; 40% is preferred under most circumstances, because this coverage will normally produce more accurate estimates of total population size. In extremely large colonies or habitats that are very difficult to traverse, then 20% coverage is adequate. Transects used to achieve a 40% sample of a colony should be chosen systematically from the entire set of possible transects. As long as the colony size and location remains constant, the same transects can be surveyed for more than one year. However, the random selection process should be repeated whenever the colony size and distribution of nests changes. For multi-species colonies that are partially or entirely segregated by species, a random sample approach stratified by species distribution should be used to ensure that all species are adequately surveyed (i.e. each species receives 40% coverage). Establishing transects, determining transect width, and conducting the surveys should follow the methods described in the Complete Nest Counts section.

Measuring Detection Probability – The first observer walks the transect line using plastic tape to mark every shrub/tree that supports an active nest. Each shrub/tree is individually identified by the tape and the number of nests for each species is counted. Once the first observer is finished, a second observer independently repeats this process. After the second observer is finished, the transect is revisited and the number of shrubs/trees found by both observers and/or missed by one or both are recorded. For large colonies, this process does not have to be followed for every transect. Depending upon the number of nests detected along each transect, following this procedure for 5-10 transects should be sufficient to establish detection probabilities. For small colonies (<5 transects), this procedure should be followed for every transect.

Nest counts during the non-breeding season - (May be useful for Double-crested Cormorants in the Great Lakes region and Great Blue Herons in the Northeast)

Nest counts conducted during the non-breeding season are more problematical to accurately translate into numbers of breeding pairs, because it is impossible to positively establish whether a nest was actually used during the previous nesting season. These surveys can only count the total number of nests, and assume that the changes in these counts reflect actual changes in numbers of breeding pairs. In Florida, colonies may be continuously used for most months of the year. The composition of the breeding populations will vary seasonally, so that species breeding in late spring and summer may not be the same as those breeding in late winter. A single nest may be used by two or more species during the course of a single year. These colonies will have to be surveyed on multiple dates during the breeding

season in order to accurately assess the changing composition of the breeding communities, and nest counts during the non-breeding season should not be attempted. Nest surveys during the non-breeding season should follow the methods described in the Complete Nest Counts section. Since disturbance to birds is normally not a factor, these surveys should attempt to count every nest when possible. All nests located in bushes and trees should be counted, even those that may not be habitable by birds in the future. Nests that have fallen to the ground should also be counted, and then broken up to avoid counting them again in future years. Multi-species colonies pose additional challenges, since nests will have to be identified by species when they are counted. In some colonies, nest identification is straightforward because each species' nests are readily segregated by height, size, and type of supporting vegetation. In a Great Blue Heron/Black-crowned Night-Heron colony, for example, the Great Blue Heron nests are located near the canopies of tall trees while the Night-Herons are found much lower in the understory, and nest identification is fairly easy. In many mixed colonies, however, it will not be possible to identify every nest to species. Nests of large herons can be distinguished from the smaller species, and nest placement and structure may distinguish some of the smaller species. But Little Blue Herons, Snowy Egrets, and Cattle Egrets build similar nests in similar locations, and positively identifying them will not be possible under most circumstances during the non-breeding season. For colonies where all nests cannot be positively identified during the non-breeding season, surveys must also be conducted during the breeding season to accurately establish the number of breeding pairs for each species.

Measuring Detection Probability - Same as method described above.

Perimeter Counts – Perimeter counts can be conducted by boat or by locating fixed points around the perimeter of a colony and conducting counts from these pre-determined stations. Several potential problems complicate the use of perimeter counts. Under most circumstances, some nests within a colony will not be visible during perimeter counts. The proportion of undetected nests will vary from colony to colony depending upon vegetation structure and density, nest location, and other factors, so that developing a correction factor to compensate for these undetected nests has to be done on a colony-by-colony basis. Normally, a complete nest count (using transects or aerial photographs when appropriate) is performed in addition to the perimeter count, and provides the basis for establishing the proportion of nests that are undetected from the perimeter. Another problem is that some nests may be counted from more than one location along the perimeter. In many instances, determining whether or not a nest has been previously counted is not possible, so that double-counting is a potential source of error in these estimates of population size. For these reasons, use of perimeter counts is recommended for colonies when accurate nest counts are possible only during the non-breeding season and the nests of some species cannot be distinguished during these surveys. Perimeter counts provide an index to the size of the breeding populations for each species that can then be combined with the nest counts to provide a more reasonable estimate of total population size. Perimeter counts are also recommended for small colonies (<50) nests of Great Blue Herons or other species that build conspicuous nests and return to the colonies before the nests are concealed by vegetation, especially in areas where access to the colony is difficult.

The number and location of survey points will vary from colony to colony depending upon vegetation structure and density, colony size and shape, types of species breeding in the colony, and possibly other factors. The points should be located at sufficient intervals around the colony to allow for counting the maximum number of nests while minimizing the risk of double-counting nests. Initially, the survey locations should be established during the non-breeding season when nests are most visible. The points should be located from positions that allow birds to be counted without disturbing them from the colony. These points should also provide views of unique "landmarks" within a colony that can be used to establish which nests to count from each point. The number of nests visible from each point should be counted. The total number of nests visible from the perimeter can then be compared with a nest count from within the colony taken at the same time to determine the proportion of nests that are visible from outside of the colony. Enough points should be established to count at least 50 percent of the nests within the colony, and coverage of 75 percent or greater is preferable. The survey points should be

marked and used during each survey, except when there are changes in colony size, nest location, and/or vegetation structure which may require periodic adjustments in the locations of the perimeter survey locations in order to count a comparable proportion of the breeding population of each species present in the colony.

Measuring Detection Probability

A "primary" observer would verbally count the nests for each species that are visible from each survey point. The "secondary" observer would independently conduct counts and record nests that were missed by the primary observer. For large colonies where there are many survey points, the observers can trade roles between points in order to obtain detection probabilities for each observer.

