

# North American Important Bird Areas

A Directory of 150 Key  
Conservation Sites



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## Foreword

Some 1,400 species of birds inhabit North America. This is roughly equivalent to one species in six of all the world's avifauna. By country, one finds over 1,000 species in Mexico, over 800 in the United States and over 600 in Canada. More than 250 species in North America are migratory.

The spectacular array of bird life found across the continent is supported and created by the varied tapestry of North America's lands and waters. For example:

- Waterfowl and shorebirds stage in the hundreds of thousands in Mexico's Lagunas de Chacahua National Park, the United States' Chesapeake Bay Wetlands System and Canada's Southern James Bay Migratory Bird Sanctuaries;
- Songbirds migrate by the millions in the spectacular gulf crossings along Mexico's Sian Ka'an Biosphere Reserve, the United States' Mississippi River Valley and Canada's Long Point National Wildlife Area;
- Birds of prey form a unique river of raptors across Veracruz, Mexico and soar by the thousands across Mexico's Sierra de Manantlán Biosphere Reserve, the United States' Hawk Mountain lookout and Canada's Rocky Mountain national parks system.

In addition to serving as a significant aspect of North American landscape, wild birds support many people in North America in terms of basic human needs, especially food. Our relationship with birds, however, goes far beyond sustenance. Other bird-related activities include bird watching, bird feeding, hunting and falconry. Birds are also important in the realms of the arts, science and spirituality. Furthermore, birds serve as flagships for many highly valued natural ecosystems: ducks symbolize wetlands, parrots embody the color of the rain forests, quetzals exemplify cloud forests, eagles represent mountain landscapes. Highly visible, well known, and popular with people, birds are clearly one of mankind's closest links with nature.

Bird-related activities can also generate billions of dollars in economic activity. For example, 1991 survey by Environment Canada's Canadian Wildlife Service calculate that, in Canada, \$5.6 billion (Canadian) was spent on wildlife-related activities. These expenditures contributed close to 7 percent of Canada's GDP, \$3.8 billion in personal income and \$3.1 billion in tax revenues.

A 1991 survey produced by the US Census Bureau concludes that in the United States, some 109 million residents spent \$59.1 billion on wildlife-related activities, of which \$18.1 billion was mainly on bird watching and nature appreciation activities.

In Mexico, eco-tourism, often in the form of bird watching, is becoming an increasingly attractive, environmentally friendly, economic alternative for communities. Local residents have begun to see the conservation of birds as a viable alternative to economic activities, such as logging and subsistence agriculture, which result in deforestation and the destruction of wildlife habitats.

The role birds play also provides numerous hidden benefits, often unaccounted for economically. Birds may be keystone species in the life-supporting cycles. To a large extent, the fate of the North American forest sector rests on the health of birds residing in and traveling through all three countries. As voracious eaters of weed seeds, farm rodents and insect pests, as well as dispersing agents of fruit seeds, birds provide society with "free" ecological services. The conservation of birds throughout the continent is vital to the one of our largest, shared economic sectors—the wood and wood products sector. How many North Americans, however, are aware of this?

Moreover, human well being is dependent on birds. Loss of insect-eating birds from farms, woodlots and hedgerows will reduce the natural pest-control services previously provided by birds. Healthy, diverse bird populations are also an excellent indicator of the underlying health of the ecosystem in which they—and we—live. When a wetland begins losing its ducks, rails, warblers and swallows, it is a sign that it is likely to be not as good a provider as when it was abundant with clean, filtered water.

Despite their enormous value, bird populations in North America are becoming increasingly threatened. The World Conservation Monitoring Center, in its *1994 IUCN Red List of Threatened Animals*, includes 71 bird species in Mexico, the United States and Canada as threatened: 34 are listed as endangered, 22 as vulnerable and 15 as rare.

Many of the threatened and endangered species migrate across our political boundaries, forging a fundamental ecological link between Canada, Mexico and the United States. From March to May each year, during the northern springtime, a tremendous tide of bird life surges north from the tropics and near-tropics, re-filling quiet northern forests, prairies, wetlands and tundra. After a short, song-filled and energetic breeding season, the tide withdraws southward. During the northern autumn, from August to November, the tide of avian wildlife recedes back to warmer climates where the insects that sustain birds abound. The lesson, of course, is that birds carry no passports and “belong” to no nation. Flying within and among the nations of North America, migratory birds see no boundaries. They have surged northward and southward each year, long before humans populated the Americas and borders were created.

Loss of natural habitats, pollution, pesticides, chemical spills, over-hunting, collisions with buildings, predation by uncontrolled dogs and cats—these are the principal threats to the birds of the three North American countries. Although any of these threats can place a bird species in decline or even push it to extinction, one is key: loss of natural habitat. Once the natural habitat is lost, or so severely degraded as to render the habitat unsuitable for the bird, it is often impossible—or would entail enormous amounts of effort, money and time—to replace.

Natural habitat—both quantity and quality—must be secured to ensure long-term survival of all species, including birds. It is the cornerstone of all conservation efforts. Once a reasonable expanse of habitat is secured for bird species to breed, migrate and winter, other threats such as over-hunting and pollution can then be tackled.

Since most birds are migratory to some extent, a variety of habitats for feeding and breeding, as well as for shelter, migration and wintering are needed. And since many birds migrate long distances, crossing international boundaries, bird conservation requires continental cooperation.

Probably no other nations on earth are as dependant upon each other for the survival of shared birds and other wildlife as are Canada, Mexico and the United States. These three nations, therefore, face the enormous responsibility and challenge of working together to conserve their bird populations.

The efficient and effective conservation of birds in North America calls for joint action by the three nations. The Commission for Environmental Cooperation (CEC), a trinational body involving Canada, Mexico and the United States, created under the North American Agreement on Environmental Cooperation (NAAEC), is helping to encourage coordinated efforts at a regional level.

The CEC is working closely with key organizations, wildlife agencies and universities to establish a North American Bird Conservation Initiative (NABCI), to facilitate the conservation of bird populations by increasing the effectiveness of existing and new initiatives,

enhancing coordination, and fostering greater cooperation among the nations and peoples of the continent. One of these efforts includes the Important Bird Areas program in North America. This program will identify sites in North America which are critical for the conservation of birds, and will develop actions that focus on the protection of those sites. Through these initiatives, the CEC is helping to conserve the bird populations of North America now and for many generations to come.

## Acknowledgments

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## Introduction

The following publication presents the initial results of the North American Important Bird Areas (IBA) Program. Like other IBA programs being administered around the world, this program has two complementary goals: 1) to identify those sites most critical for the protection of birds in North America; and 2) to take positive and coordinated action to promote the conservation of these sites.

As in all IBA programs, the IBA sites in North America were chosen carefully, using scientific criteria applied with common sense. All sites identified as potential IBAs were subjected to rigorous review to determine whether they truly qualified. They represent sites which include both terrestrial and non-terrestrial habitats that are critically important for bird species not just during the breeding and wintering seasons but also during migration. They are intended to be large enough to support self-sustaining populations of those species for which they are important. This program is part of a wider, integrated approach to conservation that embraces protection of sites, species and habitats.

## History

The idea for the Important Bird Area program originated in a series of unpublished studies conducted in the early 1980s by BirdLife International and the International Wetlands Research Bureau (IWRB) on behalf of the Commission of the European Community and the Council of Europe.

Recognizing that these studies not only deserved wider attention but also represented a potentially powerful tool for conservation, BirdLife International launched an effort to identify and gather data regarding the most important sites for birds throughout the European continent and to make the data widely available. The publication of this data, in 1989, as *Important Bird Areas in Europe* represented the birth of the IBA concept and was a milestone in the evolution of the BirdLife Partnership's bird conservation strategy for Europe.

The IBA concept, however, is more than just a priority-setting exercise. Legal protection or conservation management of IBAs is the ultimate aim, and through cooperation with national decision-making bodies, several European countries now have nearly all of their IBAs protected.

Recognizing the excellent opportunities for bird conservation that the IBA concept and program present at both the national and international level, BirdLife Partners have initiated IBA programs throughout the world. *Important Bird Areas in the Middle East* was published in 1994, and programs have been initiated in Africa, Asia, and the Americas. Starting in 1995 in the United States and in 1996 in Canada and Mexico, the Commission for Environmental Cooperation, in partnership with other organizations, contributed to the development of the IBA program in North America. In Canada, the BirdLife International partners jointly conducting the program are Bird Studies Canada and the Canadian Nature Federation. In the United States, the program is a cooperative effort between the American Bird Conservancy and the National Audubon Society. In Mexico, the partnership is being carried out by the *Consejo Internacional para la Preservación de las Ares-sección México* (Cipamex), the Mexican Section of BirdLife International.

## The Biological Rationale for IBAs

There is a strong biological rationale behind the IBA idea. Some sites are exceptionally important for maintaining those species dependent upon the habitats found there. Vigorous protection of these most critical sites is an important approach to conservation and many bird species can be effectively conserved by this means. Patterns of bird distribution are such that sites selected as IBAs often support not just one but a complement of important species. If selected carefully, IBAs can, in conjunction, form a network that will protect many species throughout their biogeographic distributions. These sites may include the best examples of

a species' natural habitat, whether in terms of distinctively high numbers or densities (particularly in degraded habitats) or as 'typical examples' (particularly in habitats yet little modified). But because all are, or may become, refuges, the consequences of losing any one of them may be disproportionately large. As an additional benefit, since birds are often effective indicators of biodiversity in other plant and animal groups, the protection of a network of IBAs can help ensure the survival of many other taxa.

While sites are selected using scientifically defensible quantitative criteria, the IBA concept is a pragmatic one. Thus, the existing network of protected areas (e.g., national parks and refuges) is considered first, and typically forms the backbone of the IBA network, with additional sites proposed to fill the gaps. Ideally, each site should be large enough to support self-sustaining populations of as many of the species as possible for which it was identified or, for migrants, fulfill those species' requirements for the duration of their presence at the site.

The IBA concept is not a panacea for bird conservation nor one that will work equally well for all species. Many birds are not amenable to conservation through a site-based approach. Among these are species which have highly dispersed breeding ranges or which breed at such relatively low densities that it is not possible to protect a significant proportion of their populations by protecting one or even a few sites where they are known to occur. These species will require a different approach (e.g., a landscape- or management-based approach, including practices such as delaying haying until after the nesting season or shifting timber rotations to benefit priority species). For others, the site-based approach needs to be combined with conservation measures in the wider environment. Within the United States, the IBA program is part of the larger Partners in Flight Bird Conservation Strategy (the Flight Plan). The Conservation Strategy contains additional landscape- and management-based approaches to bird conservation. Taken together, these approaches are designed to help ensure the conservation of all bird species. While the Flight Plan, as written, currently applies only to the United States, its guidelines in developing more comprehensive bird conservation plans may prove useful elsewhere within the Western Hemisphere.

As outlined in the Methods section, the criteria for what qualifies as an IBA fall into four basic categories:

- those protecting globally or nationally threatened species;
- those protecting species with restricted ranges (such as many endemic species);
- those protecting species which breed only or primarily in a single biome; and
- those protecting congregations of species, such as nesting colonies of seabirds.

The biological differences between the countries are reflected in the proportions of such sites identified for each criterion. Mexico, the fifth most biologically diverse country on earth and a great center of endemism, has many sites supporting bird species with limited ranges, whereas the United States has few, and Canada none. However, Canada is particularly rich in sites with congregations of breeding seabirds and other colonial species. It should also be pointed out that, although cultural differences may divide these three countries, their avifauna unites them; many migratory species depend on habitats in all three countries at different times of the year.

A note about the arrangement of this volume: the first part contains sections on Methods, Criteria, and Conservation and Management of IBAs. In the second part, there are separate introductions to the IBAs identified for each country, which immediately precede the 50 site descriptions for that country. The reader should note that these 50 sites represent only a small sampling—at most no more than 5 percent—of the IBAs already identified for each country, and that they are not necessarily even the 50 most important sites. The list and accompanying site descriptions for IBAs in North America is still very much a work in progress; the current plan is for each country's program to publish a more complete guide to its IBAs

in the near future. Information about the current status of each country's IBA program can be obtained by contacting one of the national partner organizations.

The IBA programs have already clearly demonstrated that they have the ability to mobilize and unite the efforts of both scientists and conservationists. In gaining the enthusiastic support of a wide group of organizations and individuals, they have already done much good.

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## Methods

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### Introduction

Site-based conservation strategies, such as the IBA program, recognize that some sites contain habitats and ecosystems that are exceptionally important for maintaining certain species that depend on them for all or part of their life cycle. Vigorous protection of these critical sites is one important approach to conservation, with many bird species being effectively conserved by this means.

In addition, concentrating on birds offers a way to identify a broader spectrum of biodiversity, as well. Birds have been shown to be effective indicators of biodiversity in other plant and animal groups. They are also excellent flagships for conservation because they are relatively well known and can attract popular support. Moreover, because many birds migrate across international boundaries, they provide an excellent means of fostering international cooperation on environmental issues. Previous programs have demonstrated the effectiveness of using bird distribution patterns to identify wetlands of international significance (Ramsar Convention) and major centers of terrestrial endemism (Endemic Bird Areas of the World).

Important sites for birds may include the best examples of the species' natural habitat, in terms of distinctively high numbers or densities (particularly in habitats already much degraded) or typical examples (particularly in habitats as yet little modified). Because many sites already are or may increasingly become the only places of refuge for birds in an increasingly modified landscape, the consequences of the loss of any one of them may be disproportionately large.

Patterns of bird distribution are such that, in most cases, it is possible to select sites that support many species and also to develop networks throughout the range of habitats that a species occupies during its life-cycle. These sites are objectively identified on the basis of the bird numbers and species complements they hold.

### Structure of the IBA Criteria

At the outset of the North American IBA program, one of the first tasks involved the development of a set of criteria for application in North America. A North American IBA Technical Committee was formed, with representatives from all three countries, its goal being to develop a set of criteria that worked at the global, continental, and national scales. These criteria were designed to encompass, as much as possible, those criteria already in use by BirdLife International while at the same time being applicable in the North American context.

The criteria were structured within four main categories: Threatened Species (sites that regularly hold significant numbers of a species that has been identified as threatened or at risk of extinction); Restricted-range Species (sites that contain species with very limited distributions); Biome-restricted Species Assemblages (sites that have assemblages of birds that are largely restricted to the various North American Biomes); and Congregatory Species (sites that are important because they hold large concentrations of birds during one or more seasons). These criteria are presented in detail in the following section.

### Identification of Sites and Collection of Data

In all three countries, the identification of potential IBAs basically followed a four-step process: 1) consideration of the existing protected-areas network; 2) identification of additional areas of possible significance from the technical reports and published papers;

3) solicitation of nominations from the conservation and birding community; and 4) the hosting of a series of workshops or round-tables in the various states, provinces and regions of each of the three countries, to which experts in each of the jurisdictions were invited.

The existing protected area network forms the backbone of the IBA network. In general, it has been used as a starting point, with data outlining the significance of the existing protected areas being collected and reviewed to determine if they are suitable as IBAs.

Additional potential IBAs were identified through the review of technical reports and published papers. This literature review also included national databases, as well as national, regional and local bird journals. Nominations for additional IBAs were also solicited from the general public. Although potential IBAs could be nominated by anyone, most were proposed by ornithologists, birders, landowners and members of the conservation community in general.

After the initial background research, regional workshops were held in each of the countries. At these workshops, the participants were asked to identify sites in their respective geographic areas which they believe meet one or more of the criteria, and then to appoint individuals to fill out the nomination forms. As a result of the background research, site nominations, and regional workshops, a tremendous number of potential IBAs have been identified, totalling nearly 3,000 in all three countries. In all of these countries, additional potential IBAs are still being identified, particularly through site nominations coming in as a result of the workshops.

Once potential IBAs were identified, it was the responsibility of the Technical Coordinator in each country to compile existing biological data outlining the importance of the site and to determine whether or not it qualifies as an IBA. Subsequently, a recommendation was made as to the level of significance (i.e., global, North American, or national).

Although the significance of the site is decided on the basis of its bird populations, other information about the site is compiled as well. This includes data on significant or rare species other than birds, as well as threats and conservation measures relating to the site.

### Delineation of Sites

As part of the identification of an IBA, one task is to identify the boundaries of the site. By definition, an Important Bird Area is a site that provides essential habitat to one or more species of breeding or non-breeding birds.

Sites can vary in size, but are usually discrete and distinguishable. In general, a site should be different in character, habitat or ornithological importance from the surrounding area. It may exist as an actual or potential protected area, with or without buffer zones, or be an area that can be managed in some way for nature conservation. It should also, alone or with other sites, provide all of the requirements of the birds that the site is important for during the time they are present.

Practical considerations of how best the site may be conserved are often the foremost consideration when identifying site boundaries. Simple, conspicuous boundaries such as roads, rivers, railway lines, etc. were used to delimit site margins wherever possible, while features such as watersheds and hilltops helped in places where there were no obvious discontinuities in habitat (transitions of vegetation or substrate). Boundaries of ownership were also relevant in many cases. Although there were no fixed size requirements for IBAs, the biologically sensible was tempered with the practical. Often, the larger sites involved fewer landowners.

In some cases, several small sites occurred near one another. Whether these were best considered as a series of separate IBAs, one large site containing areas lacking ornithological significance, or several sub-sites listed under one site usually depended on local conservation and political realities.

### Landowner Contacts and Development of Conservation Plans

Once it has been confirmed that a site meets the criteria for identification as an IBA, work begins towards the development of an appropriate conservation plan. In some cases, the conservation plans may involve a hands-off approach, while in other cases local stakeholder groups may be assembled and detailed management plans written. In all cases, the landowners are contacted and the significance of the site discussed. In some cases, sites may not be officially identified and publicized as IBAs. It depends on the landowner's response and/or whether formal identification is in the best interest of the particular species for which the site is significant.

The process of developing conservation plans relies heavily on the establishment of partnerships at all levels: international, national, regional, and local. These partnerships form the base upon which cooperative on-the-ground conservation initiatives are developed. Individuals from community-based groups, native communities, government organizations, regional nongovernment organizations and other relevant stakeholders are directly involved in the development and implementation of local conservation strategies. The cooperative and inclusive nature of the IBA program provides the necessary force to be an effective tool or strategy for bird conservation that produces enduring results.