Flight-Line Counts – This method would be used only for colonies that cannot be surveyed from the ground, have a large proportion of the nests that are not visible from the perimeter, and the colony supports populations of dark-colored species that would be poorly sampled by aerial surveys. This method can also be used if disturbance to the colony by other methods is significant and must be avoided. Flight-line counts provide an index of population size at a colony, but tend to under-estimate the numbers of breeding adults at a colony. Many factors influence the relationship between this index and the actual number of breeding pairs that are present, including the stage of the nesting cycle, species-specific patterns in feeding rates, time of day, and tidal stage. The importance of these factors normally varies from colony to colony. Hence, standardization may allow for comparison of totals between years at a colony but does not permit comparisons among colonies. Survey locations for flight-line counts are established at a position that allows for unobstructed views of birds flying between the colony and their foraging habitats. A single observer or multiple observers may conduct these counts if birds are returning to the colony from all directions. The flight directions are generally non-random, and if a single observer is conducting the count, the location should be selected to detect the greatest number of birds entering or leaving the colony. Multiple observers should establish points at sites that will not duplicate counts of individual birds. Reference points in two different directions should be identified from each survey point, and only birds crossing the line between the observer and these reference points should be counted. Individual birds flying to and from the colony should be counted separately. Counts are conducted for 3 hours, preferably during the incubation stage of nesting to reduce the variability associated with repeated visits to feed a brood of hungry young. If tidal feeding is important, then these counts should be made at low or ebbing tides. These counts should be conducted during the morning hours (0800-1200) in most areas.

Parameter The number of adults observed flying to/from the colony is used as an index to the overall population size.

Advantages -This method provides an index to abundance at sites that cannot be sampled by other methods.

Disadvantages -The relationship between the number of birds counted during these surveys and the total number present in the colony is unknown, and may vary from colony to colony. Timing of these surveys is critical for obtaining reasonable counts, and must be based on the local biology and patterns of movements for the species. All birds are assumed to be breeders, but the proportion of non-breeders in the population is unknown.

Measuring Detection Probability - The "primary" observer would verbally identify and count all individuals as they fly to/from the colony. The "secondary" observer would try to find individuals/flocks that are missed by the "primary" observer, as well as check the identification and counts of birds reported by the primary observer. Since these counts are frequently taken over a several hour period, the observers should change roles half-way through the survey period in order to obtain detection probabilities for both observers.

II. Aerial Surveys

Purpose: To estimate population numbers and to determine population trends at $\approx 20\%$ between years (For colonies with ≈ 100 nests). At larger colonies, the ability to detect population trends may vary from site to site depending upon the species composition, numbers of individuals present, and the visibility of the colony from the air.

Advantages: While ground surveys may provide the most accurate counts of nesting adults, these techniques may be uneconomical for large-scale monitoring programs, logistic constraints may prevent access to some colonies or restrict the number of colonies that may be surveyed during a single breeding season, and are somewhat disruptive of the breeding birds since they frequently require entering the colony. Since a number of colonies can be visited during a single flight, the cost-effectiveness of these surveys can be fairly high despite the relatively high cost of using aircraft. For these reasons, aircraft have been regularly used to survey colonial waterbird colonies.

Disadvantages: Some species are poorly detected by aerial surveys, especially dark-colored species and those that nest under the canopy or within the vegetation. Visibility of all individuals may be an issue in some habitats, primarily where the vegetation is relatively dense. Because of these visibility problems, ground counts must be periodically conducted concurrently with the aerial surveys in order to document the proportion of individuals that are missed from the air.

Parameter: Number of nesting pairs in a colony

Survey Design: The main problem with aerial surveys is unequal visibility of species from the air. White birds tend to be very visible since they are normally viewed against a dark background. Dark-colored birds are frequently significantly under-counted by these surveys. Vegetation density is another factor influencing the visibility of birds on aerial surveys, especially species that nest under the tree canopy. For these reasons, aerial surveys provide biased estimates of population sizes for many species. To correct for the species that are under-counted by aerial surveys, they should be supplemented by counts conducted on the ground. These ground counts should be made very close to the date of the aerial surveys, and use an appropriate ground survey method described above. Totals obtained from the ground surveys can then be used to develop appropriate visibility correction factors for species that are undersampled by the aerial surveys, so that appropriate adjustments can be made during years when only aerial surveys can be conducted at a colony. Both fixed-wing aircraft and helicopters have been used for aerial surveys. Disturbance from both types of aircraft tend to be minor and of short duration. A study comparing the levels of disturbance associated with each type of aircraft indicated that helicopters caused the same or less disturbance than fixed-wing aircraft for most of the species (Kushlan 1979). Because of their slower speeds and better visibility from inside the aircraft, helicopters tend to provide more accurate counts for most species. These surveys will normally consist of two passes over a colony, one at an altitude of 100-200 m above the colony and a second pass at 60-80 m altitude. At least ten minutes should separate the two passes. During both passes, the aircraft should circle the colony three to five times during a 2-3 minute period until a satisfactory count has been completed. A single pass may be sufficient under some circumstances, such as for nest counts during the non-breeding season. Observer variability is one of the main sources of imprecision in aerial surveys. Estimating large concentrations of birds is always difficult and observers conducting aerial surveys should receive training in estimation before conducting the surveys. Detecting and identifying species from the air also requires some training prior to the surveys. Because of the issues associated with observer variability, the use of methods to determine detection probabilities for each observer is essential for all aerial surveys.

Aerial surveys are not likely to produce precise estimates in most circumstances because of the problems with unequal visibility from the air. A possible exception would be for colonies composed of large white species (Great Egrets, Wood Storks) that have widely spaced nests in the tree canopy. Any attempt at an aerial photographic survey should be combined with ground counts to determine the precision of the aerial population estimates.

Measuring Detectability - A double observer approach similar to those used in waterfowl surveys would provide estimates of detection probabilities for these surveys. One observer would be the "primary" observer, verbally identifying and counting all of the birds that they see. The "secondary" observer would note all birds that were missed by the "primary" observer. The observers can switch their roles between colonies, in order to obtain detection probability estimates for both observers. Both observers will need training in the estimation of flock size, and should be tested to ensure that their abilities are comparable.

GROUND NESTING SPECIES

American White Pelican, Double-crested Cormorant, White-faced Ibis, Ring-billed Gull, California Gull, Sabine's Gull, Caspian Tern, Common Tern, Forster's Tern

[Note: Aerial photography has been successfully used for some ground nesting gulls and terns. This section discusses ground counts. For information on using aerial photographs, please see section on cliff-nesting species]

Purpose: To estimate population numbers with reasonable precision and detect changes in numbers $\geq 20\%$ between years.

Target Population: Number of occupied nests within the area of interest.

Ground-nesting Gulls, Terns

Selection of the survey technique should be based on colony accessibility and nest visibility. The preferred method is a direct nest (ground) count, which is possible only for accessible colonies where all nests can be readily observed. Where nests are located in dense vegetation and are difficult to locate, or in very large colonies where a total nest count is not feasible, a sampling procedure is recommended for the nest counts. Counts of adults or total individuals should be avoided unless no other options exist, since these counts include both breeding and non-breeding individuals. The proportion of non-breeders to breeders may vary hourly, daily, seasonally, and between years, so that comparisons of these counts is problematical under most circumstances. Additionally, counts of flying birds tend to be inaccurate and do not allow for the determination of detection probabilities.

Protocols for Gulls - Surveyors should count or develop an estimate of the number of occupied nest sites at each colony. Defining an occupied nest site varies from species to species, depending upon the complexity of the nest that is normally constructed. For some species, it may be necessary to distinguish between the more elaborate nests built by breeding adults from the less well-built structures constructed by non-breeding individuals. For all species, an occupied nest site should be more than a simple scrape, but should include a defined built-up edge. The presence of fecal matter may be helpful to distinguish between occupied nests and sites that were abandoned prior to incubation. Nest counts should be conducted during the mid- to late incubation period for gulls. Most nesting pairs should be present at this time, except possibly some adults that failed early during the incubation period and did not attempt to re-nest. These counts should be made between 0900 and 1600 since colony attendance is most stable during these hours making it easier to find nests. Heavy rain, fog, and high winds should be avoided (wind speed ≤ 22 knots or visibility is ≤ 400 meters). Caution should also be exercised on very hot days, since lengthy exposure to direct sunlight and high temperatures may kill the developing embryos. Under these conditions, the adults should be kept off their eggs for only the minimum amount of time needed to count nests, ideally for 20 minutes or less, and the surveys should be conducted during the relatively cooler morning hours. This time period may be extended in large colonies if the disturbance is local and birds in adjacent areas remain on their nests. However, small newly established colonies tend to be very prone to desertion after disturbance and great caution should be exercised when surveying these colonies.

Protocols for Terns - For terns, an occupied nest site is usually defined as adults that are sitting tight and apparently incubating eggs or brooding chicks. Most colonies of breeding terns are very difficult to

count with an acceptable degree of precision. In addition to the problems associated with counting large numbers of birds, the numbers of terns at colonies vary throughout the breeding season. Unsuccessful pairs may shift to another colony for a second nesting attempt, hence, numbers may decrease at unsuccessful colonies during the season and increase at sites where success rates are relatively high. In bad years, some colonies might be suddenly abandoned and large numbers of birds may not attempt to breed. A complete count of every pair that attempts to breed at a colony will not be possible under most circumstances, and the number of nesting pairs counted during a single survey will probably underrepresent the total population for a breeding season. Some species of terns have a fairly well defined peak of egg laying early in the breeding season, followed by one or more smaller peaks. Renesting attempts and young birds nesting for the first time account for the latter peaks. For these species, surveys should be conducted shortly after the main peak of laying so that the most synchronized group of breeding terns are counted. Other species of terns may have a fairly prolonged laying peak, or may not have any clearly defined laying peak. For these species, the surveys should be conducted during the middle of the main egg laying period, noting the stage of the breeding phenology that exists on the survey date. Future surveys of these sites should be timed to coincide with a similar stage of the breeding phenology so that nest counts are comparable from year to year.

Complete Nest Counts. If good vantage points are available, all nests are readily visible, and the colony contains fewer than approximately 200 pairs, then complete nest counts can be made from the perimeter. One or more survey points should be established as needed to count all nests within the colony, but necessary caution should be used to avoid double counting of nests. If more than one survey point is needed, then clear landmarks should be used to define the nests that are counted from each point. The same survey points should be used in subsequent surveys, unless the colony location shifts or its visibility changes and new points are needed to obtain a complete count of nests. If perimeter counts are not suitable for counting every nest, then a systematic ground survey should be conducted. These surveys are possible only at accessible sites. The entire colony is surveyed and each nest marked with spray paint or by some other means to avoid omission or double counts. The decision to conduct systematic ground surveys or to use a sampling method will depend upon the colony size, accessibility of the colony site, ability to find nests within the vegetation, and the number of people available to conduct the survey without causing unacceptable levels of disturbance to the nesting birds. Under most circumstances, systematic surveys should be attempted for colonies with fewer than approximately 200-300 pairs. If accessibility is not an issue and sufficient personnel are available to conduct the surveys, then colonies of 500-1,000+ pairs can be surveyed by these methods.

Parameter: Total number of nests within the colony

Sampling colonies. For large colonies, generally those in excess of 1,000 pairs, and for colonies where the nests are hidden in vegetation and more difficult to locate, complete nest counts are not feasible without causing unacceptable levels of disturbance to the nesting birds. In these situations, a sampling methodology should be used to develop an estimate of the population size. The sampling procedures require developing nest density estimates in a portion of the colony, and using these densities to extrapolate to the total number of nesting pairs at the site. In order to develop these estimates, the total area occupied by the colony must be established. For colonies of relatively conspicuous species in open habitats, aerial photographs may be adequate for establishing colony size. For less conspicuous species or where the nests are hidden by vegetation, the colony location will have to be mapped on the ground. This process should be repeated every time the colony is surveyed to develop more reasonable estimates of population change over time. The number of sampling units (transects or quadrats) will depend upon the colony size, relative ease of locating nests, and the availability of personnel to conduct the survey. Ideally, 20% to 40% of the total colony area should be sampled to develop an estimate of population size, assuming that sufficient personnel are present to conduct the survey without causing unacceptable levels of disturbance to the nesting birds. A minimum of 10% coverage should be achieved under most circumstances, except for huge colonies (tens of thousands of nesting pairs over a large area) or sites where the nests are very difficult to locate and only a small number of units can be adequately sampled

within the appropriate period of time. In these situations, only 5% coverage may be realistic. For colonies that are rapidly increasing or decreasing in size, or that frequently move between years, permanent sampling locations are not practical; the selection of sampling locations will have to be made before each survey. Where colony sites are stable between years, permanent sampling locations can be used. Since between-year population changes are more likely to be reflected by changing densities at the periphery of the colony rather than at the preferred nesting sites within the center of the colony, stratifying sampling sites by their location within the colony may be important for more accurately detecting population changes. The accuracy of the population estimates will reflect the proportion of the colony sampled by these methods. As the area sampled increases, these estimates will generally become more accurate. A consistent level of coverage between years is helpful to produce comparable estimates of population sizes over time. The need to achieve consistent levels of coverage, and the personnel needed to reach these levels, should be factored into the choice of an appropriate amount of coverage for each colony when they are initially surveyed.