### Strengths, Weaknesses and General Relationships to Other Bird Conservation Initiatives

The Important Bird Areas (IBA) Program is a proven international conservation tool that helps ensure the protection of key habitats for all bird species for which a site-based approach is appropriate. For many bird species, a site-based conservation approach may not be appropriate, or may represent only half of the required conservation efforts. Additional habitat- or landscape-based conservation programs may be required. In these cases, the IBA program has the potential to effectively complement and expand upon existing bird conservation efforts within the overall framework of the North American Birds Conservation Strategy.

As part of this process, the North American IBA program is establishing working relationships with existing bird conservation initiatives such as the North American Waterfowl Management Plan, Partners In Flight (Canada and US), and the Western Hemisphere Shorebird Reserve Network (WHSRN). There is great potential to work cooperatively with these programs to achieve common goals. More importantly, the IBA program addresses gaps in existing site-specific conservation initiatives by including groups of birds not addressed through existing initiatives, or by capturing additional significant sites for species groups (e.g., shorebirds) that are covered by other programs.

One of the outstanding merits of the IBA program is that it identifies important sites for **all** groups of birds. The program will not only provide benefit to waterbirds and their habitats; it integrates aquatic and terrestrial habitat conservation for seabird, shorebird, landbird, and waterfowl habitat. The IBA program is inclusive, filling in gaps in existing programs to ensure that all bird species in need of our protection efforts have equal opportunity to benefit from this site-based approach to conservation.

## Criteria

*North American IBA Technical Committee*

### Introduction

An essential part of the IBA program are the criteria for deciding which nominated areas qualify as IBAs and what level of significance they should be assigned. Following are the criteria developed by the North American IBA Technical Committee to function at the global, North American, and national scales. The criteria are set out in detail under each of the four categories of IBAs. As mentioned in the previous section, they encompass, as much as possible, those already in use by BirdLife International but are designed to be applicable in the North American context.

### Categories of Important Bird Areas

#### Category 1

*Sites regularly holding significant numbers of an endangered, threatened, or vulnerable species.*

This includes those sites sustaining a local population, either breeding or non-breeding, of an endangered or threatened species, subspecies, or readily identifiable population. This means globally threatened to qualify as a global site (e.g., according to BirdLife International's *Birds to Watch 2: The World List of Threatened Birds*), nationally threatened to qualify as a national site, state threatened to qualify as a state site, etc. It is not restricted to breeding or wintering, but includes areas **regularly** used by the species during migration, if such sites can be identified.

Population size thresholds for site selection and notes on how to apply this category need to be set on a species-by-species basis. In cases where the population size of a species is known or a reasonable estimate can be arrived at, 1% of the population size should be considered as the threshold for a site to qualify. This threshold value should not be applied blindly; relevant features of the ecology and biogeography of each species and the reason(s) for the species decline should all be taken into account. Each country, with the assistance of experts and consultations with the other countries, is responsible for setting appropriate numeric thresholds for each species. Population estimates for species are most readily available for seabirds, waterfowl, shorebirds, wading birds and endangered species, but not generally available for most other terrestrial birds.

This category **excludes** incidences of vagrancy, marginal occurrence, ancient historical records, etc. Sites that have the potential to support the threatened species, following habitat restoration work or re-introductions, etc., are not excluded. These sites may be included as IBAs if a re-introduction program is underway or imminent

#### *Category specific recommendations*

**G-1:** The site contains a population of a globally endangered, threatened, or vulnerable species. The list of species will follow BirdLife International's *Birds to Watch 2: The World List of Threatened Birds* (Collar, Crosby, and Stattersfield 1994). Very exceptionally, known globally threatened subspecies may be included under this category, on a case-by-case basis within the relevant region. This is most likely to be applied to well-marked, isolated forms, possibly valid species, that occur, for example, on oceanic islands. The threshold for the identification of a site as a Globally Important Bird Area should be set as outlined above—that is, 1% of the population size should be used to set a threshold value. This value may then be tempered by taking into account ecological and biogeographical information about the species.

**NA-1:** The site contains a population of a species, or distinct population, that is vulnerable or declining within the continent but not globally. Not all species undergoing decline face

immediate threats, nor are species that may be increasing out of danger. Vulnerability takes into account problems with both population size, dispersion, and habitat. In Europe this category was used for species of European Conservation Concern Categories 2 and 3.

**N-1:** The site regularly holds significant numbers of a species, or a distinct population, listed on the appropriate Federal list. For the United States, this would be set by the US Endangered Species Act; in Canada, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) list should be used; and in Mexico, the Cipamex 1988 list. As in the above categories, vulnerable species should also be considered, with each country developing its own list of species. For example, in the United States the list includes candidate species (for listing under the US Endangered Species Act) and all species on the Partners in Flight WatchList that are not otherwise globally at risk. The population size thresholds should follow the 1% threshold outlined above, with the same caveats. In cases where the population size is unknown, efforts will be made to identify the best sites containing concentrations (breeding or non-breeding) of the vulnerable species.

**S-1:** The site regularly holds significant numbers of a species, or a distinct population, listed, or is a candidate for listing, on the appropriate state/province list. In the United States, this category might include species with Partners in Flight state/physiographic region prioritization scores of 29-35.

## Category 2

### *Sites regularly containing species with restricted ranges.*

This includes those sites known or thought to hold a significant component of the group of species *or distinct populations* whose distributions define an Endemic Bird Area (EBA). The site has to form one of a set selected to ensure that, as far as possible, all restricted range species of an EBA are present in at least one or, preferably, more sites. This category also covers species or distinct populations that are not in an Endemic Bird Area, yet still have restricted ranges (world distributions of less than 50,000 sq. km).

Note: Endemic Bird Areas (EBAs) are places where two or more species or distinct populations of restricted range (e.g., with world distributions of less than 50,000 km<sup>2</sup>—an area approximately the size of Costa Rica) occur together. More than 70% of the threatened species also have restricted ranges (so would qualify under G-1 as well). Also included are those species of secondary EBAs (only one restricted range species). For many EBAs, that hold a large number of restricted-range species, it is necessary that a network of sites be chosen, by complementary analysis, to protect all relevant species. In cases where data on bird distribution within the EBA is insufficient, the network will ensure that sufficient (for example, at least 10%) of the key habitat types are included.

The “significant component” term in the criterion is intended to avoid selecting sites solely on the presence of one or more restricted range species that are common and adaptable within the EBA and, therefore, occur at other chosen sites. Additional sites may, however, be chosen for one or a few species that would otherwise be under-represented.

**G-2:** The site is known or thought to hold a significant component of the group of species whose distributions define an Endemic Bird Area (EBA). It also has to form one of a set selected to ensure that, as far as possible, all restricted range species of an EBA are present in at least one site and, preferably, more.

**NA-2:** The site contains species with **small** total ranges (breeding and/or nonbreeding) but with important populations within North America (e.g., with more than 50% of the global distribution within the area). It identifies sites for species with ranges of greater than 50,000 km<sup>2</sup> but less than 100,000 km<sup>2</sup> that are not restricted to a biome. Some of these species are likely to be numerous in parts of their range and are unlikely to be threatened.

In selecting sites for these species, consideration needs to be given to the threats the species faces and whether conservation for the species is needed. To conserve overall genetic diversity better, consideration should be given to including subspecies or distinct populations in defining NA-IBAs based on areas of endemism.

## Category 3

### *Sites regularly holding assemblages of species restricted to a biome or unique/threatened natural community type*

The site is known (or thought) to contain a significant component of the group of species whose distributions are largely or wholly confined to one biome. The site has to form one of a set selected to ensure that, as far as possible, all species restricted to the biome are adequately represented.

Note: This category applies to groups of species with largely shared distributions of greater than 50,000 km<sup>2</sup> that occur mostly or wholly within a particular biome and are, therefore, of global importance. (A biome may be defined as a major regional ecological community characterized by distinctive life forms and principal plant species.) Many of these assemblages occur in places—deserts, boreal forests, etc.—where delimiting IBAs is particularly difficult. For consistency throughout this discussion of North American IBAs, the levels of ecological regions established by the Commission for Environmental Cooperation will be interpreted as biome levels.

More than one habitat type, and therefore bird community, often occurs within a given biome and this needs to be reflected by the sets of sites identified. Typically, the application of this category will be habitat driven; thus, the quality and representativeness of the habitat types within sites may determine their selection. This is because it may be impractical or impossible to provide either definitive lists of all species that characterize a given biome or produce and handle exhaustive and lengthy species inventories for each site. It needs to be kept in mind that an IBA is selected for its value to bird conservation. An excellent example of a habitat type depauperate in its natural avian species richness would be a poor candidate for an IBA. Natural avian species richness does not refer to the total number of species present but how representative the site is of the native species that should be found there. For example, consider two prairie grassland sites: one an undisturbed prairie grassland, and the other a grassland disturbed in the past and containing a shelterbelt. An analysis of overall species richness would most likely identify the disturbed site with the shelterbelt as being the “better” site. However, under this criterion it is the presence of the native grassland species (e.g., Sprague’s Pipit, Baird’s Sparrow, Le Conte’s Sparrow, etc.) that is important. Under those circumstances, it would be better to select a site that may not be as good of an example of the habitat type, but has a better natural avian assemblage.

Note: Some EBAs and many biomes cross political boundaries; where this is the case, the networks of sites should try to ensure that, as far as possible, all relevant species occur in IBAs in more than one country.

**G-3:** The site is known or thought to hold a significant component of the assemblage of species whose distributions are largely or wholly confined within one biome (CEC level I). It also has to form one of a set selected to ensure that, as far as possible, all species restricted to a biome are adequately represented. While it is possible for a biome to be wholly restricted to one country, it would still be a global site. Similarly, for biomes that cross political boundaries, sites will be selected in each country—but they will still be G-IBAs.

**NA-3:** The site is known or thought to hold a significant component of the assemblage of species whose distributions are largely or wholly confined within one sub-biome (CEC level II). It also has to form one of a set selected to ensure that, as far as possible, all species restricted to a biome are adequately represented. While it is possible for a sub-biome to be

wholly restricted to one country, it would still be a North American site. Similarly, for sub-biomes that cross political boundaries, sites will be selected in each country—but they will still be NA-IBAs.

**N-3:** The site is one of the best representative sites of an Avian Physiographic Stratum (as defined by BBS/PIF) or, alternatively CEC level III, and sustaining the characteristic associated avian assemblage of that stratum. Sites are selected based upon the completeness of the avian **assemblage** for the habitat type. As there are usually multiple habitat community types within a physiographic region, the selection of sites is such that each habitat, as much as possible, is covered. As many habitat types and many bird species are widespread, the site selection process will concentrate on those sites with the best assemblage of bird species occurring in the more restricted habitat community types.

**S-3:** The site is one of the best representative sites of an Avian Physiographic Stratum (as defined by BBS/PIF) within a state/province, and it sustains the characteristic associated avian assemblage of that stratum. Where possible, these sites will concentrate on sites containing unique or unusual avian assemblages because they are in habitat community types that are rare, threatened, or unusual within the state or province. Again, the emphasis on the selection of the sites must be based on the avian assemblage within the habitat community type, not based on the habitat community type alone.

#### Category 4

##### *Congregations of species*

This category deals with sites containing concentrations of species. These concentrations could occur on the wintering grounds, the breeding grounds, or during migration. This category applies to those species that are vulnerable, or perceived to be vulnerable, concentrating at these sites. It embraces not only terrestrial sites, but also marine/lacustrine sites and sites **over** which migrants congregate (e.g., before gaining height in thermals). This category also includes migratory stop-over sites that may not hold spectacular numbers at any one time but do so over a short period, due to the rapid turnover of birds on passage.

**In general, and whenever possible, the population size threshold used here is 1% of the biogeographical population size.**

A biogeographical population can be defined as a mostly discrete group of birds that lives and freely interbreeds in an area (or group of areas, if migratory) and rarely exchanges members with other groups. This could apply to a subspecies or population and also to portions of the range of a species. For example, many waterfowl species are widespread in their distribution, breeding in both hemispheres. However, the populations in each hemisphere rarely exchange members and so each population should be considered separate. Similarly, in North America the population of Burrowing Owl in Florida is biogeographically distinct from the other populations. Biogeographical populations can also be defined within areas separated by political boundaries (e.g., states/provinces), or are quasi-biological in nature (e.g., flyways). The reason for treating each biogeographical population separately is that each population faces different conditions in different parts of its range. This includes differences in pressures on the population, differing threats to habitats, and different conservation and management alternatives.

The 1% threshold for population size has been widely used in different countries and different programs around the world. While there is no fundamental biological reason 1% should be used as a threshold, other countries have found it to afford an appropriate degree of protection to populations, and to be useful in defining ecologically sensible sites. In addition, the use of a proportional measure as a threshold is self-adjusting for rarity. In species with small overall population sizes, fewer individuals need be present to designate the site as an IBA. Additionally, species with very large populations typically have few sites where 1% of the population is found to concentrate.

IBA coordinators in each area will attempt to identify the 1% threshold for as many species as possible. In cases where the population size cannot be estimated with any confidence, the numbers listed below can be used as guidelines in lieu of thresholds. In all cases, the numbers need to be considered in tandem with other factors concerning the species in question. These factors include population size, threats, habitat loss, dispersion, overall distribution, etc. These are not rigid rules, but guidelines to assist in the identification of IBAs.

In each category, global refers to the overall biogeographical population, North American to the biogeographical population within the continent, national to the biogeographical population within the country in question, and state/province to the biogeographical population of the state/province.

##### *Category 4a—Congregations of a single species*

The site is known to contain, or thought to contain an average of 1% of the biogeographical population of a species.

**G-4a:** The site is known or thought to contain more than 1% of the biogeographical population of a species.

**NA-4a:** The site is known or thought to contain more than 1% of the continental biogeographical population (flyway or other population) of a species.

**N-4a:** The site is known or thought to contain more than 1% of the national biogeographical population (flyway or other population) of a species.

**S-4a:** The site is known or thought to contain more than 1% of the state/province population of a species. This category can also be used to identify important source populations of individual species.

*The following categories come into use only if the 1% population thresholds are unknown. Thresholds are known for most waterfowl, seabirds and shorebirds and for many wading birds.*

##### *Category 4b—Congregations of a waterfowl*

The site is regularly an important concentration site for waterfowl during any portion of the year. Concentration refers to those species present over a short period rather than an entire season. These thresholds are guidelines for instances where: a) the single species biogeographical population size is unknown; or b) several species might be present in large numbers. In cases where the threshold values are known but no individual species meets the value, the combined proportion of the species present should be examined. For example, one species may have 0.3%, a second species 0.2% and a third species 0.5%. These total 1% and the site should be considered for inclusion in the IBA network.

**G-4b:** The site is known or thought to contain more than 20,000 waterfowl.

**NA-4b:** The site is known or thought to contain more than 15,000 waterfowl.

**N-4b:** The site is known or thought to contain more than 10,000 waterfowl.

**S-4b:** States/provinces will develop their own criteria here, as criteria suitable for an inland site will differ from those of a coastal site. Ideally, unique criteria will NOT be developed for each state/province but will fall into one of a few categories. For example, Pennsylvania has set the following threshold: 2,000 waterfowl at one time.

**Category 4c—Congregations of seabirds**

The site (terrestrial or marine) is regularly an important concentration site for seabirds during any portion of the year. Concentration refers to those present over a short period rather than an entire season. These thresholds are guidelines for instances where: a) the single species biogeographical population size is unknown; or b) several species might be present in large numbers.

**G-4c:** The site is known or thought to contain more than 20,000 seabirds.

**NA-4c:** The site is known or thought to contain more than 15,000 seabirds.

**N-4c:** The site known or thought to contain more than 10,000 seabirds.

**S-4c:** States/provinces will develop their own criteria here, as criteria suitable for an inland site will differ from those of a coastal site. Ideally, unique criteria will NOT be developed for each state/province but will fall into one of a few categories.

**Category 4d—Congregations of shorebirds**

The site is regularly an important concentration site for shorebirds during any portion of the year. Concentration refers to those present over a short period rather than an entire season. These thresholds are guidelines for instances where: a) the single species biogeographical population size is unknown; or b) several species might be present in large numbers.

**G-4d:** The site is known or thought to contain more than 20,000 shorebirds.

**NA-4d:** The site is known or thought to contain more than 15,000 shorebirds.

**N-4d:** The site is known or thought to contain more than 10,000 shorebirds.

**S-4d:** States/provinces will develop their own criteria, as criteria suitable for an inland site will differ from those of a coastal site. Ideally, unique criteria will NOT be developed for each state/province but will fall into one of a few categories. For example, Pennsylvania has set the following threshold: 100 shorebirds at one time.

**Category 4e—Congregations of raptors**

The site is regularly an important migratory stopover site, “bottleneck,” or migratory corridor for raptors. Concentration refers to seasonal totals rather than a brief period.

**G-4e:** The site is known or thought to have more than 25,000 raptors pass through in an average season.

**NA-4e:** The site is known or thought to have more than 15,000 raptors pass through in an average season.

**N-4e:** The site is known or thought to have more than 10,000 raptors pass through in an average season.

**S-4e:** States/provinces will develop their own criteria. Ideally, unique criteria will NOT be developed for each state/province but will fall into one of a few categories. For example, Pennsylvania has set the following threshold: 8,000 raptors as a seasonal total during one season.

**Category 4f—Concentrations of wading birds**

The site is regularly an important concentration site for wading birds during any portion of the year. Concentration refers to those present over a short period rather than an entire season. These thresholds are guidelines for instances where: a) the single species biogeographical population size is unknown; or b) several species might be present in large numbers.

**G-4f:** The site is known or thought to contain more than 10,000 wading birds.

**NA-4f:** The site is known or thought to contain more than 5,000 wading birds.

**N-4f:** The site is known or thought to contain more than 2,500 wading birds.

**S-4f:** States/provinces will develop their own criteria as criteria suitable for an inland site will differ from those of a coastal site. Ideally, unique criteria will NOT be developed for each state/province but will fall into one of a few categories. For example, Pennsylvania has set the following threshold: 50 pairs of wading birds during the breeding season.