Parameter: Total number of occupied nests per colony.

Transects. Transects are normally preferred in fairly open and uniform habitats where the nests are relatively visible. If the vegetation is relatively dense and nests are not easily found, the quadrat method (see below) would be preferred under most circumstances. If habitats are heterogeneous at a colony, then both methods may be employed. Once a colony has been mapped, transects need to be defined in order to obtain a representative sample of the population. Transects should be placed at 5m intervals. If possible, they should be permanently marked at both ends of the line and possibly at regular intervals if they are extremely long. Marking the lines with colored string may facilitate following the transects through the colony. The subset of transects chosen for the survey should be randomly selected from all possible transects crossing the colony. As the colony size varies over the years, the number of transects that are sampled should be correspondingly adjusted to maintain a consistent level of coverage. The number of occupied nests sites within 1m on either side of each transect are counted and marked to avoid double counting. Once the area of the colony and transects are known, then the number of breeding pairs can be estimated.

Quadrats. Choice of quadrat size will reflect the nest density and vegetation density at the colony. The standard size is 10m x 10m, but a 20m x 20m may be employed where large species (e.g. Great Blackbacked Gulls) are prevalent or the nests are widely spaced. Smaller quadrats may be used where nests are tightly packed or where the vegetation is fairly dense and the nests are located with some degree of difficulty. Quadrat location should be selected at random, although stratification by sub-areas within the colony may be necessary to ensure that the sites are representative of the entire colony. These locations can be points placed at equal distances along randomly selected transect lines, or they can be sites randomly chosen within the colony to include both nests along the periphery and preferred sites in the center.

Measuring Detection Probability

For the complete nest count, transect, and quadrat methods, a double observer approach can be used to determine detection probabilities. For all methods, a single observer would conduct the survey method and mark the nests using a colored washer or some other inconspicuous object. Once this count was completed, a second observer would independently conduct the same survey and mark each nest with a different object. At the completion of the second survey, a third observer would record how many nests were found by both individuals and the number found by only one observer. For the transect and quadrat methods, detection probabilities do not necessarily have to be calculated for each plot or transect. Instead, this method would be employed at only enough transects/plots to establish the detection probabilities for each observer involved in the survey.

Flush Counts. This method should be used only where colonies are inaccessible or where nest counts can be accomplished only with unacceptable levels of disturbance. Flush counts can be completed

relatively quickly without entering the colony, but some inaccuracy is inevitable in counts of flying birds and determining the degree of error is difficult to establish in the field. Detection probabilities also cannot be determined for counts obtained with this method. In this method, a flying bird constitutes the counting unit. A group of observers approach the colony and startle the adults by using a loud horn or some other noise for terns or by waiving their arms for gulls. The adults are counted while they are flying. Estimates of population size should be made within the first minute that all of the birds flush; as the birds fly around the colony for longer periods of time or as the adults return to their nests, the counts become less accurate. These counts should be conducted between the mid-incubation and early nestling stage of the breeding phenology to count the peak numbers of birds at a colony. Flush counts are most appropriate for small colonies (fewer than 200 pairs) occupied by single species or where the multiple species can be easily identified by sight. In colonies hosting species that are difficult to distinguish in the field, such as Arctic and Common Terns, accurate estimates of population sizes for each species may not be possible. Given the inaccuracies associated with counts of flying birds, multiple observers should produce estimates for each species at a colony. These counts can be averaged to provide a reasonable estimate of total population size (Prater 1979). A minimum of five observers should conduct the flush counts, and each observer should receive training on the estimation of numbers of birds prior to the surveys. Bullock and Gomersall (1981) developed a nest-attendance index to relate the true numbers of nesting pairs with the estimates derived from flush counts. Comparing counts of "apparently occupied nest sites" with flush counts from a small number of tern colonies in the Scottish islands every five days over the breeding season at 2-hourly intervals between 0800 and 2200 derived this index. At these colonies, they calculated that three flying birds were the equivalent of two breeding pairs. The applicability of this index to other locations and species is uncertain, and similar nest-attendance indices should be developed for colonies where flush counts are the only acceptable methods for population estimation.

Parameter: Total number of adults present in the colony. This number includes both breeders and an unknown proportion of nonbreeders. While counts of individual birds may be possible at small colonies, the precision of estimates at large colonies is uncertain. At large colonies, only major changes (probably >25%) in abundance will be evident from year to year.

Measuring Detection Probability

Field testing of a method is necessary, and given the difficulty of attempting to count any flock of birds milling around a colony site determining detection probabilities is not possible for this method.

MARSH NESTING SPECIES

Black-crowned Night Heron, Black Tern, Cattle Egret, California Gull, Common Tern, Double-crested Cormorant, Eared Grebe, Forster's Tern, Franklin's Gull, Great Egret, Green Heron, Great Blue Heron, Ring-billed Gull, Snowy Egret, Western Grebe, White-faced Ibis

In general, methods for monitoring the populations of colonial-nesting birds in wetland habitats remain poorly developed. Access to the colonies in these habitats is frequently difficult, and many monitoring methods proposed for terrestrial habitats become inappropriate in wetlands. All methods used to monitor wetland-nesting species should respect the relative fragility of these habitats and the vegetation at the colony sites; disturbance to the vegetation should be avoided as much as possible to minimize the possibility of nest failure and/or colony abandonment in response to the monitoring activities. Disturbance to the nesting adults should be kept within the guidelines outlined previously. Since observer movement through the colonies generally requires greater periods of time in wetlands than in uplands, minimizing disturbance of the breeding pairs becomes a critical factor in the selection of potential monitoring methods for these species. These factors, combined with the difficulty of locating nests, contribute to the relative imprecision associated with the existing methods used to monitor colonial nesting species in these habitats. The following section summarizes the strengths and weaknesses of the methods that have been used to monitor populations of colonial-nesting birds in wetlands. In some cases, alternative methods are suggested, although these approaches certainly require testing and

verification in the field before they should be applied across a large geographic area. Methodological development is a critical need before meaningful population monitoring programs can be initiated for most of these species, and must include creating approaches for determining the detection probabilities associated with these methods.