**Category 4g—Congregations of migratory landbirds (other than raptors)**

The site is regularly an important migratory stopover site, “bottleneck,” or migratory corridor for migratory landbirds (other than raptors). Concentration refers to seasonal totals rather than those occurring over a brief period of time. No absolute thresholds have been set, owing to the scarcity of quantitative data. Sites nominated should contain exceptional numbers and/or diversity of migratory landbirds. For example, two criteria that have been applied to sites include greater than 500,000 passerines estimated to pass through the site in a short period or an estimate of 40 birds/ha estimated to occur in an area at any one time.

## Conservation and Management of Important Bird Areas

Fred Baumgarten

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The IBA Program is designed to promote the protection or conservation management of essential habitats for birds. This section outlines some of the strategies which conservationists can use to bring this about. By necessity, this discussion is cursory. A large body of literature exists on the techniques of land protection available to individuals and organizations, and there are many different options available. Those interested in pursuing conservation of IBAs are encouraged to read more and to consult with professional land conservationists. Moreover, the political, legal, regulatory, and voluntary means of land protection and management vary dramatically among the three North American countries, so that a specialized knowledge of the institutions and practices of each country is desirable but beyond the scope of this discussion.

### IBA Conservation Guidelines

Some general statements can be made about Important Bird Areas and their conservation:

- (1) The identification of IBAs produces a basis for governments, conservation groups, and other stakeholders to determine *conservation priorities* within a particular country, region, state/province, or local area. Information collected on IBAs allows one to compare the level of importance of sites (global, North American, national, state/provincial), the nature and urgency of threats, and the feasibility of implementing conservation measures. Such comparisons can lead in turn to decisions about what sites should receive the greatest effort and resources in terms of conservation. In addition, by using objective criteria to identify Important Bird Areas, the IBA Program presupposes that all such sites identified have a conservation value for birds greater than other areas.<sup>1</sup>
- (2) The process of identifying IBAs generates *data* that are potentially critical for guiding land-use planning and habitat management decisions. Information on what species (or species groups) are important in a given area, how many occur and at what time of year, the major habitat types, and the conservation issues can assist the landowner or land manager in avoiding harmful activities in a particular area, transferring development to a less important site, or adopting management practices to sustain (or enhance) populations of target species.

Conservation of IBAs should be focused on the species or groups for which the site is deemed important, but other conservation values must also be taken into consideration, such as the overall health of the ecosystem. The conservation of IBAs will in all likelihood benefit other non-avian wildlife, flora as well as fauna.

- (3) Conservation of IBAs, like the IBA Program itself, is primarily *site-based*, and therefore the types of conservation strategies will differ from one site to another. For each site, conservationists will need to assess the location, type of land ownership (public or private), current and historic patterns of land use, needs and attitudes of groups utilizing the area, management considerations for key bird species, availability of conservation resources, and existence of current or previous protection efforts—among other things—before proceeding with any type of conservation strategy. However, there are also conservation tools, such as legislative actions, regulations, and international agree-

<sup>1</sup> It must be stressed that areas not identified as IBAs may still be deserving of protection, whether because they possess other conservation values (e.g., for non-avian wildlife or plants, or endangered species; as open space; for pollution control or buffering; for educational purposes or ecotourism), are significant on a smaller (local) scale, are deemed important by the local community, or for any other reason.

ments, that can effect entire categories or groups of sites, and these are also discussed, albeit briefly, in this section.

- (4) The impetus for conserving IBAs can come from any source: governments, non-governmental organizations (NGOs), and individuals—including private landowners and public land managers. The most successful conservation arises from *cooperative partnerships* between these sectors. Conservation planning must involve all stakeholders for a particular site or sites. Landowners and land managers must be notified whenever possible if their land has been identified as an IBA (or part of an IBA), and they must be given the opportunity to participate in a cooperative conservation planning process.
- (5) The IBA Program is *non-regulatory*. Identification (or designation)<sup>2</sup> of a site as an Important Bird Area by itself imposes no legal restrictions or management requirements on any property, public or private. By the same token, it is hoped that the recognition of an area as important for birds will invest landowners and land managers with a sense of responsibility and stewardship for the site and its birdlife, and will lead them to take steps to ensure the long-term viability of the habitat. Finally, we hope to achieve, through partnerships, education, and public outreach, an environment in which local communities, state/provincial governments, and even national leaders take pride in the knowledge that they are caretakers of important natural resources—and that their actions, in safeguarding significant bird populations, can help ensure a better future for people as well as for wildlife.

### IBA Conservation Planning Process<sup>3</sup>

The following is recommended as a generalized procedure to be followed when attempting to protect or conserve an Important Bird Area. It should be broadly applicable to all IBA sites, at the local, state/provincial, national, North American, and global scale.

- (1) *Select a site or sites for “adoption.”* This decision may be based on familiarity with the area, strength of local interest, immediacy or level of conservation threats, potential for conservation success, or some other factor. At this stage, data about the IBA should be carefully reviewed, including key species, habitats, land-use, and so on.
- (2) *Identify and contact landowners.* Is the site publicly managed, privately owned, or a mix of public and private? In Canada, the provinces control most of the public (crown) lands. Public lands may also belong to the federal government or various levels of municipal government. In the United States, public lands may be in the hands of federal, state, county, municipal, or city governments. In Mexico, a small amount of lands is part of the federal park system, but many lands, known as *ejidos*, are communally owned at the local level. Private lands may be corporately owned, vary in size from large ranches to small suburban woodlots, or be inholdings within national parks or refuges.

At all times, it is important for landowners—and public land managers—to be notified that a site has been identified as an IBA and to seek their cooperation in designation and conservation of the site.

<sup>2</sup> The terms “identification” and “designation” are a source of some confusion. For our purposes, we consider a site to be identified as an IBA when it has been determined to meet the criteria at one or more level; a site is designated as when it has been given formal recognition as an IBA and/or at the initiation of a conservation planning process.

<sup>3</sup> Adapted from unpublished work by Jeffrey V. Wells, New York State IBA Coordinator, National Audubon Society.

- (3) *Identify and contact other potential stakeholders.* These include other individuals familiar with the site, land conservancies and conservation organizations (NGOs) involved in the area, and relevant governmental organizations. All should be invited to participate in the conservation planning process.
- (4) *Identify key issues and threats.* For example, is the area being excessively logged? Are there plans to develop it? Is the habitat being altered by invasive species of plants or animals? The IBA data form may contain some of this information, but it should be checked in detail by consulting with knowledgeable groups or individuals.
- (5) *Identify existing conservation activities.* Many Important Bird Areas are the focus of long-running conservation activities coordinated by any number of agencies or NGOs, and others have some type of management or conservation plan in place—although this may not be adequate to protect the area. IBA conservation efforts should always be consistent with, and not supplant, existing efforts.
- (6) *Assess present and future conservation and management needs.* Prepare a list of needs for the IBA in the areas of Education, Outreach, Research, Management, and Land Planning. This is the most complex part of the process and will require the input of local stakeholders who are familiar with the site, as well as a knowledge of the habitat management needs of the birds for which the site is important.
- (7) *Develop, implement, and review conservation measures.* Once the conservation and management needs have been determined, prepare a list of recommendations for the future conservation of the site. This forms the core of the IBA conservation plan. Direct conservation measures may include purchase of the site by a government entity or active management of the site for bird populations. Other measures may be to educate communities about sustainable use of the area, provide direct assistance or incentives to local user groups, promote ecotourism to the IBA, or conduct further research into the status of bird populations on the site and determine what management, if any, might be appropriate.

Conservation plans should be made available to all the stakeholders, as well as local officials, so that measures can be implemented by the appropriate groups. The conservation plan should be reviewed periodically and improvements made as needed.

### IBA Conservation Tools

What conservation measures are actually available for protecting IBAs? The list of possibilities is long, and, again, this discussion cannot cover more than a handful of them.

#### 1 Voluntary Initiatives

##### 1.1 Habitat management

In some ways the simplest of conservation measures, habitat management encompasses a suite of actions to maintain the suitability of the habitat for the target bird species. It will often be the most appropriate recommendation for publicly-managed IBAs that already have protected status (such as parks or refuges), or for private lands where the landowner has made a commitment to protecting the habitat. In its most basic form, it may involve nothing more than continuing current management practices, if they are determined to maintain or increase populations of key species.

More often, active habitat management will be necessary—measures ranging from selective cutting of important tree species, removal of brood parasites (cowbirds) or exotic species, and predator control, to prohibition of destructive or disruptive activities, construction of artificial nest structures, and implementation of specific management regimes (e.g., careful

timing of mowing on agricultural lands, prescribed burning of grasslands, and flooding of fallow fields).

Habitat management recommendations can be made, and put into practice, through a wide variety of channels. Conservationists may work directly with private landowners, public land managers, and local land-users to educate them about beneficial habitat management techniques, or they may find volunteers who can directly implement certain practices, such as predator removal or erosion control. NGOs and citizens may participate in public resource-management reviews at different levels when these are mandated by law. For example, in Pennsylvania (US), the state system of public forests is currently having all of its management plans reviewed, and local activists are having input into the process through the identification of IBAs. Similar opportunities may exist in the United States and Canada during the environmental impact review process (under the National Environmental Policy Act and/or state laws in the US, and the Canadian Environmental Assessment Act and/or provincial laws in Canada) and when mitigation plans are being proposed.

### 1.2 Cooperative agreements with local stakeholders

Conservationists may seek to secure agreements from private landowners or local user groups (e.g., representatives of *ejidos* in Mexico) stating that they will maintain the habitat as an IBA or a protected area, avoid certain destructive or disruptive activities, or not develop it. In Mexico, such measures will depend greatly on the ability to ensure continued access to vital resources by local groups, identifying productive alternatives to forestry, livestock grazing and other agricultural practices, as well as on other educational efforts. In the United States, these agreements will often take the form of conservation easements (see below), and will depend on public outreach and education. In Canada, there has been a remarkable growth in private stewardship programs during the past decade. Options for private landowners under such programs range from landowner contact where a simple handshake represents a joint agreement to look after the land for conservation purposes, to short to mid-term leases or even legal agreements such as a conservation easement (see below), covenant or servitude.

### 1.3 Conservation Easements

A conservation easement is an agreement between a landowner and another entity (usually a government agency, NGO, land trust or conservancy) whereby the owner retains title to the land but stipulates that certain areas will be maintained in perpetuity in a natural state. It is, in effect, a public/private partnership, and thus is a very important tool for land conservation in the United States and Canada. However, conservation easements can be extremely complex to negotiate, and their enforcement may place a significant burden on the public (or NGO) partner. Easements may be donated by the landowner, but more often they are purchased, so they also require substantial financial resources on the part of the public partner. Landowners generally benefit financially through tax breaks—and emotionally, by supporting conservation. If a conservation easement is being considered for an IBA, we recommend contacting The Nature Conservancy or a similar land trust or conservancy experienced in the intricacies of such arrangements. In 1997, amendments were made to Canada's *Income Tax Act* in order to facilitate the donation of privately-owned, ecologically sensitive land, easements, covenants, and servitudes, for conservation purposes. In the amended *Act*, donations to municipalities and registered charities are given the same tax treatment as donations to the crown.

### 1.4 Land acquisition

Purchasing land from willing sellers is the most protective type of land conservation, because it allows the new owner to manage it entirely for its conservation values. Land purchase is especially crucial for enlarging, or creating buffer zones around, protected areas in order to establish large contiguous blocks of natural habitat. It is also likely to be the most expensive alternative, requiring potentially enormous financial resources not only to buy the land but to manage it. Governments, NGOs, and private individuals all may purchase land

for conservation. Land may be purchased at fair market value (the most expensive), or at discount, or it may be donated. Management is best done by NGOs equipped to handle the responsibility, or by governments. It is not uncommon for NGOs to raise the funds to purchase a site and then transfer or sell it to the government for long-term management.

In the United States, there are authorized sources of funding for land acquisition. At the federal level, the Land and Water Conservation Fund exists to create a dedicated stream of funding for land acquisition, but has been historically underutilized, with money diverted to other items. Many states have “open space programs” that set priorities for land acquisition—an IBA designation can be, and has been, used as a valid criterion in ranking sites—and a variety of funding mechanisms, ranging from local sales taxes and environmental bond issues to state lottery funds and special license-plate receipts. Even so, these add up to just a fraction of what is needed to purchase more than a few important habitats.

The Mexican government and NGOs have virtually no money for land acquisition, and cooperative agreements or direct government policy take on a much larger role. There are, however, a few examples of private land acquisition that contribute to the enlargement of a previously protected area. For example, the Estación Biológica Chamela of the National Autonomous University of Mexico was enlarged by the acquisition of adjacent land by the Fundación Cuitzmalá A.C., forming the largest biosphere reserve containing tropical dry forest in the Mexican Pacific Slope. Also, agreements with local owners have worked in Mexico, especially those in which economically attractive options have been explored.

Hunting ranches are beginning to play a role for conservation in Mexico, while acting as extensive areas where umbrella species, such as white-tailed deer and collared peccary, are actively managed and harvested in a sustainable way, while keeping the habitat in good condition. (An umbrella species is a species whose welfare is considered representative of a majority of the other species in its habitat.)

### 1.5 Incentives

It may be possible to offer a package of financial incentives to landowners and NGOs who agree to protect or restore habitat on or near IBAs.

The National Audubon Society is currently studying the feasibility of a national legislative proposal to create a grants program in the US, administered by the federal government, that would offer incentives to landowners who adhere to a set of criteria for restoring wetland habitat within an IBA or a buffer zone (inside 90 meters of the IBA boundary).

In Mexico, as a consequence of an ambitious federal wildlife conservation program initiated in 1996, there is an increased interest in voluntary registration and management of lands for conservation and sustainable use of wildlife. Known as “UMAs,” these operate on the basis of an authorized management plan accepted by the landowner. UMAs are intended to promote the development of alternative “habitat friendly” practices. This system has grown in the last three years to cover around 10 million hectares in about 1,000 registered units.

## 2 Legal, Regulatory, and Policy Initiatives

### 2.1 Zoning and Land-use Planning

Most towns and municipalities in the United States and Canada have zoning ordinances that govern the extent and nature of development. These offer a potential means of protecting specific IBAs from destruction, such as during zoning reviews, and proactively ensuring that development does not sprawl into important habitats. For instance, some municipalities have “special overlay zones” designed to protect particular resources (e.g., watersheds, scenic areas, hillsides); IBAs might also be proposed as an overlay zone. Other ways to protect IBAs could include placing minimum sizes on subdivisions of 8, 20, 40 ha or more and ordinances that retain the original use of agricultural and forestlands. Many state and local land-

use commissions utilize Geographic Information Systems for planning, and it is hoped that IBA data eventually will be incorporated into GIS.

### 2.2 *Wetland regulatory programs*

Because many IBAs are entirely or partially comprised of wetland habitats, the application of wetland regulations may be an effective method for conserving IBAs. The key federal programs in the United States are Section 404 of the Clean Water Act and the “Swampbuster” provisions, Wetland Reserve Program (WRP), and Conservation Reserve Program (CRP) of the Farm Bill. Section 404 requires land managers to obtain a permit from the US Army Corps of Engineers in order to fill or dredge any wetland. Notice of permit applications may be obtained from local or regional offices of the Corps, and there is a required public comment period for larger projects. As a rule, wetland loss must be avoided, minimized, or mitigated. “Swampbuster” allows the federal government to deny subsidies to farmers who fill, drain, or otherwise alter wetlands, while the WRP and CRP pay subsidies to farmers for retiring and restoring wetlands or other conservation lands.

Most US states and Canadian provinces have their own set of laws and regulations governing wetlands, often more restrictive than federal regulations. Familiarity with these laws is important for anyone seeking to protect a wetland IBA. There is a national commission in Mexico which addresses water-related issues in various parts of the country.

### 2.3 *Endangered species protection*

Species on the federal endangered species list in the United States are given protection under the Endangered Species Act. The law prohibits the “taking” (direct killing or harming) of listed species and requires the US Fish and Wildlife Service to create a recovery plan and designate critical habitat for each listed species. This is a highly effective law, but it is not without weaknesses. Recovery plans do not yet exist for many listed species, and many more “candidate” species are awaiting listing. The interpretation of the “taking” clause has been hotly contested and occasionally circumvented. In the past several years, Habitat Conservation Plans (HCPs) have been substituted for single-species recovery plans. HCPs allow for the development of large areas in exchange for protecting core habitats and connecting corridors for one or more species. HCPs are very controversial and may do more harm than good. Most US states maintain their own lists of endangered and threatened species, and usually support recovery efforts.

Five Canadian provinces—Saskatchewan, Manitoba, Ontario, Quebec, and New Brunswick—have legislation protecting endangered species to varying degrees. Two others—Nova Scotia and Prince Edward Island—have introduced bills for endangered species legislation. A federal bill for endangered species legislation was introduced in October 1996 but failed to reach second reading. The federal bill found some support within many NGOs but was heavily criticized for its limited application. The bill would have protected few species and no critical habitat outside of federal lands and waters (4% of the provincial land base). The bill also left to Cabinet’s discretion the decision to list species under the law. However, the bill would have prohibited harm to listed endangered and threatened species or their “residences” and would have required the preparation of recovery plans for listed species. The Government of Canada has stated that it remains committed to reintroducing endangered species legislation in the 36th Parliament. Moreover, all provinces and territories have agreed to a National Accord for the Protection of Species at Risk, which commits governments to develop laws and programs protecting endangered and threatened species and their habitats.

### 2.4 *Creation of protected areas*

The ability to legislatively or otherwise designate protected areas is one of the basic powers governments have to effect land conservation of IBAs. However, it is not without its drawbacks. Abuse of this power can backfire, alienating local communities and landowners and, worse, potentially dislocating people who live on the land. In addition, enforcement of con-

servation restrictions on “protected” lands can be a difficult proposition even in the best of circumstances. Where resources are limited, as in Mexico, it can be almost impossible.

The National Wildlife Refuge System is the most relevant set of protected areas in the United States for conservation of IBAs. There are presently about 510 refuges in the country, and many (or most) are potential IBAs. Creation of new refuges requires only an executive order from the President, but are usually accompanied by authorizing legislation in Congress. Once a refuge is established, it may still take millions of dollars to purchase the lands to complete the refuge. Many refuge managers have to balance numerous competing uses of the site—everything from wildlife protection to recreation and resource extraction. In 1997, a “Refuge Organic Act” was enacted that for the first time in law makes wildlife protection the primary purpose of the system and attempts to resolve conflicting interests on a system-wide basis.