HERONS, IBIS

The species that are most frequently found nesting in wetland habitats are Great Egrets, Snowy Egrets, Black-crowned Night-Herons, and White-faced Ibis. Four survey methods have been used to develop estimates of breeding populations: direct nest counts, flight-line counts, helicopter surveys that serve as a "flush count", and surveys from fixed-wing aircraft.

Direct Nest Counts

Purpose: Population Estimation with reasonable precision: an ability to detect $\geq 20\%$ changes in the numbers of birds within colonies, along transects, or visible from the perimeter between years.

Parameter: All active nests within the colony.

This method consists of an observer or group of observers traversing a colony on foot or by boat to locate and count the nests of all breeding pairs. This method has generally been used in relatively small colonies (<100 nesting pairs) that do not require transects, especially where the colonies are located in discrete patches of vegetation and can be fairly easily located within the wetland. The habitats must allow for access by boat or on foot so that the nests can be counted without causing excessive disturbance to the adults and young. The advantage of this method is that it counts the number of nesting pairs, providing estimates that are comparable to those obtained from the recommended methods for colonies located in upland habitats. The precision of this method is uncertain and may vary from wetland to wetland; hence, determining detection probabilities should be incorporated into these surveys. Use of this method will likely be restricted to relatively small colonies, in order to keep disturbance of the nesting adults within acceptable levels and since establishing transects may not be possible in most wetland habitats. Whether this method is appropriate in all habitat types remains to be determined, especially in wetlands where the vegetation is dense and finding nests may become more difficult; determining detection probabilities by habitat type will likely indicate those wetlands that are most appropriate for the use of this method. For larger colonies, one possible approach would be to conduct direct nest counts in quadrats and use the density estimates from these quadrats to develop estimates of total population size. Quadrat size requires additional investigation, and may vary depending upon the species present and vegetation characteristics. This approach might provide a reasonable alternative to flight-line counts or aerial surveys for species that may not be well sampled by those methods.

Measuring Detection Probability: Methods for determining detection probabilities still need to be developed and tested in the field. If transects are created, then methods employed in other transect surveys may also work in wetlands. If habitats are systematically searched for nests, then a double-observer method might work in areas with fairly discrete patches of habitats. The first observer could try to locate as many nests as possible in the colony, marking each nest with plastic flagging or some other marker. The second observer would independently locate nests, recording how many had been found by the previous observer and the number of nests found only by the second observer. These data could be used to estimate detection probabilities.

Flight-line Counts

Purpose: Given the uncertain relationship between the flight-line counts and the total number of nesting pairs in a colony, the ability of this method to detect population trends is uncertain and may vary from colony to colony. Large changes should be evident, but changes in the range of 20% per year may not be detectable at most sites.

Parameter: The number of adults observed flying to/from the colony is used as an index to the overall population size. This parameter may include both breeding adults and nonbreeders, and the proportion of nonbreeders may vary between surveys. This method has been described previously, and its appropriateness for marsh-nesting species requires additional study. As in colonies located in other habitats, the primary problem is the relationship between the numbers of individuals counted by this method with the actual number of pairs nesting in the colony. This method only provides an index of population size, so comparison with estimates of total population size become problematical. At wetland colonies, flight-line counts have generally been conducted "shortly after sunrise" during the incubation period. Its appropriateness may vary from species to species depending upon the amount of synchrony in their nesting behavior. For example, large colonies of White-faced Ibis are composed of highly synchronized sub-colonies that are spatially discrete; one sub-colony may be incubating while another is feeding young in the nest so that the movement patterns of adults may vary from one sub-colony to another. Hence, timing of the count with respect to the breeding chronology each year becomes important if between-year comparisons of population size are needed. Use of this method to monitor marsh-nesting species requires verification at colonies where population estimates have been determined by other methods. Determining the most appropriate time of day and period of the nesting chronology for each species is necessary for developing indices that are comparable between years.

Measuring Detection Probability: A double observer approach can be used to determine detection probabilities. The "primary" observer would verbally identify and count all individuals as they fly to/from the colony. The "secondary" observer would try to find individuals/flocks that are missed by the "primary" observer, as well as check the identification and counts of birds reported by the primary observer. Since these counts are frequently taken over a several hour period, the observers should change roles half-way through the survey period in order to obtain detection probabilities for both observers.

Surveys by Fixed-Wing Aircraft

Purpose: To estimate population numbers with reasonable precision; to detect changes in numbers \geq 20% between years. This level of precision would apply only to light-colored species that are readily visible from the air, and probably for smaller colonies where counts of individual birds are possible.

Parameter: The total number of adult birds present in the colony and visible from the air, either counted from aerial photographs or by observers in the plane. How this number relates to the total number of nesting pairs is uncertain, because the counts may include both breeders and nonbreeders. This method has been described previously and is most appropriate for nesting egrets and other light-colored species. It will likely underestimate numbers for dark-colored species. This method needs to be combined with ground counts in order to determine appropriate correction factors for individuals not visible from the air. These surveys have generally involved estimating numbers of visible birds from the aircraft. Use of aerial photography warrants additional study. Aerial photographs would eliminate the observer-related biases associated with estimating large numbers of birds from the air. Ground counts would still be necessary for developing appropriate visibility correction factors, but this approach may improve the accuracy of estimates obtained from these aircraft.

Measuring Detection Probability: Methods used to estimate detection probabilities for other taxa from aerial surveys should be used for marsh-nesting birds.

Flush-Counts by Helicopter

Purpose: The precision of this method tends to be poor, especially at large colonies where only very approximate estimates of total populations are possible. At large colonies, between-year differences of an order of magnitude should be detectable, but smaller changes may not be evident. At small colonies where individual birds can be readily counted, the precision will be better but may still be less than the standard goal for other survey methods.

Parameter: Total number of adults flushed by the helicopter from the colony. How this number relates to the total number of nesting pairs is uncertain, because the counts may include both breeders and nonbreeders. The proportion of birds that do not flush is also unknown, and could vary between surveys. This method has been used for dark-colored species, especially White-faced Ibis that are poorly represented on surveys by fixed-wing aircraft. In this method, a helicopter is used to flush the birds from the colony and the numbers of individuals in flight are estimated. Large numbers of birds cannot be accurately counted in flight as they mill around the colony, so this method provides only a rough estimate of total population size; determining relatively minor year-to-year changes is not possible in many instances, especially for common species. Observer-related biases associated with these counts may be substantial, and comparing estimates between two different observers may not be possible.