Other US public-lands systems include the Bureau of Land Management’s (BLM) holdings, Department of Defense (DOD) lands, the National Forests, and the National Park System. BLM is the largest holder of public lands in the nation, and many of its lands are potential IBAs. It may give public lands protected status as Areas of Critical Environmental Concerns (ACECs). DOD lands contain, in many areas, excellent representations of grassland and arid habitats. Defense facilities are occasionally excessed, presenting an opportunity for their transfer to the Fish and Wildlife Service or other conservation agency. Congress may also designate protected lands and waters as wilderness, as national scenic rivers, and as national parks, monuments, and recreation areas.

In Canada, IBAs that fall within a National Park will receive the highest level of protection. Currently, Canada has 38 National Parks covering over 230,000 km<sup>2</sup> and almost 2.3% of the total land base. A large number of these areas contain sites that are being considered as potential IBAs. The National Parks Act (NPA) provides the legislation for National Parks and stipulates that its primary mandate is to maintain the ecological integrity of the park. Its regulations and policies establish a comprehensive set of rules for the use and acquisition of lands, the use of resource and facilities in the parks, fire management, and public safety. Legal establishment of a National Park involves identifying candidate sites, public notification and consultation, agreement with the province or territory concerned, negotiations with First Nations, transfer of provincial/territorial lands to the federal government, and addition of the park to the list of national parks through a legislative amendment to the act. The National Parks Act makes protection of habitat a primary objective and contains regulatory language that offers protection specifically to migratory birds.

Migratory Bird Sanctuaries (MBS) and National Wildlife Areas (NWA) also contribute to Canada’s protected areas system. Nearly all MBS and NWA are being considered as potential IBAs. MBS were the first to be established after the passage of the Migratory Birds Convention Act (MBCA) in 1917. The MBCA is the legislation which implemented the Migratory Birds Convention into Canadian Law. In addition to the establishment of MBS, regulations under the Act control the hunting of migratory birds (including game birds, insectivorous birds and non-game birds). The purpose of these sanctuaries is to protect migratory birds from physical disturbance and hunting, the major threat to migratory birds early in the century. In the 1960s and 1970s, the major threat shifted from hunting to the loss and fragmentation of habitat. In response, the Canada Wildlife Act was passed in 1973 to authorize the establishment of refuges known as National Wildlife Areas (NWA) in which migratory birds, other wildlife, and habitat could receive protection.

The National Parks Act, Canada Wildlife Act, and Oceans Act have mechanisms for the creation of National Marine Conservation Areas, Marine Wildlife Areas, and Marine Protected Areas in Canada; such areas may be crucial as IBAs for pelagic species, alcid, etc.

Provincial parks and protected areas are much less straightforward in Canada, with the level of protection varying among ‘classes’ of parks and between provinces. Some ‘wilderness class’ provincial parks offer protection that is nearly as strong as national parks, while some provinces, such as Manitoba and Ontario, actually allow mining or logging within their parks. Other provincially mandated protected areas include conservation areas, ecological parks, and conservation reserves.

In Mexico the national system of protected areas includes about 200 designated sites with differing statuses of protection ranging from biosphere reserves to flora and fauna refuges. Designation, however, does not always involve real protection. There is currently a prioritization effort to ensure protection of fewer very important areas, where government is appropriating funds to support staff positions involved in full-time protection of these areas.

### 2.5 Other laws and regulations

All three countries have an array of wildlife and environmental laws, and regulatory programs, that potentially affect IBA conservation. Among the most important in the United States are the National Environmental Policy Act (NEPA), National Forest Management Planning Act (NFMPA), and Migratory Bird Treaty Act (MBTA). NEPA mandates the preparation of an Environmental Impact Statement (EIS) for any federal action likely to have a significant effect on the environment. There is a public comment period on the EIS, and this affords the opportunity to assess the impact of a proposal on an IBA and its natural resources. All national forests are required to have management plans under NFMPA, and these periodically come up for review. They must balance resource extraction with wildlife and recreational uses. MBTA enforces the terms of a tri-national treaty and prevents the taking of virtually all migratory species of birds.

Other laws and policies that may potentially affect IBA conservation in Canada include the Canadian Environmental Assessment Act (CEAA), the Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act (WAPPRITA) and the Fisheries Act. Not unlike NEPA in the US, CEAA mandates the preparation of an environmental assessment (EA) for any federal action likely to have an effect on the environment. Again, there is a public review process in which the impact of a proposal on an area (e.g., IBA, National Park) can be assessed by communities and NGOs. WAPPRITA governs the trade in and transport of wildlife in Canada. The overall purpose of the law is protect wild species, especially those at risk from over-exploitation caused by poaching and illegal trade, and to safeguard ecosystems from the introduction of harmful wild species. The Act and Regulations include provisions for higher penalties, designation of wildlife officers and improved authorities for the administration and enforcement of trade-related controls. The Fisheries Act, possibly Canada’s strongest environmental legislation, provides for the protection of fish habitat. This can be a useful tool for protecting aquatic habitat, including IBAs.

### 2.6 International agreements<sup>4</sup>

A number of international conventions and treaties cover the conservation of birds and avian habitats. As with all such agreements, they depend for their effectiveness on the commitment and resources of the signatory countries to implement their terms.

The World Heritage Convention was established in 1972 by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in order to provide for the identification and protection of areas of cultural and/or natural heritage that are of outstanding universal value (Articles 1 and 11(2)). Article 2 indicates the criteria used for identifying natural heritage areas, including areas “which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of sci-

<sup>4</sup> Adapted from “Review of Legislation and Policy Governing Bird Conservation in Canada,” unpublished document, courtesy of Canadian Nature Federation.

ence or conservation.” In order to establish a World Heritage Site, it is the responsibility of each party to the convention to identify sites that may qualify for protection (Article 3). Once identified, the site is nominated for addition to the World Heritage List. The World Heritage Committee, an intergovernmental committee of UNESCO, makes the determination and manages the list, which includes sites in all three countries.

In June 1992, at the Earth Summit in Rio de Janeiro, the United Nations adopted a Convention on Biological Diversity, which offers a framework for action to enhance the protection of birds and their habitats. To date, Canada and Mexico have signed this agreement, but the United States has not.

The Convention on Wetlands of International Importance, or Ramsar Convention, was signed in Ramsar, Iran in 1971. It is an intergovernmental treaty that provides a framework for international cooperation in the conservation of wetland habitats. As of 1995, 84 nation-states were signatories; these countries agree to the designation of at least one wetland to the list of wetlands of international importance; promotion of wise use of wetlands; and establishment of protected wetland areas throughout their countries. The Ramsar Convention uses criteria not unlike the IBA criteria to identify wetlands of international importance. The criteria are in three categories: (1) criteria for representative or unique wetlands; (2) criteria based on plants and animals; and (3) criteria based specifically on waterbirds. Some 645 Ramsar sites have been designated worldwide, including sites in all three countries. As with IBAs, Ramsar designation offers no legal protection, but the sites are often sympatric with protected areas (e.g., national parks, refuges).

In 1995, Mexico, the United States, and Canada signed a memorandum of understanding creating the Trilateral Committee for Wildlife, Plants, and Ecosystem Conservation and Management, an outgrowth of the North American Waterfowl Management Plan (NAWMP). The Trilateral Committee is composed of senior members of wildlife agencies in the three countries. Its purpose is to develop, implement, review, and coordinate cooperative conservation projects and programs for integration into the conservation priorities of each country.

The Migratory Birds Convention (MBC) of 1916 is an international treaty between the United States and Canada providing the basis for federal governments of both countries to regulate migratory bird hunting. Similar to other conventions, the MBC establishes commitments of a moral nature. It is the responsibility of each country to implement effective legislation. In Canada, the Migratory Bird Convention Act (MBCA) is the implementing legislation; in the United States, it is the Migratory Bird Treaty Act (MBTA). Both laws essentially prohibit the hunting, killing, or harming of most migratory species of birds, or place restrictions on hunting seasons. They also forbid the taking of nests or eggs of migratory birds and the shipment or sale of birds.

### 2.7 Funding

As has been discussed elsewhere, lack of funding resources is probably the single most important limiting factor in the effective conservation and management of migratory birds and their habitats, including IBAs. Increased funding is necessary to acquire key habitats and to enforce protective measures. Securing adequate funding should be a goal of all concerned conservationists seeking to protect Important Bird Areas. Both private and government sources should be sought for conservation funding.

### 2.8 Proactive legislation

Aside from the existing laws and policies discussed above, the IBA Program offers the opportunity to create new legislation specifically designed to protect IBAs. A local, state, or national government may decide to give blanket protection to all or some IBAs in a region, or to mandate the management of IBAs to conserve avian habitats. One such precedent was set in 1997 when the New York State government enacted a law which adopts the

state IBA criteria to identify Important Bird Areas on state-owned lands and makes conservation management of these sites the top priority.

### 2.9 Litigation

Legal challenges to actions that are perceived as illegal or that would have dire consequences to bird habitat can be an important strategy when all other avenues to protection have been exhausted. In the U.S., for example, many, though not all, laws have mechanisms for citizens to challenge regulatory decisions in court, although getting legal standing can be difficult. However, litigation, while serving a useful conservation purpose, often serves to alienate members of local communities. It should be considered only as a last resort—after all other methods have failed.

### 3 Other forms of action

Several other options may also be worth exploring as last resorts, or, perhaps, as part of an overall strategy for IBA conservation. *Direct action*, i.e., non-violent protest against activities that may do imminent damage to vital habitat, could help in forestalling or preventing habitat destruction. *Media campaigns*—writing letters to newspapers, meeting with editorial boards, or contacting TV and radio stations—can help bring public attention to key areas. *Political action* can take a number of forms: writing letters to elected officials, supporting candidates whose positions favor habitat conservation, and even choosing to run for elected office—anything from town planning board to state/provincial or national legislature.

### 4 Education, research, and monitoring

We conclude with a brief discussion of these three areas. Although they may not seem to be “conservation” activities, strictly defined, all three make an important contribution to bringing about conservation, and should be integral to any strategy for protecting IBAs.

*Education* spans a wide range of potential activities. The goal is always to make people aware of the values and benefits of conserving habitats, as well as to guide landowners and land managers in specific conservation management techniques. Some possible educational activities include: making presentations to community groups on the birds and habitats of a particular IBA; producing and distributing educational materials (fact sheets, posters, etc.) on IBAs; and sponsoring birding tours and educational workshops on or adjacent to IBAs. In this category, too, we put ecotourism, a possible benefit to landowners and public land managers who want to open their lands to birders and other outdoor recreationists. Volunteers can also be brought in to help restore or maintain trails, clean up sites, and help in monitoring and research activities.

*Monitoring and research* are important tools for gauging the success of the IBA Program and the health of specific habitats and species or populations of birds. They are also inherently pleasurable activities for birders, presenting a variety of opportunities for amateurs to contribute both to science and to conservation. Regular surveys that take place in Mexico, Canada, and the United States include the annual Christmas Bird Count (sponsored by the National Audubon Society) and Breeding Bird Surveys. The Cornell Laboratory of Ornithology in Ithaca, New York, has developed several volunteer monitoring programs such as Project FeederWatch, Project Tanager and, more recently, the Cerulean Warbler Atlas Project (CEWAP). All of these activities can be tied into IBAs on a regional or local level.

At a more skilled level, point counts, strip-transect surveys, and other monitoring techniques can be employed to track quantitative trends in bird populations. The IBA Program should be used as a basis of research into bird-habitat relations, changes in land-use patterns and their effects on bird populations, source-sink dynamics, and the role of protecting important areas in the overall health of key species.

## Conclusion

The identification and designation of Important Bird Areas provides both a strategy and a tool for action. In the IBA process, we begin by identifying habitat essential to the species of concern. Then we plan an agenda of protection, restoration and/or management accordingly, always linking our action to good science coupled with effective conservation. Our goal is not only to change or improve the ways in which government and private landowners manage their lands, but to change the way people think about conservation. This change in attitude is equally important for the long term proper management and protection of birds in North America.

## Acknowledgments

The author wishes to thank Christie Chute and Steve A. Wilcox for contributing the materials on Canada, and María del Coro Arizmendi Arriaga and Humberto Berlanga for contributing the materials on Mexico.

## How to Read the IBA Site Accounts

The IBA site accounts from all three countries are laid out in the same format. This page should help you better understand how to read them.

### Box

In the upper left corner is the site number. The sites are numbered as they are found geographically by longitude, from west to east.

The black box contains the site name and its geopolitical location (state in Mexico, county/parish and state/province in US/Canada).

The lower left corner gives the site code. The first two letters represent the country (US/CA/MX), the next two letters are the abbreviation of the state/province or, in the case of Mexico, the general region of the country (NW=northwest, NE=northeast, C=central, SE=south, southeast), followed by the number representing the site within the state/province, and concluding with the letter representing the level of significance of the site (G=global, NA=North American, N=national, S=state/province). The reports from Mexico further specify the applicable subdivision of the code for the level of significance, as described above under Criteria (p. 9).

In the lower middle position are the geographic coordinates (latitude and longitude) for the center of the site.

The lower right corner provides the elevation range for the site (from lowest to highest) and the size of the site in km<sup>2</sup>.

### Summary Information

The bulleted section provides summary information about the site. The habitats portion provides an overview of the main habitat types found on the site. The land-use section provides information on the primary and secondary uses of the site. The threats section provides a listing of the different threats facing the site. In some cases, those providing information on the site have subdivided the threats into categories. A critical threat is one anticipated to impact greater than 50% of the resource, a major threat 10%-50% of the resource and a local threat less than 10% of the resource. Potential threats are those that will possibly affect the site in the future. Finally, in US and Mexican sites the ownership category gives the name or type of the entity owning or managing most of the site, whereas in Canadian sites the protection status is given, since in the case of many of those sites, the ownership is still a matter to be resolved.

### Site description

This section gives a general overview of the site. It might include information on the topography, vegetation types and other species found there. Economic, visitation and other social information may be included here as well.

### Birds

This section provides an overview as to why the site is important as an IBA. If available, it includes information on bird population sizes and the significance of those populations in terms of what percentage of the estimated population is present. Population may refer either to the world population or to the biogeographic population of the species, which in some cases may represent a flyway, and in other cases a hemisphere. In any case, if the percentage is greater than 1% then the site qualifies as an IBA (see Criteria, p. 9).

In some of the US and Mexican sites, information is also given in this section on the number and percent of neotropical migratory birds (e.g., birds that winter in the neotropics but breed in the US and Canada) found on the site. This information comes from inventory information for the site, from the site's bird checklist (where available) and from the Partners in Flight list of neotropical migratory birds.

Included also is a table summarizing the important bird population data for the site, if available, listing only those species which have led to the designation of the site as an IBA.

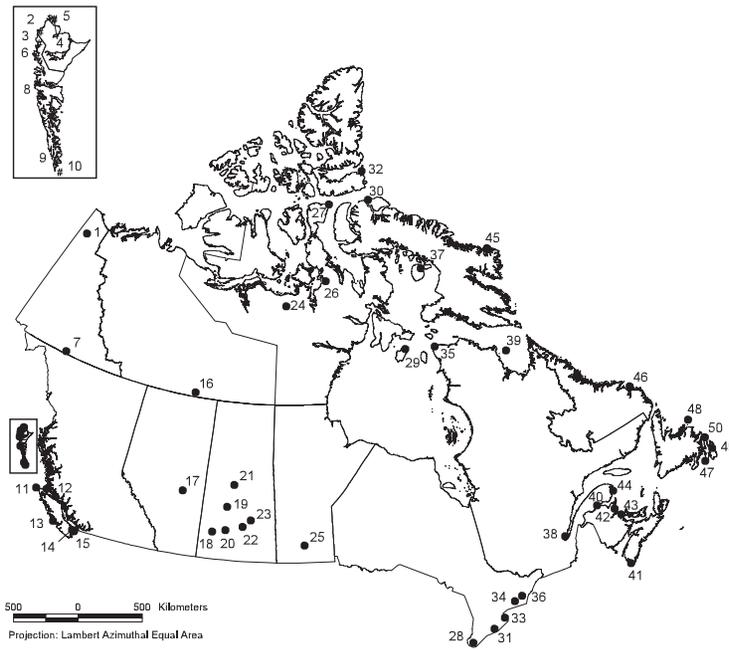
### **Chart**

The species listed in the chart are the highlight species for which the site was identified as being significant. In many cases these are species with populations at the site that are equal to or greater than 1% of the population, but not in all cases. The season codes are as follows: SM= spring migration; B=breeding; S=summer (post-breeding dispersal); F=fall; FM=fall migration; W=winter; A=all seasons; other.

### **Conservation issues**

The final section provides a description of the conservation issues facing the site, or conservation and research activities being conducted there.

# Canada



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## Introduction to the Canadian Sites

*Steve A. Wilcox*  
*Bird Studies Canada*

In Canada, the BirdLife International co-partners are Bird Studies Canada and the Canadian Nature Federation. Together they initiated the Canadian Important Bird Areas program in 1996. Bird Studies Canada is responsible for the technical side of the program, whereas the Canadian Nature Federation is responsible for advocacy, policy development, and site conservation.

Thus far, over 1,100 potential IBAs have been identified across the country. They appear to be clustered in four main areas: coastal British Columbia, the Great Plains, southern Ontario, and Atlantic Canada, with a broad scattering across northern Canada. Although the site identification process is by no means finished, the general distribution of sites is unlikely to change. The sites featured in this interim directory reflect this distribution. There are 13 sites from coastal British Columbia, 8 sites from the Great Plains, 5 sites from southern Ontario, 11 sites from Atlantic Canada, and 13 sites from northern Canada.

Along the coast of British Columbia, it is primarily sites such as seabird colonies, staging areas for shorebirds, or staging and wintering areas for waterfowl that are being identified. Some, such as the Scott Islands and Duke of Edinburgh Reserve, are relatively well studied and easy to identify as IBAs—over two million breeding birds have been estimated on the Scott Islands, including 55% of the estimated world population of Cassin's Auklet; for others, such as remote islands along the Queen Charlottes (like Langara Island, Kerouard Islands, Hippa Island), information is not as readily available or complete.