Measuring Detection Probability: For small colonies where individual birds can be readily counted, a double-observer approach might be developed to produce an estimate of detection probabilities. Since flushed birds may quickly re-settle on their nests or fly away from the colony, a double-observer method may be difficult to develop. For large colonies where total population size can only be estimated, no method for determining detection probabilities is possible. Because of the difficulty in obtaining precise counts of breeding population size and an inability to determine detection probabilities under most circumstances, this method should be used only when no other options are available.

GULLS

In North America, two species of gulls are obligate wetland nesters: Franklin's Gull that is widely distributed across the northern Great Plains and Little Gull which has a very small breeding population on this continent.

Franklin's Gull

Purpose: To estimate populations with reasonable precision; the goal is to detect $\geq 20\%$ changes in the numbers of birds present at monitoring plots between years.

Parameter: To develop estimates of the numbers of nesting pairs at each colony. Nest counts are needed to avoid counting nonbreeders. Franklin's Gulls breed in large colonies at permanent wetland sites, always nesting over water on mats of vegetation, muskrat houses, floating debris, and similar structure. They prefer areas with low vegetation densities and where there are patches of open water of varying size. Their nests are generally 0.5-4.5 m apart, and their nesting behavior tends to be highly synchronous. Since their colonies normally number in the hundreds or thousands of pairs, they are normally fairly easy to locate. Developing accurate estimates of numbers of nesting pairs can be difficult at the larger colonies, and no specific monitoring methods have been proposed. Aerial photography of the colonies during the early to mid-incubation period (generally during the last half of May or early June) might be the most promising method for monitoring this species. The adults nest in relatively sparsely vegetated habitats, and the adult birds should be visible from photographs taken at low altitudes during that time of the year. Concurrent ground counts taken at small colonies or portions of large colonies would be needed to develop a correction factor for birds that are not visible from the air. Direct nest counts may be possible at smaller colonies (<100-200 pairs), although considerable care will be needed to accurately count the nests across a relatively featureless habitat. A quadrat method may also be possible at some larger colonies, although given the relatively broad spacing of the nests, these quadrats would have to be fairly large (at least 20 X 20m) in order to contain enough nests for developing a reasonable estimate of total population size. This approach may be feasible at locations that are consistently occupied by nesting colonies. But colony sites tend to change frequently in response to fluctuating water levels, hence, establishing quadrats may be difficult at most colonies.

Measuring Detection Probability: Until methods are better defined to adequately survey the breeding population, developing methods for estimating detection probabilities is not possible. If aerial photography proves to be a useful survey method, then methods described previously for estimating detection probabilities for other taxa from aerial photos should also apply to Franklin's Gulls.

TERNs

In North America, two species of terns are obligate wetland nesters: Forster's Tern and Black Tern. These species tend to nest in small colonies, usually totaling fewer than 50 pairs. Both species regularly nest as isolated pairs or small groups of 5 or fewer pairs. Direct nest counts are the most appropriate method for estimating population size, but the most important challenge is actually finding all of the nesting locations that may be scattered within a large wetland. Their nest site preferences are described below, and these habitats at potential breeding sites should be systematically searched (normally by boat) in order to locate all nesting pairs. The defensive behavior of the adults is frequently a good indicator that an observer is near a nest site. These surveys should be conducted during the incubation stage of nesting, since some adults may abandon their breeding sites if their nesting attempts fail during incubation. The timing of the surveys should be consistent from year to year to produce comparable results. Counts of foraging adults should not be used as an index of breeding population size, since both species will forage at wetlands away from their nesting locations.

Forster's Tern. This species only nests in "large" marshes, preferring those in excess of 100 acres in extent with permanent open water. Forster's Terns regularly occupy freshwater and tidal wetlands. Their nests are usually located at the edge of large open pools, frequently on muskrat houses, mats of vegetation, and other sites that are well above normal water levels. They tend to be more social than Black Terns, and as many as five pairs may nest on a single muskrat house.

Black Tern. Black Terns prefer large freshwater wetlands where 25-75% of the surface is covered with vegetation and water depths are generally 0.5-1.5m. They frequently nest as isolated pairs, although clusters of fewer than 50 nests may be found within a relatively small area. The response of the adults to the presence of the observer is a good indication if more than one pair is present at a site. Their nests are usually located on floating mats of dead vegetation barely above water level, normally within 2m of a large expanse of open water. Some nests are hidden within small patches of emergent vegetation, while others are on floating mats that are completely exposed. Other terns will occasionally nest in various wetland habitats, generally in small numbers that are monitored using direct nest counts. Common Terns may form fairly large colonies in some wetland habitats, and the methods previously discussed for that species will likely prove to be most appropriate for monitoring their colonies in wetlands.

MARSH BIRDS

Excerpts Taken/Modified From:

Standardized North American Marsh Bird Monitoring Protocols. Conway, C. 2002. Report to USGS-BRD for USDA project no. 5004789. (See <http://www.waterbirdconservation.org/waterbirds/NorthAmericanMarshbirdSurveyProtocolsOnlywithoutpicture2.pdf> for complete manual and references)

During surveys for primarily marsh birds, observers may (at their option) record species of secondary concern that are also under-sampled by other monitoring programs, e.g., grebes, herons, egrets, waterfowl, Forster's and Black Terns (*Sterna forsteri* and *Chlidonias niger*), Common Snipe (*Gallinago gallinago*), Sandhill Cranes (*Grus canadensis*), Northern Harriers (*Circus cyaneus*), Belted Kingfishers (*Ceryle alcyon*), Willow Flycatchers (*Empidonax alnorum* and *E. traillii*), Marsh Wrens (*Cistothorus platensis* and *C. palustris*), Red-winged and Yellow-headed Blackbirds (*Agelaius phoeniceus* and *Xanthocephalus xanthocephalus*), Common Yellowthroats (*Geothlypis trichas*), etc.