Several dozen shorebird sites have also been identified as potential IBAs along the British Columbia coast. As an example, the Tofino Mudflats support as many as 200,000 Western Sandpipers during the fall migration. Much of the western coast of North America provides unsuitable habitat for migrating shorebirds; thus the concentration of deltas and estuaries in southwestern British Columbia is crucial. These same estuaries, deltas, and straits also support large numbers of staging and wintering waterbirds. For example, Active Pass supports large concentrations of wintering Pacific Loons, Brandt's Cormorants and, during spring and fall migration, Bonaparte's Gulls.

On the Great Plains, IBAs are being identified primarily on the basis of staging waterfowl, shorebirds, or threatened species. The concentration of potential IBAs in this area should be of no surprise. This area is extremely important to many of the waterfowl and shorebird species that nest in the Canadian Arctic and northern Alaska. It provides the last highly productive habitats before the final push to the Arctic nesting grounds, or, for some species, the first stop on their way south. Some sites, like those in this interim directory, contain huge concentrations of birds during migration (e.g., Galloway and Miry Bay, Luck Lake, Quill Lakes, Last Mountain Lake). In 1995, for example, about 750,000 Greater White-fronted Geese gathered in late September along a small section of the South Saskatchewan River (Galloway and Miry Bay). Equally impressive numbers of Sandhill Cranes also frequent Galloway and Miry Bay, and also Last Mountain Lake; one-day counts of about 70,000 have been recorded. The Quill Lakes are also extremely significant. One-day peak counts of shorebirds regularly approach 200,000, with at least eight species regularly being observed in numbers that exceed 1% of their estimated populations.

In southern Ontario, practically all of the large marsh systems and associated peninsulas on the lower Great Lakes qualify as IBAs on the basis of waterfowl numbers, migrating landbirds or both. Sites featured in the interim directory include Prince Edward Point, Presqu'Île, Long Point, and Point Pelee. The wetlands of Long Point are especially significant. They support nearly 10 million days of waterfowl use. One-day counts of 100,000 waterfowl are made regularly and on 28 February 1998 over 50,000 Canvasback were observed (about 8% of the estimated North American population). Many of these wetland systems also support

significant populations of nationally endangered species, such as King Rails. There are also many sites in southern Ontario of significance for other waterbirds, such as Bonaparte's Gulls and herons. Along the Niagara River Corridor, for example, one-day counts of 8 to 10% of the estimated North American Bonaparte's Gull population are made regularly.

Like the west coast, Atlantic Canada's IBAs support large numbers of seabirds, waterbirds and shorebirds. For many bird species, use and distribution in this area are influenced primarily by the marine environment. For example, off Newfoundland, the cold Labrador current mixes with the warm Gulf Stream creating rich feeding areas that support millions of birds. Several well-documented seabird colonies from this area are featured in this interim directory (Cape St. Mary's, Witless Bay Islands, Baccalieu Island, Funk Island, the Gannet Islands). Most have estimated populations of greater than 500,000 pairs. Baccalieu Island, for example, has been estimated to support as many as 2 to 3.4 million pairs of Leach's Storm-Petrel (about 70% of the west Atlantic population). The Gulf of St. Lawrence is also productive, with about 50% of the estimated North American Northern Gannet population nesting on a single island off the coast of Quebec (Ile Bonaventure). Likewise, the beaches in the Maritimes (such as Kouchibouguac and Tabusintac sites) support over one-fifth of the Canadian population of the globally-threatened Piping Plover. And as much as two-thirds of North America's estimated Common Tern population nests in the Maritimes, with two of the largest colonies being at the Kouchibouguac and Tabusintac sites.

Northern Canada is a huge expanse of wilderness, with practically the entire area having population densities of less than 1 person per square kilometer. As a result, much of the area is relatively unexplored, from the perspective of bird populations, the exceptions being areas with seabird colonies, and areas supporting concentrations of nesting or staging waterfowl. In the eastern Canadian Arctic, huge seabird colonies are present. Digges Sound, for example, is reported to have as many as 290,000 nesting pairs of Thick-billed Murres. And the colony at Aktapok Island is even larger, with as many 600,000 pairs being estimated. Farther west, there are several large wetlands of especial significance: the Rasmussen Lowlands contains large populations of nesting shorebirds, and waterbirds; Queen Maud Gulf Lowlands have huge Snow and Ross' Geese colonies; and the Old Crow Flats in the northern Yukon are used as both a breeding and staging area by hundred of thousands of ducks.

Although only a sampling of Canadian IBAs are featured in this interim directory, many of the sites are among the most significant in terms of the numbers of birds that are concentrated in relatively small areas. The importance of many of these sites is unlikely to be new to people who have watched or studied birds in these various parts of Canada. And some of the sites have already been identified as internationally significant through various programs such as the Western Hemisphere Shorebird Reserve Network (WHSRN), or Ramsar; or of national significance by the federal government as National Wildlife Areas or Migratory Bird Sanctuaries. But for many of the sites that remain, much of the existing data is widely scattered, requiring a great deal of effort to determine a site's level of significance within a national and international context. Much needs to be done and many more sites will be identified.

<b>1</b>	<b>Old Crow Flats</b> <i>Old Crow, Yukon</i>	
	CAYK001G	68°00' N, 139°50' W
	286–303 m / 6,170 km <sup>2</sup>	

► **Habitats:**

Mosaic of wetlands, cotton grass meadows, and low shrubs on uplands.

► **Land-use:**

Conservation, fly-in access, snowmobile access for traditional use.

► **Threats:**

*Potential* – Pipelines, oil and gas development.

► **Protection Status:**

Partially within Vuntut National Park, partially within the Old Crow Flats Special Management Area – Vuntut Gwitchen First Nation Settlement Land (Private Lands).

### Site description

The Old Crow Flats are located in the northern Yukon, about 125 km south of the Beaufort Sea. The Flats are located on a large, ancient lake bottom which is bordered by mountains on three sides and dotted with over 2,000 shallow lakes and ponds. With an area of over 617 km<sup>2</sup>, it is in many respects a unique wetland system in the mostly mountainous landscape of the northern Yukon.

The Old Crow River and its tributaries wind through the flats in down-cut ravines that are well below the general level of the plain. Most of the habitat consists of lakes and ponds, ringed with sedge marshes, and shrub thicket habitats in the slightly drier areas.

### Birds

The Old Crow Flats have been identified as an IBA primarily due to the large numbers of waterfowl that make use of the site for staging, breeding and molting. During the summer, approximately 500,000 waterfowl make use of the area, which is the greatest usage of any site in the Yukon. The most abundant breeding species include White-winged and Surf Scoters (20,000–80,000), Greater and Lesser Scaup (50,000–100,000), and Northern Pintail (10,000–100,000). From a global perspective, this translates into approximately 1.1% to 4.5% of the White-winged and Surf Scoter population, 0.83% to 1.65% of the Greater and Lesser Scaup population, and 0.4% to 4.0% of the Northern Pintail population.

Other waterfowl species that breed in this area in substantial numbers include Oldsquaw, Green-winged Teal, American Wigeon, swans, loons and grebes. Additional duck species also move into the flats to molt, rest and feed prior to fall migration, especially Barrow's Goldeneye and Canvasback.

Two nationally threatened raptors breed in this area: the *anatum* subspecies of Peregrine Falcon (endangered in Canada) and Short-eared Owl (vulnerable in Canada). The Siberian Tit, a landbird with a very restricted range within Canada, also occurs in this area.

	Season	Number
White-winged Scoter, Surf Scoter	B	20,000–80,000
Greater Scaup, Lesser Scaup	B	50,000–100,000
Northern Pintail	B	10,000–100,000

## Conservation issues

In 1982, the entire area was designated as a Wetland of International Significance under the Ramsar convention. Part of the flats lies within Vuntut National Park, and the section south of the Old Crow River has been designated as a Special Management Area. The Vuntut Gwichin First Nation manages the Special Management Area and, in cooperation with the federal government, the Vuntut National Park. Although industrial development is prohibited in the park, the entire area is threatened by possible road construction and pipeline development. Some oil exploration has occurred within the area, but in general the Flats have experienced little impact from industrial activities. Management plans for Vuntut National Park and Old Crow Flats will be cooperatively developed by the federal government and the Vuntut Gwitchin First Nation.

2

## Frederick Island

*Queen Charlotte Islands, British Columbia*

CABC004G

53°56' N, 133°10' W

0 to 150 m / 4.2 km<sup>2</sup>

### ► Habitats:

Mostly heavily forested, with Sitka spruce, western hemlock and red cedar being dominant; the understory varies from grass to moss.

### ► Land-use:

Natural.

### ► Threats:

*Potential* – Introduced mammalian predators, oil pollution, gill net mortality.

### ► Protection status:

None.

## Site description

Frederick Island is located off the west coast of Graham Island, the largest of the Queen Charlotte Islands, between Langara Island to the north and Hippa Island to the south. The perimeter of the island is rocky. On its north, west, and south sides abrupt knolls give way to a more uniform slope rising to the higher areas of the island. Most of the knoll and perimeter slopes are vegetated with a predominantly Sitka spruce forest and a grassy understory. Farther from shore, the vegetation changes to one of mixed western hemlock, western red cedar, and Sitka spruce forest with moss understory. An interior area of cedar, lodgepole pine, and sphagnum bog is located towards the northwest end of the island.

## Birds

Frederick Island supports the largest seabird colony on the Queen Charlotte Islands. Globally significant breeding populations of Ancient Murrelets (136,000 breeding birds or approximately 9% of the population) and Cassin's Auklets (180,000 breeding birds or approximately 5% of the population) are present. Frederick Island has the largest colony of Ancient Murrelet, a species listed as nationally vulnerable, of the 26 islands that have confirmed nesting records in British Columbia (the only area in Canada where this species occurs). It has the third largest Cassin's Auklet colony of the 52 island colonies in British Columbia where they are known to breed. The island also supports several pairs of Peregrine Falcons (ssp. *pealei*), a species considered nationally vulnerable.

The surrounding marine waters are important staging areas for breeding seabirds. To the north, this zone extends to the vicinity of two small islets that are within 5 km of Frederick Island. "Grassy" and "Wooded" islets, together with Frederick Island, support nationally significant breeding populations of Black Oystercatchers (40; approximately 2.6% of the national population) and Pigeon Guillemots (145; approximately 1.4% of the national population).

	Season	Number
Ancient Murrelet	B	136,000
Cassin's Auklet	B	180,000
Black Oystercatcher	B	40
Pigeon Guillemot	B	145

### Conservation issues

At present there is no protective status for Frederick Island, nor is there any for "Grassy" or "Wooded" islet. As with practically all seabird colonies, the major conservation concerns are the introduction of mammalian predators, oil pollution, and the drowning of foraging adults in fish gill nets.

3

### Tian Bay – Port Louis Area

*Queen Charlotte Islands, British Columbia*

CABC011N

53°45' N, 133°05' W

0–20 m / approx. 10 km<sup>2</sup>  
(and adjacent marine area)

► **Habitats:**

Small rocky islets, vegetated with grasses and forbes and sparse clumps of Sitka spruce; mature spruce forest on the larger islets.

► **Land-use:**

Natural.

► **Threats:**

*Potential* – Introduced mammalian predators, oil pollution.

► **Protection status:**

None.

### Site description

Situated on the west coast of Graham Island, between Frederick and Hippa islands, this site consists of two groups of islets lying within the waters encompassed by Tian Bay, Otard Bay, and Port Louis. Tian, Pip and Kiokathli islets are clusters of small rocky islets vegetated with grasses and forbs. Sparse clumps of Sitka spruce grow on the crowns of the larger of these islets. Solide and Brock are larger islands with a mature spruce forest, and grass and forbs along the shoreline.

### Birds

Surveys completed in the late 1980s showed that collectively, these islets support 24 pairs of Black Oystercatchers (2.4% of the estimated national population) and 159 Pigeon Guillemots (1.5% of the estimated national population). Numbers of nesting Glaucous-winged Gulls recorded during some of the surveys approach or exceed the 1% threshold for national significance (e.g., 289 pairs in 1986, 228 pairs in 1988). Although the most recent survey in 1988 recorded no nesting Pelagic Cormorants, a survey two years previously recorded 98 pairs of breeding birds on Tian Islets. This would have established it as a nationally significant site for this species. (Pelagic Cormorants may not always use the same site each year for nesting.)

Small numbers of Cassin's Auklets, Fork-tailed Storm Petrels, and Leach's Storm Petrels nest on some of the islets. Although they presently do not support any nesting seabirds, several other islands in this area (Queen, Ogilvie and McKenzie) historically supported breeding colonies of storm petrels.

The marine waters of this area (out to a minimum distance of 5 km, and extending from Tian Head in the north to Louis Point to the south, including Port Louis, Otard Bay and Tian Bay) are an important feeding area for the nationally threatened Marbled Murrelet. Concentrations of feeding birds have been reported in Tian Bay.

	Season	Number
Pigeon Guillemot	B	159
Black Oystercatcher	B	24 pairs
Glaucous-winged Gulls	B	228 (1998)

### Conservation issues

Although these Islands are all Provincial Crown land, they have no protective status. The primary threats to this site, and the seabirds that nest there, are potential oil spills and the spread of introduced predators (raccoons) from the adjacent shoreline of Graham Island.

4

### Lepas Bay Islet

*Queen Charlotte Islands, British Columbia*

CABC008G

54°10' N, 133°02' W

0–20 m / 0.01 km<sup>2</sup>

► **Habitats:**

Grasses and forbs under sparse clumps of spruce trees.

► **Land-use:**

Natural.

► **Threats:**

*Potential* – Mammalian predators, oil pollution.

► **Protection status:**

British Columbia Provincial Ecological Reserve.

### Site description

This unnamed islet lies about 150 m from shore, near the head of Lepas Bay at the extreme northwest corner of Graham Island. The islet is small (about 0.8 ha) with a steep-sided rocky shore, and a lush covering of grasses and forbs under an open stand of wind-swept, stunted sitka spruce. The burrow-nesting storm-petrels nest throughout this fragile habitat. At very low tides, the island is connected to the sandy beach of Lepas Bay.

### Birds

Nationally significant numbers of nesting Fork-tailed Storm-Petrels occur on Lepas Bay Islet. During surveys completed in 1977, a total of 3,500 breeding pairs were estimated, which is about 2% of the national population. This islet supports at least the 13th largest Fork-tailed Storm-Petrel colony in British Columbia (about 40 colonies are known). The islet is also a breeding site for Leach's Storm-Petrels, with the estimated number of 4,500 pairs approaching the 1% threshold for the western Canada population.

In addition to supporting storm-petrels, the islet also supports large numbers of Pigeon Guillemots (173 birds were estimated in 1986). This represents about 1.5% of the national population for this species. Small numbers of Cassin's Auklets, Glaucous-winged Gulls and Black Oystercatchers are also found nesting here.

	Season	Number
Fork-tailed Storm- Petrel	B	3,500 pairs
Pigeon Guillemot	B	173

### Conservation issues

Potential oil spills, and the spread of introduced predators (raccoons and rats) from the adjacent shore are the primary threats to the site and the seabirds that nest there. The islet is also vulnerable to damage from human trampling.

<b>5</b>	<b>Langara Island</b> <i>Queen Charlotte Islands, British Columbia</i>	
CABC003G	54°14' N, 133°00' W	0–150 m / 31.05 km <sup>2</sup>

► **Habitats:**

Heavily forested, with Sitka spruce, western hemlock and red cedar being dominant; also areas with open sphagnum bog.

► **Land-use:**

Natural.

► **Threats:**

Introduced mammalian predators, oil pollution. *Potential* – Gill-net mortality.

► **Protection status:**

None.

### Site description

Langara Island is located at the northwest corner of Graham Island, the largest of the Queen Charlottes. It is about 10 km long and 6 km wide, with many cliffs around its perimeter. The island's shoreline is dominated by Sitka spruce. Proceeding in from the sea, the forest composition shifts to western hemlock and then to predominately western red cedar. In the interior of the island there are areas of open sphagnum bog.

### Birds

Langara Island supports globally significant numbers of Ancient Murrelets, a species which is listed as nationally vulnerable. Approximately 24,000 pairs, representing 4.8% of the global population, are present during breeding season. Of 26 individual islands with confirmed nesting records of Ancient Murrelets in British Columbia (the only area in Canada where this species occurs), Langara supported the fifth-largest colony in the mid-1980s. Historically, the island may have supported much larger populations of Ancient Murrelets; it has been suggested that in the 1950s and earlier the island almost certainly held more than 250,000 pairs, and probably held between 375,000 and 750,000 pairs.

In addition to Ancient Murrelets, Langara Island also supports nationally significant numbers of both Pigeon Guillemots (187; approximately 1.8% of the national population), and Peregrine Falcon (ssp. *pealei*) (5 to 7 pairs; approximately 7% of the national population). The *pealei* subspecies of Peregrine Falcon has been listed as nationally vulnerable, with an estimated population of fewer than 100 pairs. Large numbers of Pelagic Cormorants (104) are also present.

The marine waters surrounding the island are important staging areas for the breeding seabirds. In addition, an important marine feeding habitat for nationally significant numbers of the threatened Marbled Murrelet extends from Parry Passage to Pillar Bay along the south shore of Langara Island and includes the adjacent north coast of Graham Island.

	Season	Number
Ancient Murrelet	B	24,000 pairs
Pelagic Cormorant	B	104
Pigeon Guillemots	B	187
Peregrine Falcon <i>ssp. pealei</i>	B	5–7 pairs

## Conservation issues

It is very likely that at one time Langara Island was the largest seabird colony in the Queen Charlotte Islands. Colonies of burrow-nesting seabirds occupied most of the perimeter of the island. Now only a small portion of the northeast coast supports an Ancient Murrelet breeding colony. A program to exterminate introduced rats (an important cause of the elimination and decline of nesting seabirds on this island) has been established on the island. With this program there is potential to restore Langara Island, as well as adjacent islands (Cox and Lucy), to their former state. Currently, Langara Island has no protected status.

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## Hippa Island

*Queen Charlotte Islands, British Columbia*

CABC009G

53°32' N, 132°58' W

0–486 m / 6.76 km<sup>2</sup> (land)

► **Habitats:**

Coniferous forest, rocky shorelines.

► **Land-use:**

Natural.

► **Threats:**

*Potential* – Introduced mammalian predators, oil pollution.

► **Protection status:**

British Columbia Provincial Ecological Reserve.

## Site description

Hippa Island lies just north of Rennell Sound on the west coast of Graham Island. The island is heavily forested, with Sitka spruce dominant along the shore, and western hemlock and red cedar becoming dominant away from the shoreline. Ground cover in the mature stands of forest is predominantly mosses, with grasses occurring along the shore edges and on the more open knolls, especially along the north and west sides of the island.

The western side of the island has a rugged, dissected shoreline of cliffs, knolls and recessed beaches, while the northeastern side, which faces Graham Island, has a more uniform shoreline. At the southern end, the island rises steeply to its peak, while the northern end stretches out in a low undulating peninsula. It ends with a small islet separated from the main island by a narrow channel of water.

## Birds

Hippa Island is a site of global significance for Ancient Murrelets. It is also the second-largest Ancient Murrelet colony in British Columbia. About 40,000 breeding pairs were documented during studies completed in 1983 (about 8% of the world population, and as much as 15.2% of the national population). Large numbers of Fork-tailed Storm Petrels (about 5.7% of the national population) and Leach's Storm Petrels (as much as 2.3% of the western Canada population) have also been recorded. In addition, the number of Cassin's Auklets breeding on the island approaches the threshold for a site of national significance. The island also supports several pairs of Peregrine Falcons (*ssp. pealei*), which are listed as nationally vulnerable.

Other species of seabirds nesting on Hippa Island include Pelagic Cormorant, Black Oystercatcher, Glaucous-winged Gull, Pigeon Guillemot, and Tufted Puffin. The Bald Eagle also nests on both the main island and the small northern islet.

The waters surrounding Hippa Island (out to a minimum distance of 5 km and extending north to Hughes Point and south to Skelu Point) have been identified as being important to local seabirds. In particular, Hippa Passage (between the island and the west shore of Graham Island) has been identified as an important staging area for the breeding seabirds.

	Season	Number
Fork-tailed Storm-Petrel	B	10,900 pairs
Leach's Storm-Petrel	B	12,800 pairs
Ancient Murrelet	B	40,000 pairs
Cassin's Auklet	B	12,500 pairs

### Conservation issues

Hippa Island is part of the Vladimir J. Krajina Provincial Ecological Reserve. The primary threats to the area and the seabirds that nest there, are from potential oil spills and the spread of introduced predators (raccoons and rats) from adjacent shores. The islet is also vulnerable to damage from human trampling.

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## Nisutlin River Delta

*Teslin Lake, Yukon*

CAYK003G

60°12' N, 132°32' W

695–700 m / 48 km<sup>2</sup>

► **Habitats:**

Wetlands, mudflats, river delta.

► **Land-use:**

Natural, wildlife conservation.

► **Threats:**

*Potential* – Upstream damming, mineral exploration.

► **Protection status:**

Nisutlin River Delta National Wildlife Area.

### Site description

The Nisutlin River flows into Teslin Lake in south-central Yukon. Here, the river widens into a 4 km-wide delta, with a mosaic of wetlands and meandering river channels. In the late spring and early summer, the water levels on Teslin Lake are very high and the delta is mostly submerged. As a result, only limited numbers of waterbirds use the delta for nesting. In late summer and fall, however, the water level drops rapidly, exposing a series of mudflats and plant communities characterized by dense emergent, floating, and submerged vegetation. This late summer drop in water levels is in stark contrast to the regime in other large headwater lakes of the southern Yukon River Basin. As a result, the Nisutlin River Delta is one of southern Yukon's most important congregation areas for migratory waterfowl in the fall.

### Birds

During fall migration, regular one-day peak counts of over 1,000 Tundra Swans and up to 40 Trumpeter Swans, have been recorded on the delta. In all, as many as 2,000 swans have recently been recorded on a single day. The lower 80 km of the Nisutlin River valley also supports a breeding population of Trumpeter Swans, with about 10 to 12 breeding pairs being recorded in 1997. This is one of the larger concentrations of breeding Trumpeter Swans in Canada. In addition to swans, up to 10,000 waterfowl (both ducks and geese) stage on the delta during fall migration.

The delta also provides feeding habitat for migrating Peregrine Falcons (ssp. *anatum*—nationally endangered) and Short-eared Owls (nationally vulnerable). Habitat for an additional 12 species identified as at risk in the Yukon is also provided by the delta.

	Season	Number (one-day peaks)
Tundra Swan (western population)	FM	> 1,000
Trumpeter Swan (Pacific population)	FM	40
Trumpeter Swan (Pacific population)	B	10–12 pairs

## Conservation issues

The Nisutlin River Delta National Wildlife Area has recently been established to help conserve the area. A management plan is currently being prepared.

The biological productivity of this site is closely linked to the hydrological regime of the Nisutlin River. Any upstream disruption, such as damming or hydroelectric development, could threaten this habitat. Mineral staking, oil and gas exploration, and road building are also potential concerns in the region.

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## Englefield Bay Islands

*Queen Charlotte Islands, British Columbia*

CABC015G

53°00' N, 132°25' W

0–120m / 2.6 km<sup>2</sup>  
(plus adjacent marine area)

► **Habitats:**

Mostly forested, with Sitka spruce, western hemlock and red cedar being dominant; also areas with shrubs, patches of grass, and forbs.

► **Land-use:**

Natural.

► **Threats:**

Introduced mammalian predators; *Potential* – Oil pollution.

► **Protection status:**

None.

## Site description

Englefield Bay is situated on the northwest coast of Moresby Island, at the mouths of Moore and Inskip channels. Two clusters of islands within the bay support nesting seabirds: to the north, Saunders, Helgesen, Willie, Carswell, Lihou islands and Bone Point; and to the south, Luxmoore and Rogers islands, Moresby Islets, and Cape Kuper. These islands support the only major nesting concentration of seabirds along this section of rugged coastline.

The larger islands are forested with a mix of Sitka spruce, western hemlock and western red cedar. The smaller islands support spruce and some hemlock, with more extensive areas of forbs and grasses than the larger islands. The three largest islands in the group, Helgesen (54 ha), Lihou (75 ha) and Saunders (55 ha) are rugged and precipitous, bound by cliffs and deeply dissected by gorges and crevices that effectively divide the islands into segments.

## Birds

The islands in Englefield Bay support significant populations of nesting seabirds. At least two species were present in globally significant numbers during surveys completed in 1986: Rhinoceros Auklets (3.2% of the global and 5.5% of the national population) and Ancient Murrelets, (3.7% of the global and 7.0% of the national population). Ancient Murrelets have been designated as a Nationally Vulnerable species. Cassin's Auklets and Pigeon Guillemots are also present in numbers just over 1% of their estimated national populations.

Although separate estimates for nesting Fork-tailed and Leach's Storm-Petrel were not obtained during the 1986 surveys, the combined estimate of 48,550 pairs is likely of North American significance for Fork-tailed Storm Petrel and of national significance for the eastern Pacific Leach's Storm-Petrel population. In addition, nesting Black Oystercatchers are present in numbers approaching national significance. Other species of seabirds nesting there include Pelagic Cormorants, Glaucous-winged Gulls and Tufted Puffins. Bald Eagles nest on most of the islands, and Peregrine Falcons (ssp. *pealei*) are in the area.

	Season	Number
Fork-tailed / Leach's Storm-Petrels	B	48,550 pairs
Cassin's Auklet	B	15,870 pairs
Rhinoceros Auklet	B	19,770 pairs
Ancient Murrelet	B	18,670 pairs
Pigeon Guillemot	B	165
Black Oystercatcher	B	9 pairs

### Conservation issues

The primary threats to the area, and to the seabirds that nest there, are the spread of introduced predators (particularly raccoons) from the adjacent shores, and potential oil spills. Saunders Island once had an extensive colony of Rhinoceros Auklets and Cassin's Auklets, but it had declined before the 1986 surveys. Although the cause of the decline (abandonment) is not known, it is likely the result of introduced predators. Raccoons reached adjacent Helgesen Island in the past decade and have devastated the breeding seabirds there. Control measures to remove raccoons from Helgesen Island are undertaken on a yearly basis.

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### Anthony Island Complex *Queen Charlotte Islands, British Columbia*

CABC01G

52°05' N, 131°13' W

0–75m / 2 km<sup>2</sup>  
(plus adjacent marine area)

► **Habitats:**

Mostly conifer forest, with areas of shrubs, patches of grass, and forbs.

► **Land-use:**

Natural.

► **Threats:**

*Potential* – Mammalian predators, oil pollution, disturbance.

► **Protection status:**

Gwaii Haanas National Park Reserve; Provincial Ecological Reserve.

### Site description

The Anthony Island Complex is located off the southwest coast of Moresby Island, west of Kunghit Island in the Queen Charlotte Islands. It is centered around Anthony Island and its associated offshore islets and extends out to include a marine area of 5 km radius, from Cape Freeman on the west coast of Moresby Island, to Tuga and Etches Point within Louscoone Inlet, then across the western entrance of Houston Stewart Channel to Arnold and Bowles points on Kunghit Island. Also lying within this area are Louscoone Rocks, Adam Rocks, Flatrock Island and Gordon Islands.

Anthony Island is forested with a typical mix of Sitka spruce, western hemlock, and western red cedar. Spruce is more predominant near the shore, and hemlock and cedar are more abundant inland. The forest understory is generally bare litter with some moss. Grass occurs along shoreline knolls and ridges, and scattered shrubs grow in patches throughout the island. Most of the shoreline of the island is rocky and cliff-bound. The islets range from bare rock, or rock with patches of grass and forbs, to forested islets with an understory varying from grasses to patchy or continuous dense shrubs. Gordon Islands, to the east of Anthony Island, are a series of rugged, dissected rocky knolls, covered with dense salal under a sparse spruce forest. Flatrock Island, Adam Rocks, and Louscoone Rocks are rocky with patches of grasses and forbs.

### Birds

Surveys completed within the Anthony Island complex in the mid-1980s recorded globally significant numbers of both Cassin's Auklets (1.4% of the estimated global and 1.9% of the estimated national population), and Rhinoceros Auklets (2.2% of the estimated global and 3.8% of the estimated national population). An additional five seabird species are present in nationally significant numbers. The small offshore islets collectively support just over 1% of both the estimated Canadian Fork-tailed Storm-Petrel population, and the estimated western Canada Leach's Storm-Petrel population. Nationally significant numbers of Pigeon Guillemots (4.6% of the estimated Canadian population), Glaucous-winged Gulls (1.9% of the estimated Canadian population) and Black Oystercatchers (1.6% of the estimated Canadian population) nest within this group of islands.

Other species of seabirds nesting on these islands include Pelagic Cormorants, Ancient Murrelets, Tufted Puffins and Horned Puffins (fewer than 25 pairs of Horned Puffins are suspected of nesting in Canada). Peregrine Falcons (ssp. *pealei*) are recorded in the area and Bald Eagles nest on the Anthony Island complex and Gordon Islands.

	Season	Number
Fork-tailed Storm-Petrel	B	2,100 pairs
Leach's Storm-Petrel	B	8,600 pairs
Cassin's Auklet	B	25,400 pairs
Rhinoceros Auklet	B	13,771 pairs
Pigeon Guillemot	B	465
Glaucous-winged Gull	B	546 pairs
Black Oystercatcher	B	16 pairs

### Conservation issues

Anthony Island is part of Gwaii Haanas National Park Reserve. The remains of the Haida village of Ninstints on the east coast of the island have earned it the designation of a United Nations World Heritage Site. The small group of islands off the southwest and northwest coasts of Anthony Island, bound by the 10 fathom contour, were designated as a Provincial Ecological Reserve in 1979.

Primary threats to the area are from potential oil spills, and possible disturbance from boaters and other visitors. The spread of introduced predators (raccoons), which are found on nearby Moresby Island, is a potential threat.

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## Kerouard and St. James Islands

*Queen Charlotte Islands, British Columbia*

CABC005G

51°55' N, 131°00' W

0–96 m / 78 km<sup>2</sup>  
(includes marine area)

#### ► Habitats:

Rugged islets with steep grassy slopes, rocky ledges and bluffs.

#### ► Land-use:

Natural.

#### ► Threats:

*Potential* – Introduced mammalian predators, oil pollution, gill net mortality.

#### ► Protection status:

Within Gwaii Haanas National Park Reserve.

### Site description

The Kerouard Islands are a group of rugged, treeless islets lying south of Kunghit Island at the extreme southern tip of the Queen Charlotte Islands. They consist of three main islets and several small rocks surrounding the larger islets. The two largest islets have steep grassy slopes on their eastern sides, which grade to rounded grass-covered tops. The principal grass species is *Calamagrostis*, with *Elymus* on the perimeter. In some areas, the grass tussocks reach heights of 1.5 meters. The third islet of the Kerouards is deeply dissected and comprised of ledges and bluffs completely devoid of vegetation. There is a major northern sea lion rookery occupying this islet.

St. James Island is located in close proximity to the Kerouard Islands, just off the southern tip of Kunghit Island. It exhibits vegetation that is transitional between the forested islands to the north and the exposed and treeless Kerouard Islands to the south. The northern section is forested, while the southern section is grass covered and devoid of trees.

### Birds

The two largest of the Kerouard Islands support a dense colony of burrow-nesting Cassin's Auklets (4.4% of the global population). It is the second-largest colony of this species in the Queen Charlotte Islands and the fourth-largest of 52 island colonies along the BC coast. Common Murres occur in nationally significant numbers (4.6% of the western Canada population). The Kerouards are the only site in the Queen Charlotte Islands where they breed. The islands also support about 930 Tufted Puffins, just over 1% of the national population.

A breeding pair of Peregrine Falcons (ssp. *pealei*), also nest on the Kerouard Islands. This subspecies is considered nationally vulnerable. In addition, the islands support breeding populations of Glaucous-winged Gulls, Pelagic Cormorants, and Pigeon Guillemots, although not at nationally significant levels.

The waters surrounding the Kerouard and St. James Islands are an important feeding area for marine birds. During surveys of the seabird colonies, continuous streams of thousands of Sooty Shearwaters were seen flying between the islets. Bald Eagles frequent the islets as well.

	Season	Number
Cassin's Auklet	B	78,000 pairs
Common Murre (Pacific population)	B	400
Tufted Puffin	B	930

### Conservation issues

Primary threats to the area are from potential oil spills, and possible disturbance from boaters. The spread of introduced predators (raccoons and rats) to the Kerouard Islands from nearby islands is also a concern. However, it may not be as serious a threat as in other areas of the Queen Charlotte Islands, due to the strong tidal currents between the Kerouards and St. James and Kunghit Island to the north. Rats are present on St. James Island, however, and are suspected to have caused the extirpation of the Cassin's Auklet colony that was once present. A program has been established to exterminate rats from St. James Island.

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## Scott Islands

*Northern Vancouver Island, British Columbia*

CABC006G

50°47' N, 128°46' W

0–312 m / 1,440 km<sup>2</sup>  
(including marine area)

#### ► Habitats:

Rugged islets with steep grassy slopes, rocky ledges and bluffs, forest cover of Sitka spruce, western hemlock and red cedar.

#### ► Land-use:

Natural.

#### ► Threats:

*Potential* – Introduced mammalian predators, oil pollution, gill net mortality.

#### ► Protection status:

Designated as a Class A British Columbia Provincial Park.

### Site description

The Scott Islands are a group of five islands extending in a line westward from 10 to 46 km offshore of Cape Scott at the northwestern tip of Vancouver Island. The inner two islands, Cox and Lanz, are large, forested islands, whereas the outer two, Triangle and Sartine, are completely treeless. Beresford, the smallest island, lies in the middle of the chain and exhibits transitional features.

### Birds

The Scott Islands support the largest concentration of breeding seabirds in the eastern North Pacific south of Alaska, and are the most important breeding colonies for seabirds in British Columbia. Twelve species of seabirds breed in this group of islands, with virtually all the nesting occurring on Triangle, Sartine and Beresford Islands. Together these islands support over two million breeding birds.

Three of the seabird species nesting on the islands occur in globally significant numbers. These species are: Cassin's Auklet (as much as 55% of the global, and 73% of the national population); Rhinoceros Auklet (as much as 7% of the global, 9% of the North American, and 12% of the national population); and Tufted Puffin (2% of the global, and almost 90% of the Canadian population). Other species that are present in at least nationally significant numbers include: Fork-tailed Storm-Petrel (1.5% of the Canadian population), Leach's Storm-Petrel (2.3% of the western Canada population), Pelagic Cormorant (just over 1% of the North American, and 17.5% of the Canadian population), Brandt's Cormorant (40% of the Canadian population) Black Oystercatcher (almost 3% of the Canadian population), Glaucous-winged Gull (about 4% of the national population), Common Murre (as much as 95% of the western Canada population) and Pigeon Guillemot (6% of the national population).

Other species of seabirds nesting on the islands include Thick-billed Murre (the only known site in Canada where the Pacific population nests) and Horned Puffin (less than 25 pairs in British Columbia). The marine areas surrounding the islands are important feeding areas for the nesting seabirds as well as other marine birds, such as Sooty Shearwaters. Large numbers of migrating and wintering seabirds, such as White-winged Scoters, also frequent the area, particularly in the vicinity of Cox and Lanz Islands.

Triangle Island supports several pairs of Peregrine Falcons (ssp. *pealei*), a species considered nationally vulnerable. Peregrine Falcons are also recorded at each of the other four islands in the group and Bald Eagles nest throughout.

	Season	Number
Forked-tailed Storm-Petrel	B	3,000 pairs
Leach's Storm-Petrel	B	12,700 pairs
Brandt's Cormorant	B	39 pairs
Pelagic Cormorant	B	741 pairs
Black Oystercatcher	B	29 pairs
Glaucous-winged Gull	B	1,077 pairs
Common Murre	B	4,100 pairs
Pigeon Guillemot	B	619
Cassin's Auklet	B	990,000 pairs
Rhinoceros Auklet	B	41,700 pairs
Tufted Puffin	B	34,900 pairs

## Conservation issues

The primary threats to the area are potential oil spills, and possible disturbance from boaters. During the late 1930s, mink and raccoon were introduced to Lanz and Cox islands. It is thought that their subsequent population explosion caused the extirpation of the Cassin's and Rhinoceros Auklets colonies that were probably there. The spread of predators (raccoons and mink) to the outer islands has not occurred and is not thought likely to pose a threat, because of the distance between them and the inner two islands.