FIELD PROCEDURES, METHODS, PROTOCOLS

Location of survey points:

Permanent survey points should be chosen and marked with unique, inconspicuous markers in the field. If possible, locations of all survey points should also be plotted on maps of each wetland and UTM locations of each point recorded using a GPS receiver. For the standardized continental monitoring program, distance between adjacent survey points is 400 m to avoid the risk of double-counting individual birds and increase the total area covered by monitoring efforts in a local area (200 m can be used in small survey areas, but this will increase likelihood of double-counting). Survey points in ponds should be located either on the upland-emergent interface or on the open water-emergent interface, whichever will allow easier access and travel between survey points. If new marsh patches appear in future years in areas within the predefined management area that did not have emergent marsh previously and did not have survey points, additional survey points should be added (provided that they are $\geq 400\text{m}$ from existing survey points). Original survey points are never dropped from the survey and are always surveyed in subsequent years. If no appropriate marsh exists at an original survey point, then the observers still make an entry for that point but write in the "Comments" column "no survey conducted because no longer appropriate habitat".

Timing of surveys:

Survey routes can be either morning or evening survey routes. Observers can conduct either morning or evening surveys on a route as long as each survey route is surveyed during the same period (morning or evening) consistently every year (once a route is designated an evening route, it will always be an evening route in perpetuity). Morning surveys begin 30 minutes before sunrise (first light) and must be completed by 10:00 am. Evening surveys begin 4 hours before sunset and must be completed by dark. Including both morning and evening surveys into a standardized monitoring protocol will provide added flexibility and more potential survey hours for field personnel. Conduct at least 3 surveys annually during the presumed peak breeding season for all primary marsh birds in your area. Each of the 3 replicate surveys should be conducted during a 10-day window, and each of the 10-day windows should be separated by 7 days. Try to maintain 2 weeks between each replicate survey. Seasonal timing of these 3 replicate survey windows will vary regionally depending on migration and breeding chronology of the primary marsh birds breeding in your area. The first survey should be conducted when migratory passage is over, but prior to breeding (e.g., in south-central Washington the first survey should be between 1-10 May, the second survey 17-27 May, and the third survey 3-13 June). Contact your regional non-game bird coordinator to help choose the most appropriate survey windows for your area if you are unsure.

Survey methods:

Because many marsh birds are secretive, seldom observed, and vocalize infrequently, we will use broadcast calls to elicit vocalizations during vocal surveys (Gibbs and Melvin 1993). But because we want to estimate detectability, estimate density using distance estimators, evaluate the usefulness of call broadcast for future survey efforts, and survey secondary species, we will also record birds during a passive period prior to broadcasting calls.

At each survey point, observers will record all primary species (rails, bitterns, and pied-billed grebe) detected during both a 5-minute passive period prior to broadcasting recorded calls, and during a period in which pre-recorded vocalizations are broadcast into the marsh. The broadcast sequence includes calls of the primary marsh bird species that are expected breeders in that area and is broadcast using a portable cassette tape player, CD player, or MP3 player. A few potential broadcast systems include:

Cassette Tape Players: Optimus SCP-88 Stereo Cassette Player (Radio Shack #14-1231); or SONY Sports Series CFD-980; or Johnny Stewart Game Caller.

CD or MP3 players: Philips Jogproof CD player AX511217 (\$49 at www.surprise.com); Lenoxx, model #CD-50 (Walmart \$20); Aiwa XP-SP90 or XP-MP3 Portable CD Player; or Panasonic SL-SX286J or SL-SX280G Personal CD Player (e.g., Radio Shack #14-1231 or #42-6014).

Amplified Speakers: Optimus AMX-4 amplified speakers (Radio Shack #40-1407), or Sony portable speakers (Circuit City for \$19.99).

CD or MP3 broadcast equipment will probably produce better quality and more consistent sound than cassette tapes, but cost slightly more than cassette players. The recorded calls should be obtained from the Marsh Bird Survey Coordinator (contact info below); request a CD of the species of interest, and I will ensure that it coincides with the protocol. Participants can also obtain their recorded calls from the Cornell Laboratory of Ornithology's Library of Natural Sounds (contact LNS at 607-254-2404), but the Cornell Lab may require 2-3 months to fill your order and your tape/CD will cost \$100-200. The tape/CD should include exactly 30 seconds of calls of each of the primary marsh bird species interspersed with 30 seconds of silence between each species. The 30 seconds of calls should consist of a series of typical calls interspersed with approximately 5 seconds of silence. For example, an entire survey sequence might look like this:

5 minutes of silence

30 seconds of calls of first primary species configured like this:

2 Sora *whinny* calls

5 seconds of silence

3 Sora *per-weep* calls

5 seconds of silence

4 Sora *kee* calls

30 seconds of silence

30 seconds of calls of second primary species

etc.

Include a verbal "stop" at end of survey interval so that observers know when to stop the tape or CD

The chronological order of calls on the tape/CD will vary with each survey area, but will always be consistent within a particular survey area across replicate surveys and across years. Species to include in the call broadcast is up to the individual organizing the local survey effort, but we suggest you include all species believed to be local breeders (species for which you expect to get responses). Order of calls should start with the least intrusive species first, and follow this chronological order: Sora, Virginia Rail, American Bittern, American Coot, Pied-billed Grebe. *Please see the complete manual for additional descriptions of the recommended methodology and appropriate datasheets.*

Habitat Measurements:

Patterns of distribution and population trends of marshbirds can often be explained by local changes in wetland habitat. Natural water level fluctuations and habitat alterations (e.g., dredging, burning, diking) can result in major changes in marsh vegetation. Thus, it is important that surveyors attempt to quantify proportions of major habitat types associated with survey stations. Observers should visually estimate proportion of each major habitat type within a 50 m radius circle around each survey point (only once per year, and does not need to be collected during the vocal survey). If vegetation structure changes substantially during the season, the observer should make a note of this, with a description of the changes, on the survey datasheet.

List of the most common calls for the primary target species of marsh birds:

Sora: *whinny* (territorial defense and mate contact), *per-weep*, *kee* (may be given to attract mates)

Virginia Rail: *grunt* (pair contact, territorial call), *tick-it* (male advertisement call), *kicker* (female advertisement call)

American Bittern: *pump-er-lunk* (territorial/advertisement call), *chu-peep* (given during copulation ceremony), *kok-kok-kok* (given when flushed)

American Coot: clucking (*kuk-kuk-kuk-kuk-kuk*), cackling, grunting

Pied-billed Grebe: "donkey-braying", greeting call

OTHER WATERBIRDS

Basic Protocol for surveying waterfowl – but should be similar for other waterbirds (extracted from Unnasch et al. 2003. Monitoring and Evaluation Plan for Idaho Wildlife Mitigation Projects)

FIELD PROTOCOLS

Methods:

These surveys are for birds on the open water, including breeding pairs, individual birds, and brood counts. Surveys should be conducted as a combination of observation point counts, shoreline walking surveys, and boat and motor vehicle runs, as appropriate for the site. Observation point counts should be used where there is good visibility, especially from elevated positions, to observe open water areas. When using observation points, disturbance must be kept to a minimum. Observation points are best conducted with the aid of a spotting scope, although binoculars are sufficient for small aquatic sites. After data are gathered via observation points a walking survey, along the shoreline, may need to be conducted to observe additional open water areas that are not visible from observation points. Walking surveys are best used in wetlands with shorelines containing small amounts of emergent vegetation, which can be walked efficiently. Care should be taken to keep disturbance of birds to a minimum. Boat and motor vehicle surveys are most efficient for sites with open shorelines. Boat speed should be moderate (5-10 mph) and consistent throughout the survey, stopping only to count broods or identify species.