Beginning in the mid 1970s, Triangle Island has been a site for seabird ecological studies sponsored by the Canadian Wildlife Service. It is now the site of a research station sponsored by the Canadian Wildlife Service/Simon Fraser University.

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## Duke of Edinburgh Ecological Reserve

*Port Hardy, British Columbia*

CABC007G

50°59' N, 127°43' W

0–85 m / 176 km<sup>2</sup>  
(includes marine area)

### ► Habitats:

Rocky shoreline and islets; Sitka spruce, western hemlock and red cedar forest; understory varying from thick shrubs to moss and grass.

### ► Land-use:

Natural.

### ► Threats:

*Potential* – Oil pollution, disturbance.

### ► Protection status:

Provincial Ecological Reserve.

## Site description

The Duke of Edinburgh Ecological Reserve is located at the western end of Queen Charlotte Strait, midway between the coast of British Columbia and the northern tip of Vancouver island. It is comprised of six island groups in three clusters: Storm Islands, Reid Islets, and Naid Islets are the most northerly and outermost islands; the Buckle Group lie farthest to the southeast; and Pine Island and Tree Islets are located in between.

The larger islands have a forest cover of western hemlock, western red cedar and Sitka spruce, with an interior ground cover of salal, salmonberry, elderberry and in some areas, moss, grasses and forbs. The perimeters of some of the large islands and some of the smaller vegetated islets are covered with dense growths of salmonberry and other shrubs. Other islets are mostly bare rock with small areas of lush grass and forbs.

The shorelines of most of the islands are comprised of steep rock dissected by gorges and crevices. Areas with shelving rock and boulders are used by harbor seals as haul-out sites.

## Birds

The Ecological Reserve supports over one million seabirds and is the second-largest seabird nesting site on the west coast of Canada (the Scott Islands are the largest). It contains the largest colony of Rhinoceros Auklets in Canada and the largest colony of Leach's Storm-Petrels and Fork-tailed Storm-Petrels in British Columbia.

Approximately 161,600 pairs of Rhinoceros Auklets have been estimated on Pine and Storm Islands. This represents approximately 26% of the global and as much as 45% of the national population. Large numbers of storm-petrels also nest on the Reserve, including 60,000 Fork-tailed Storm-Petrels (2.4% of the global, and 32% of the national population). An even larger population of Leach's Storm-Petrels (276,600 pairs—over 3% of the global, almost 10% of the eastern Pacific, and 50% of the western Canada population) nest on all the islands except Naiad Islets and Pine Island. Small colonies of Cassin's Auklets (6,710 pairs) also occur among the other burrow-nesting seabirds (mostly on the Buckle Group) but not in nationally significant numbers.

In addition, all of the islands except Pine support nesting Black Oystercatchers, with 23 pairs being present. This represents over 2% of the Canadian Black Oystercatcher population. Pigeon Guillemots also occur around all of the islands, with nearly 3% of the national population being present.

Large numbers of Glaucous-winged Gulls are also present (275 pairs) and Bald Eagles nest on most of the islands. The surrounding marine waters are also important for migrating Red-necked Phalaropes. Flocks of thousands feed on tide lines during July and August.

	Season	Number
Fork-tailed Storm-Petrel	B	60,000 pairs
Leach's Storm-Petrel	B	276,600 pairs
Rhinoceros Auklet	B	161,600 pairs
Black Oystercatcher	B	23 pairs
Pigeon Guillemot	B	279
Glaucous-winged Gulls	B	275 pairs

### Conservation issues

Pine and Storm Islands, Tree, Naid, and Reid Islets, and the Buckle Group are all part of the Duke of Edinburgh Ecological Reserve. The reserve was designated by the province of British Columbia in 1988, and, as such, most major disturbances and threats are managed. Potential oil spills, general environmental contamination, and disturbance from boaters, however, are still a concern.

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### Tofino Mudflats

*Tofino, British Columbia*

CABC002G

49°10' N, 125°50' W

0–5 m / 320 km<sup>2</sup>

#### ► Habitats:

Primarily exposed mudflats covered by eelgrass and algae during low tide, with areas of deeper water nearby and forest and salt marshes lining the upper tide line.

#### ► Land-use:

Primarily wildlife conservation, with some hunting, general tourism, and recreational boat use within the channel.

#### ► Threats:

*Potential* – Oil pollution.

#### ► Protection status:

Portions of the mudflats are within a Wildlife Management Area.

### Site description

The Tofino Mudflats are located on both sides of Browning Passage near the town of Tofino, British Columbia. There are six mudflats in total, locally known as Arakan Flats, Ducking Flats, Doug Banks' Flats, Maltly Slough, South Bay, and Grice Bay. About half of the 320 km<sup>2</sup> area is mudflats that are left exposed during low tides. These mudflats are partially covered by dense growths of eelgrass and algae. The upper tide limit is lined with salt marshes and forests. Chesterman Beach, which is located on the seaward side of the Esovista Peninsula, is a clean sand beach with driftwood tangles along the upper tide line. This beach is an important roosting area for Western Sandpipers.

### Birds

The Tofino mudflats are a critical stopover site for migrating Western Sandpipers. In southern British Columbia, the site is second only to the Fraser River Delta in terms of usage by this species. The peak counts of 16,000 Western Sandpipers in May 1988, 23,000 in August 1989, and an average autumn peak of 35,000 at Chesterman Beach are reported to be among the highest recorded on the west coast of Canada for this species.

Elsewhere in British Columbia, studies on Western Sandpipers fitted with miniature radio transmitters in spring indicate an average stopover period of about three days. It has been suggested that if this three-day stopover period applies to Tofino, the population using this area may be as high as 45,000 during the spring migration period, and as high as 164,000 during the fall migration period. These numbers represent at least 2.25% of the global population during spring and possibly as much as 8.2% of the global population during fall.

In addition to Western Sandpipers, the Tofino mudflats also provide habitat for a variety of other shorebird species, including dowitcher, Dunlin, Least Sandpiper, Black-bellied Plover, Greater Yellowlegs, Sanderling, Whimbrel and American Black Oystercatcher. The adjacent areas are also important as a wintering area for variety of waterfowl. Some of the more abundant species include Trumpeter Swan, Mallard, Northern Pintail, American Wigeon, Surf Scoter, Bufflehead and various species of loons and grebes.

The site is also important as a late summer feeding area for the northwestern population of the Great Blue Heron (ssp. *fannini*). Up to 100 individuals occur on the mudflats each August. This represents approximately 1.1% of the global population of this subspecies. The *fannini* ssp. of the Great Blue Heron has been identified as nationally vulnerable.

	Season	Number
Western Sandpiper	FM	164,000
Western Sandpiper	SM	45,000
Great Blue Heron ssp. <i>fannini</i>	S	approx. 100

### Conservation issues

The Tofino Mudflats are the only site on the west coast of Vancouver Island known to support large numbers of shorebirds. In this regard, they have been identified by the Canadian Wildlife Service as a potential site within the Western Hemisphere Shorebird Reserve Network. Some have noted that the Tofino Mudflats are second only to the Fraser River Delta in importance as a feeding and resting site for Western Sandpipers in British Columbia. Currently only a small portion of the site (3,067 ha) is protected as a Wildlife Management Area.

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## McFadden Creek Heronry

*Saltspring Island, British Columbia*

CABC001NA

48°55' N, 123°33' W

0–20 m / 0.05 km<sup>2</sup>

► **Habitats:**

Deciduous grove within a mature second growth forest.

► **Land-use:**

Natural, surrounded by rural residential properties.

► **Threats:**

*Potential* – Urbanization, disturbance

► **Protection status:**

Currently none. The Wild Bird Trust of British Columbia is raising funds to acquire the property as a wildlife reserve.

### Site description

The McFadden Creek Heronry is located on the north side of Saltspring Island. The 5 ha site is fully forested with mature second growth. The heronry is located in a deciduous grove in the center of the site, with the majority of the nest trees being trembling aspen. Nests are also located in Douglas-fir, red alder, bigleaf maple, and black cottonwood. McFadden Creek, which flows year round, is located to the north of the heronry. It empties into a small estuary to the northwest. The habitats surrounding the colony are mostly rural residential. A horse pasture is located immediately to the west of the property, and the property to the east is a mix of forest and open space.

### Birds

This site has been identified as an Important Bird Area due to the presence of a large Great Blue Heron (ssp. *fannini*) colony. In 1996, the McFadden Creek heronry contained 118 nests. It became established in 1990 and has subsequently increased to its current size. Due to urbanization and agriculture practices, suitable nesting areas near foraging areas are becoming increasingly rare.

The *fannini* ssp. of the Great Blue Heron is primarily restricted to southwest British Columbia and adjacent Washington State. Its global population is estimated to be approximately 5,000 pairs with 2,400 pairs nesting in British Columbia. The McFadden Creek heronry contains approximately 2.4% of the global population and 5% of the Canadian population. In Canada, the *fannini* ssp. of the Great Blue Heron has also been designated as nationally vulnerable (1997). This site meets the criteria for identification as a continentally significant IBA under the Congregatory Species category and as a nationally significant IBA under the Threatened Species category.

	Season	Number
Great Blue Heron (ssp. <i>fannini</i> )	B	118 pairs

## Conservation issues

Over the past two decades there has been a dramatic increase in human population on Saltspring Island. It has been growing at a rate of more than 4% annually. The associated forest clearing, urbanization, and human use of the shoreline have already led to the abandonment of several heronries. The McFadden Creek heronry is the largest unprotected heronry in the Pacific Northwest.

The Wild Bird Trust in British Columbia (WBTBC) has recently negotiated a purchase agreement with the current landowner and has committed to purchasing the property over a three-year period. Funds are being raised through the Great Blue Heron Foster Parent Program. The WBTBC will manage the property and work with the Waterbird Watch Collective (200 residents of Saltspring Island who monitor bird populations on and around the island) to implement a management plan for the area.

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## Active Pass Vancouver Island, British Columbia

CABC015G	48°52' N, 123°18' W	0 m / 4.5 km <sup>2</sup>
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- ▶ **Habitats:**  
Tidal surge channel, with coastal cliffs and rocky shores.
- ▶ **Land-use:**  
Marine transportation, including the BC Ferry.
- ▶ **Threats:**  
*Potential* – excessive disturbance of birds, oil pollution.
- ▶ **Protection status:**  
None.

## Site description

Active Pass is the water body separating Galiano and Mayne Islands in the southwest portion of the Strait of Georgia. It is about 40 km south of Vancouver and 50 km north of Victoria. It is a tidally active body of water about 4.5 km long. The tidal mixing during the floods and ebbs creates a biologically rich feeding area for fish-eating birds, mostly during the spring, fall and winter. In addition to birds, orcas feed and travel occasionally through the pass, and a rich intertidal and subtidal fauna is present.

## Birds

Active Pass is a significant wintering area for at least two species of waterbirds (Pacific Loon and Brandt's Cormorant), and a third during migration (Bonaparte's Gull). Although the overall population of Pacific Loons is poorly known, the 2,000 that regularly occur at the pass during winter is the largest concentration in the Strait of Georgia, and represents about 2% of the estimated world population. In addition, about 4,000 wintering Brandt's Cormorants have been recorded here. Based on the most recent estimates, this may be as much as 5% of the world's Brandt's Cormorant population. During migration, Bonaparte's Gulls are present in large numbers with about 10,000 (4% of the estimated world's population; possibly as much as 14% of the Pacific flyway population) being present during fall migration, and about 4,000 present during spring migration.

Several pairs of Bald Eagles nest along the shores of the pass, and upwards of 100 eagles occasionally forage in the waters during the winter.

	Season	Number
Pacific Loon	W	2,000
Brandt's Cormorant	W	4,000
Bonaparte's Gull	SM	4,000
Bonaparte's Gull	FM	10,000

## Conservation issues

The significance of Active Pass is linked to the rich feeding area that is created by the flood and ebb of the tide through the channel. Threats to birds utilizing this area are limited primarily to potential oil spills or oil discharges from ships, and possibly disturbance from recreational boaters. Pacific Loons are especially vulnerable during their winter flightless period when they undergo wing molt. The pass is well known to birders because of the accessibility afforded by the hourly passage of ferries between Vancouver and Victoria.

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## Whooping Crane Nesting Area and Summer Range

*Fort Smith, Northwest Territories*

CANT002G

60°12' N, 113°12' W

200–300 m / 5,160 km<sup>2</sup>

► **Habitats:**

Freshwater marsh, coniferous and mixed forest.

► **Land-use:**

National park, wildlife conservation/research.

► **Threats:**

*Critical* – Drought. *Major* – Natural pests/diseases, succession.

► **Protection status:**

Mostly within Wood Buffalo National Park.

## Site description

The Whooping Crane nesting area and summer range is located approximately 75 km west of Fort Smith, Northwest Territories. The site, which straddles the border between the Northwest Territories and Alberta, encompasses the northeastern portion of Wood Buffalo National Park and adjacent wetlands. Habitats within this area are poorly drained and interspersed with numerous shallow water wetlands, most with marl bottoms. The wetlands are generally separated by narrow ridges that support black spruce, tamarack, willows, and dwarf birch. Within the wetlands, the dominant species are bulrush, sedge, and cattail. The large upland areas between the marsh complexes support coniferous and mixed forests dominated by white spruce, black spruce and aspen.

## Birds

As implied by the site's name, this area supports the entire breeding population of migratory Whooping Cranes during the late spring and summer months. About 178 Whooping Cranes, a species which has been identified as globally endangered, have been recorded here during recent surveys. There are currently about 100 additional Whooping Cranes in captive breeding programs in Canada and the United States, and a small introduced population in Florida.

The migratory Whooping Crane population has increased from 15 birds in 1941 to the current population of about 178 (a non-migratory population in Louisiana was extirpated in the late 1940s). The birds winter approximately 4,000 km south of their breeding range on the coast of Texas, mainly in the Aransas National Wildlife Refuge.

In addition to Whooping Cranes, the area supports three to four pairs of the nationally endangered *anatum* ssp. of the Peregrine Falcon. A typical community of boreal forest and wetland birds is also present, including Yellow-rumped Warbler, Wilson's Warbler, Black-and-white Warbler, Yellow Warbler, Swamp Sparrow, Lincoln's Sparrow, Northern Shoveler, Northern Pintail and Bald Eagle.

	Season	Number
Whooping Crane	B	178

## Conservation issues

The Whooping Crane nesting area and summer range, as delineated here, is part of a much larger area (16,895 km<sup>2</sup>) that is recognized as a wetland of international importance under the Ramsar Convention and as a World Heritage Site by UNESCO. Most of the area is protected within Wood Buffalo National Park.

Specific conservation measures for Whooping Cranes within the park include controlled access to the nesting area as well as restrictions on low-flying aircraft. The Canadian Wildlife Service also conducts annual population surveys. Outside the park, threats include disturbance from vehicles, aircraft, hunting, and collisions with powerlines. One of the more critical, uncontrollable threats to Whooping Cranes is drought. Such conditions reduce the abundance of amphibians and invertebrates upon which the cranes feed, and make it easier for predators to move about in the normally waterlogged terrain.

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**Beaverhill Lake**  
*Tofield, Alberta*

CAAB001G

53°30' N, 113°30' W

668 to 670 m / 14.3 km<sup>2</sup>

► **Habitats:**

Lake—alkaline and shallow, mud flats, narrow sandy beaches, and areas of dense emergent vegetation; Natural Area composed of flat to gently rolling open grasslands/sedge meadows, and a mix of aspen and willow stands.

► **Land-use:**

Lake—bird watching, limited waterfowl hunting, and other recreation (canoeing). Natural Area—primarily wildlife conservation, landbird monitoring, ecotourism. Crown lands adjacent to Beaverhill Lake are used primarily for agricultural (grazing and hay).

► **Threats:**

*Major* – water quality, disease (botulism). *Potential* – over-grazing, clearing of willow and aspen groves, ecotourism related disturbance, cultivation.

► **Protection status:**

Beaverhill Natural Area (protects <10% of shoreline and uplands).

## Site description

Beaverhill Lake is located approximately 60 km southeast of Edmonton near the town of Tofield, Alberta. The site includes the waters of Beaverhill Lake (13,900 ha) and the Beaverhill Natural Area (410 ha). The lake is strongly alkaline and shallow with a maximum depth of three meters. The water levels fluctuate annually in response to precipitation. The shoreline is variable and includes shallow mudflats, narrow sandy beaches, and areas of dense emergent vegetation. The adjacent Beaverhill Natural Area has flat to gently rolling open grasslands and sedge meadows with a mix of aspen groves and willow stands. Outside of the Natural Area, habitats are comprised primarily of rangeland with many cultivated areas.

## Birds

Beaverhill Lake is an important waterfowl staging area (spring and fall) with more than 200,000 individuals regularly using the site each year. During spring migration, more than 150,000 geese stage here, including daily numbers of 50,000–75,000 Snow Geese (greater than 1% of the global population) and 50,000–100,000 Greater White-fronted Geese (approximately 6.3% to 7.9% of the mid-continent population). In fall, 40,000 to 70,000 dabbling ducks are also present. The Lake is also an important waterfowl molting area.

In addition to waterfowl, Beaverhill Lake regularly supports substantial numbers of a variety of shorebirds. Intensive shorebird surveys in 1995 included two counts with over 50,000 individuals present (19 and 24 May). In total, 32 species of shorebirds were recorded during 1995. Single species high counts included 10,000 Red-necked Phalaropes, 10,000 Pectoral Sandpipers, 10,000 dowitcher spp., 7,800 Black-bellied Plovers, 7,200 Semipalmated Sandpipers, and 1,000 American Avocets. Intensive shorebird survey data are available for

only a few years (1995, 1987) and average numbers for most of these species may be lower. Nonetheless, these numbers suggest that approximately 20% of the estimated North American Pectoral Sandpiper population, and almost 16% of the estimated North American Black-bellied Plover population may have been present at Beaverhill Lake during May of 1995.

The Beaverhill Bird Observatory has been monitoring landbird migration in the Natural Area at the southwestern corner of the lake since 1984. Since 1992, this monitoring has consisted of a standardized daily program of mist netting and censuses. The number and diversity of landbirds captured vary considerably from year to year. Good numbers (1,000 to 3,000) and diversity (39 to 50+ species) of landbird migrants are banded at the site each season, with the total number of individuals moving through the area being much higher. Some of the more common species included Yellow-rumped and Yellow warblers.