Timing and Frequency:

Counts should be completed within the three-hour periods beginning either 15 minutes after sunrise or ending 15 minutes before sunset. Walking surveys may be conducted throughout the day. Surveys should be conducted when temperatures are moderate and wind speeds are less than 10 mph. Excessive wind moves birds into protected areas, and conducting surveys during rain should be avoided if possible. The frequency of surveys will depend on the needs for the site, and availability of manpower.

For those interested in assessing waterfowl populations and reproduction use the following timeline:

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

Duck breeding-pair surveys should be conducted twice, once on or near May 2 for early nesters, and once on or near May 16 for late nesters. Although some protocols call for only two duck brood sampling periods, three sampling periods provide a more adequate index. Three duck brood surveys should be conducted on or near June 6, June 28, and July 26. For waterfowl pair-counts the species and number of

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

MIGRATING SHOREBIRDS

Information has been extracted from the USGS Western Shorebird Survey protocols (wss.wr.usgs.gov/index.html; for further information contact: Jonathan Bart – Snake River Field Station, 970 Lusk St., Boise, ID; jbart@usgs.gov; 208-426-5216)

During surveys for migrating shorebirds, observers should also document other waterbirds (gulls, rails, bitterns, etc.) present in the area. At the observer's discretion, waterfowl may also be documented, but this should be a secondary priority.

FIELD PROTOCOLS

Shorebird surveys should be conducted at migratory stop-over sites. At each survey site, specific survey areas should be identified according to where shorebirds congregate, as well as areas of management interest. Surveys should be conducted during both fall and spring migration periods. Survey periods for each season are site-specific, and should encompass the 30-day interval when most shorebirds migrate through the survey sites. Because this 30-day interval varies throughout the state, contact **XXXX** before conducting any surveys. (Region 1, peak spring migration from April 1st – May 15th and peak fall migration is between August 15th and October 15th).

Surveys should be conducted annually on the first, fifteenth, and last day of each 30-day survey period. All surveys should be conducted at the same time of day each year, preferably during the first few hours of daylight. To eliminate biases based on weather conditions, surveys should be performed on specified days regardless of weather. However, surveys may be postponed to the following day if weather conditions pose a safety hazard, or if visibility is so poor that subsequent survey estimates would not be reliable.

During the survey, identify to species and count the shorebirds. Note actual counts with one asterisk (*), and indicate extrapolated estimates (i.e., only a portion of the individuals were actually accounted, and the total number was extrapolated from this count) with two asterisks (**). Indicate "guestimates" by circling the number. When identifying to species, it may not be practical to identify every individual bird to species. If only a portion of a flock is identified to species, record the actual number identified, then record the remaining number as peeps, shorebirds, sanderlings, etc. For example, if a flock of 500 sandpipers are observed and 100 are identified as Semipalmated Sandpipers, then record 100 Semipalmated Sandpipers and 400 peeps. Do not record birds that have not been individually identified as "identified". Finally, record start and stop times of the survey, wetland water levels, and any disturbance events during the survey.

BREEDING SHOREBIRDS

SPECIES-SPECIFIC SURVEYS

1. Long-billed Curlew
2. Osprey
3. Black Swift
4. Harlequin Duck

Appendix G. Sample Datasheets

Idaho Waterbird Survey Form

Date: _____ Observer(s): _____

Site: _____ Section: _____

Start Time: _____ End Time: _____

	Tally	Total		Tally	Total
Avocet, American			Merganser, Common		
Bittern, American			-----, Hooded		
Bufflehead			-----, Red-breasted		
Canvasback			-----, Unknown		
Coot, American			Night-Heron, Black-cr.		
Cormorant, Double-cr.			Pelican, American White		
Crane, Sandhill			Phalarope, Red-necked		
Curlew, Long-billed			-----, Wilson's		
Dowitcher, Long-billed			-----, Unknown		
Duck, Ring-necked			Pintail, Northern		
-----, Ruddy			Plover, Semipalmated		
-----, Wood			-----, Snowy		
-----, Unknown			-----, Unknown		
Dunlin			Rail, Virginia		
Egret, Cattle			Redhead		
-----, Great			Sandpiper, Baird's		
-----, Snowy			-----, Least		
Gadwall			-----, Pectoral		
Godwit, Marbled			-----, Semipalmated		
Goldeneye, Barrow's			-----, Spotted		
-----, Common			-----, Western		
-----, Unknown			-----, Unknown		
Goose, Canada			Scaup, Greater		
-----, Greater White-fr.			-----, Lesser		
-----, Snow			-----, Unknown		
Grebe, Clark's			Shoveler, Northern		
-----, Eared			Snipe, Wilson's (Common)		
-----, Horned			Sora		
-----, Pied-billed			Stilt, Black-necked		
-----, Red-necked			Swan, Trumpeter		
-----, Western			-----, Tundra		
-----, Small unknown			Teal, Blue-winged		
-----, Clark's/Western			-----, Cinnamon		
Gull, Bonaparte's			-----, Green-winged		
-----, California			-----, Unknown		
-----, Franklin's			Tern, Black		
-----, Herring			-----, Caspian		
-----, Ring-billed			-----, Common		
-----, Unknown			-----, Forster's		
Heron, Great Blue			-----, Unknown		
-----, Green			Wigeon, American		
Ibis, White-faced			Willet		
Killdeer			Yellowlegs, Greater		
Loon, Common			-----, Lesser		
-----, Pacific					
-----, Unknown					
Mallard					

Additional comments: (e.g., extreme survey conditions involving very high winds or very high precip.) _____