Piping Plover is the only threatened species that nests at Beaverhill Lake. During the 1996 International Survey, six breeding pairs of this globally vulnerable, nationally endangered species were reported. During migration and in the summer, Peregrine Falcons hunt in the area regularly.

	Season	Number
Snow Goose	SM	50,000–75,000
Greater White-fronted Goose	SM/FM	50,000–100,000
Pectoral Sandpiper	SM	10,000
Black-bellied Plover	SM	7,800

## Conservation issues

The significance of Beaverhill Lake to migrating birds has been recognized by a variety of initiatives. In 1987 it was designated as a Wetland of International Importance under the Ramsar program. Also in 1987, the Beaverhill Natural Area was established. It includes Dekker Islands, Pelican Island and Lister Lake Area. These areas are protected under the Alberta Provincial Government's *Wilderness Areas, Ecological Reserves and Natural Areas Act* (1981). In May 1996, the Lake was designated as a Regional Reserve for migrating shorebirds under the Western Hemisphere Shorebird Reserve Network (WHSRN). The area also received formal recognition as a globally Important Bird Area (IBA) in April 1997.

A number of initiatives are in place to limit disturbance to waterbirds. The area within 800m of the pelican nesting island has been designated as a seasonal sanctuary. Access is prohibited from 15 April to 15 September. An additional restricted area has been identified to protect staging waterfowl during fall migration. This area includes the southern half of the lake and all areas within 800m of the edge of the water (southern half only). Hunting of game birds is prohibited until after 31 October. Ducks Unlimited has also protected and enhanced approximately 820 ha of wetland and 225 ha of associated upland habitats around the lake.

The development of a conservation plan for the Beaverhill Lake IBA will ensure the continued importance of the area to migratory birds. Continuous drought, for example, has resulted in shallow, warmer waters which, in turn, have caused blooms of bluegreen algae and outbreaks of botulism—both harmful to waterbirds—and the lower water levels have made Pelican Island accessible to predators, leading to the elimination of pelican and cormorant nesting sites for a number of years.

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## Galloway and Miry Bays

*Cabri, Saskatchewan*

CASK006G

50°50' N, 108°27' W

558–560 m / 50 km<sup>2</sup>

### ► Habitats:

Freshwater lake and islands.

### ► Land-use:

*Primary* – Rangeland/pasture water supply. *Secondary* – Fisheries, hunting, recreation/tourism, wildlife conservation/research.

### ► Threats:

*Local* – Recreational development/overuse. *Potential* – Natural pests/disease, excessive disturbance, drought, over-harvesting.

### ► Protection status:

None.

## Site description

Galloway and Miry Bays are located at the west end of Lake Diefenbaker about 20 km north of Cabri. Miry Bay is located on the west side of the lake at the southern end of the IBA. It was formed when the rising waters of the reservoir drowned the mouth of Miry Creek. Galloway Bay is on the east side of the lake, about 5 km farther north. Depending on the water level, the site also includes numerous islands and sandbars that extend to the north end of Lake Diefenbaker.

## Birds

Galloway and Miry Bays are the most significant staging areas for Greater White-fronted Geese in the Canadian prairies. On average, the number of geese recorded here during annual fall surveys is about 310,500 birds, or about 40% of the average estimated fall flight of the mid-continent Greater White-fronted Goose population. In 1995, 748,000 geese were recorded (about 68% of the estimated 1995 fall flight of 1.1 million geese). The Greater White-fronted Geese generally leave Miry and Galloway Bays by early October and are replaced by mixed flocks of Snow Geese and Ross' Geese numbering 25,000 or more. Large numbers of Canada Geese are also occasionally present with about 85,000 recorded in late September 1991. The numbers of geese at this site fluctuate depending on the availability of alternate staging areas. During dry years, the numbers of geese using this site are significantly larger.

Globally significant numbers of Sandhill Cranes are also recorded at this site. Totals of 63,000 in 1990 and 78,000 in 1991 were recorded. This is about 16% of the estimated mid-continent Sandhill Crane population.

Season	Number	
Greater White-fronted Goose	FM	310,500 (avg. 1992-97)
Snow and Ross' Goose	FM	25,000 +
Canada Goose	FM	84,800 (1990)
Sandhill Crane	FM	70,500 (avg. 1990-91)

## Conservation issues

Lake Diefenbaker was formed in 1958 by dams on the South Saskatchewan river at Cutbank and on the Qu'Appelle River, near Elbow. The waters of the reservoir are drawn down gradually to generate electricity. Although the reservoir is replenished to a large extent by spring freshet from the plains, its main source is mountain runoff which arrives in June. Water levels are therefore subject to great intra- and inter-year variations, depending on the relative amounts of runoff from these two sources. Because of the low topography, fluctuating water levels result in great variations in the availability and locations of the areas used for staging. When the water is low, staging birds use the large sandbars that characterize the entire reach; during high water the birds are restricted to Galloway and Miry Bays. Under the current water management regime there are no primary threats to the staging area.

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## Redberry Lake

*Hafford, Saskatchewan*

CASK005G

51°41' N, 107°09' W

507–518 m / 65.3 km<sup>2</sup>

### ► Habitats:

Saline lake, natural grassland with aspen groves and shrubs.

### ► Land-use:

*Primary* – Wildlife conservation/research, recreation/tourism. *Secondary* – Agriculture/cultivation and rangeland/pasture.

### ► Threats:

*Major* – Disturbance, drought. *Potential* – Natural pests/disease, pesticides, recreational development/overuse.

### ► Protection status:

The lake has been designated as a Federal Migratory Bird Sanctuary; the islands have been identified as a Provincial Wildlife Reserve and part of the Representative Area Network.

## Site description

Redberry Lake, named for the profusion of buffalo berries (*Shepherdia canadensis*) that grow in the region, is located in north-central Saskatchewan near the village of Hafford. It is a large, internally drained, saline lake typical of Saskatchewan's Parkland Region. Water levels on the lake have dropped continuously since it was first surveyed in 1906-09. At that time, the levels stood at about 515 m; today's level is about 507 m. As a result, the shoreline has been reduced by 36 km, and its overall area by 2,430 ha. At present the area of the lake is 5,610 ha, including four islands with a combined area of 85 ha. These islands ("Pelican," "Gull," "Old Tern" and "New Tern") are (or were) used by nesting colonial birds. The names, however, do not now reflect the species nesting there. American White Pelicans used Pelican and Gull Islands in 1972; by 1996 they had switched to New Tern, an island that has been exposed only since 1957.

## Birds

In a 1991 census, 524 pairs of American White Pelicans were observed on the islands in Redberry Lake. In 1996 the number of nesting pelicans had increased to 1,060 pairs. Based on recent population estimates, these numbers represent about 1 to 2% of the world's American White Pelican population.

Historically, Redberry Lake has also supported nationally significant numbers of the globally-threatened, nationally-endangered Piping Plover. As many as 41 birds were recorded in both 1984 and 1985. In 1991, the International Piping Plover survey recorded 21 birds. In recent years, however, the number of plovers observed has dropped to only four birds in 1996.

During extensive studies completed in 1986, about 400 pairs of nesting White-winged Scoters were recorded on the lake. It has been suggested that this is the world's single largest breeding concentration of this species. About 215 birds have recorded in the vicinity of the lake.

	Season	Number
American White Pelican	B	792 pairs (avg. 1991-96)
Piping Plover	B	21 (1991)

### Conservation issues

The lake has been designated a Federal Migratory Bird Sanctuary since 1925, and the islands as a Provincial Wildlife Reserve since 1970. In the early 1970s, the area was also identified as a candidate representative natural area under the International Biological Program. In addition, upland habitat (920 ha) has been protected under the provincial Critical Wildlife Habitat Protection Act. The lake and associated uplands are also part of the Provincial Representative Areas Network (RAN).

In recognition of the significance of the area, provincial laws prohibit the use of boats within 100 m of the nesting islands. The Rural Municipality of Redberry has also passed zoning regulations that protect portions of the lake from further development. And the Redberry Pelican Project (RPP) has requested that boaters refrain from entering an advertised 1 km buffer zone around the nesting islands.

Potential threats include: disturbance of colonial waterbirds, scoters and Piping Plovers by boaters; loss of nesting islands through declining water levels; increased salinity due to declining water levels, which may in turn affect primary productivity and usefulness to birds; and loss of former lake bed to adjacent property owners.

20	<b>Luck Lake</b> <i>Birsay, Saskatchewan</i>	
	CASK003G	51°04' N, 107°06' W
		581 m / 20 km <sup>2</sup>

#### ► Habitats:

Freshwater marsh.

#### ► Land-use:

*Primary* – recreation/tourism, wildlife conservation/research.

#### ► Threats:

*Major* – Non-native species, drought. *Local* – Disturbance, drought, recreational development/overuse.

#### ► Protection status:

Heritage Marsh.

### Site description

Luck Lake is located in south-central Saskatchewan, near the village of Birsay. Until recently, it was a large, shallow, saline lake typical of the southern prairies. As such, it was subject to marked year-to-year fluctuations in water levels. In 1987, a large wetland enhancement project was undertaken. The lake now has three basins (separated by dykes), with the eastern and western basins always having water, and the large central basin often having water. In all, the site contains approximately 1,800 ha of freshwater marsh and about 200 ha of grassland and shrub thickets.

### Birds

Luck Lake, when it contained water, was an important staging area during fall migration. Since the wetland enhancement, however, it has developed into a globally significant site for many water bird species. During the early 1990s, one-day fall peak counts for at least six bird species indicated populations of global significance (i.e., greater than 1% of the respective biogeographical populations). These species were: Tundra Swan—about 12% of the eastern population; Greater White-fronted Goose—about 2.5% of the mid-continent population; Snow Goose—about 3% to 4% of the Alaska/NW Canada population; Sandhill Crane—just over 1% of the mid-continent population; Hudsonian Godwit—about 6% of the population; and Franklin's Gull—as much as 3% of the population. These percentages are all based on one-day peak counts. For many species, the actual number of birds using the site is probably much higher if "turnover rates" are considered (i.e., the movement of birds through the site over the course of migration). During fall migration, Luck Lake likely supports the largest concentration of Hudsonian Godwits in Saskatchewan.

In addition to these species, thousands of other shorebirds and waterfowl make use of Luck Lake during fall migration. Between 1 September and 10 October, it has been estimated that the total waterbird population ranges from 60,000 to 100,000. The globally endangered Whooping Crane is also occasionally reported here during fall migration.

	Season	Number (peak)
Tundra Swan	SM/FM	1,995 (1991–93 avg.)
Tundra Swan	FM	10,187 (1992–94 avg.)
Greater White-fronted Goose	FM	19,150 (1990–92 avg.)
Snow Goose	FM	28,663 (1989–93 avg.)
Sandhill Crane	FM	10,200 (1992)
Hudsonian Godwit	FM	2,850 indiv'als (1991, '93, '95 avg.)
Franklin's Gull	FM	15,000 (1993)

### Conservation issues

The wetlands enhancement was undertaken by Ducks Unlimited in collaboration with Saskatchewan Water Corporation, the Saskatchewan Wildlife Federation, Wildlife Habitat Canada, and the Saskatchewan Natural History Society. Through their efforts, Luck Lake was developed as a Heritage Marsh, and water is now pumped in from Lake Diefenbaker to augment natural runoff.

The major threat to the site may be competition for water during periods of low mountain runoff. Luck Lake is last in line for water after the needs for irrigation have been met. During low-water years, there may not be sufficient water to fill the basins. In addition, the invasion of non-native species has the potential to reduce habitat quality.

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## Lavallée Lake

*Prince Albert National Park, Saskatchewan*

CASK004G

54°18' N, 106°23' W

541–550 m / 28.2 km<sup>2</sup>

#### ► Habitats:

Freshwater lake and forested island with open areas.

#### ► Land-use:

*Primary* – Wildlife conservation/research, ecosystem monitoring.

#### ► Threats:

*Potential* – Aircraft activity, natural pests/disease, and overpopulation at the colony.

#### ► Protection status:

Within Prince Albert National Park.

### Site description

Lavallée Lake is located in central Saskatchewan within the northwest corner of Prince Albert National Park. It is large and shallow, and is about 2,800 ha in area. Heron Island is located in the northern basin of the lake. It contains a large colony of nesting American White Pelicans and Double-crested Cormorants. The western portion of the island is partially vegetated with stinging nettle and other herbaceous species, while the eastern portion is mostly forested. The forests on the island are dominated by mature white spruce, with a thick understory of raspberry, willow, balsam fir and nettle. The spruce trees, however, are dying back rapidly due to heavy use by pelicans and cormorants. The surrounding landscape is characterized by undulating and hummocky till plains with large areas of organic deposits.

### Birds

Heron Island, within Lake Lavallée, supports one of the largest concentrations of nesting American White Pelicans and Double-crested Cormorants in Saskatchewan. In a 1996 census completed by staff from Prince Albert National Park, a total of more than 15,000 adult American White Pelicans and more than 7,000 adult Double-crested Cormorants were recorded. These populations represent about 9% to 12% of the world's American White Pelican population, and about 1.5% of Canada's Double-crested Cormorant population. Both of these populations have been growing consistently since they were first reported in the 1930s.

In addition to the nesting American White Pelicans and Double-crested Cormorants, a large population of breeding Ring-billed Gulls is also present. Although a census of the gulls has not yet been completed, there are reported to be several thousand nesting pairs.

	Season	Number (1996)
American White Pelican	B	15,000+
Double-crested Cormorant	B	7,000+

## Conservation issues

Lavallée Lake is located within Prince Albert National Park, where it has been identified as a Zone 1 protected area (the highest level of protection within the Parks Canada system). At present, park personnel are not aware of any major, immediate threats to the colony. However, disease, over-population of the colony, and aircraft activity are a concern. A long-term monitoring program has been established to monitor the population, disease, and mortality status of the colony.

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## Last Mountain Lake National Wildlife Area *Imperial, Saskatchewan*

CASK001G

51°20' N, 105°15' W

494 to 503m / 156 km<sup>2</sup>

### ► Habitats:

Freshwater marsh, alkaline sloughs, salty mudflats, native mixed-grass prairie, groves of aspen and dense shrubbery.

### ► Land-use:

*Primary* – Wildlife conservation/research, recreation/tourism. *Secondary* – Agricultural and hunting.

### ► Threats:

*Major* – Non-native fauna/flora. *Local* – Excessive disturbance of birds, recreational development/overuse.

### ► Protection status:

Migratory Bird Sanctuary, National Wildlife Area, Ramsar site, National Historic Site.

## Site description

Last Mountain Lake National Wildlife Area is located in east-central Saskatchewan, about 120 km southeast of Saskatoon. The National Wildlife Area (NWA) includes the northern end of Last Mountain Lake, which is characterized by several shallow bays or “fingers.” Portions of the fingers have been dammed, forming several basins. The NWA includes 15,502 ha of lake, marsh, and upland at the north end of the lake. About 54% of the total area is native grasslands, and initiatives are underway to restore more area. Fire and grazing are used to keep existing grassland areas free of shrubs and exotic grasses.

## Birds

The NWA is a major staging area for several species of waterbirds. As many as 30,000 to 40,000 Sandhill Cranes are regularly reported during fall migration. This may represent as much as 9% of the mid-continent Sandhill Crane population. Large numbers of geese are also present during spring and fall migration, including over 300,000 Snow Geese and over 25,000 Greater White-fronted Geese.

Several species of colonial birds nest within the NWA including nationally significant numbers of Forster’s Terns, and large numbers of American White Pelicans (804 birds), Double-crested Cormorants (2,854 birds), Black Terns (greater than 50 pairs) and Black-crowned Night-Herons (greater than 50 pairs).

The northern end of Last Mountain Lake is one of the few areas in Saskatchewan where the globally endangered Whooping Crane occurs on an annual basis as a migrant. Most Whooping Cranes that occur here are early migrant singles or pairs, rather than the late migrating family groups that occur elsewhere. Other threatened species that occur here in low numbers include Ferruginous Hawk (one regularly nesting pair), Peregrine Falcon (fairly common migrant), Piping Plover (variable numbers—zero to a few nesting pairs),

Caspian Tern (occasional nestings of a pair), Burrowing Owl (former nester, now locally extirpated) and Loggerhead Shrike (a few breeding pairs).

Last Mountain Lake Bird Observatory has undertaken intensive landbird migration monitoring on the east side of the lake since 1990. On average, 3,400 birds of 76 species are banded annually. The total number of birds moving through the area is significantly higher than that number, since banding occurs in only a small section. The five most abundant species banded are: Yellow-rumped Warbler, Yellow Warbler, Clay-colored Sparrow, Alder Flycatcher, and Least Flycatcher. The majority of the migrating songbirds are neotropical migrants.

	Season	Number
Snow Goose	SM/FM	300,000+
White-fronted Goose	SM/FM	25,000+
Sandhill Crane	FM	30,000–40,000
Whooping Crane	FM	2
Forster's Tern	B	30 + pairs
landbird concentrations	SM/FM	

## Conservation issues

Last Mountain Lake was designated as Canada's first federal bird sanctuary under the Migratory Birds Convention Act. The area was officially designated as a National Wildlife Area in 1987 and is protected under Migratory Bird Sanctuary and NWA regulations.

Last Mountain Lake has also been recognized as a key site under the International Biological Program, a Ramsar site, a National Historic Site, and as a proposed Western Hemisphere Shorebird Reserve. A *Draft Resource Management Plan for the Last Mountain Lake National Wildlife Area and Migratory Bird Sanctuary* was released by Environment Canada in January 1994.

The primary threats to the area include: disturbance from increased public use (particularly boating); agricultural runoff (pesticides and fertilizers); and exotic plant species (smooth brome, toadflax, and nodding thistle).

23

## Quill Lakes

*Wynard, Saskatchewan*

CASK002G

51°55' N, 104°20' W

516 m / 619 km<sup>2</sup>

### ► Habitats:

Three distinct non-tidal wetlands (mostly saline), surrounded by short-grass prairie and aspen parkland.

### ► Land-use:

Natural, rangeland/pasture, hunting, wildlife conservation/research, recreation/tourism.

### ► Threats:

*Major* – Diversion of water, drainage/damming, fertilizer/pesticide runoff.  
*Local* – Excessive disturbance, drought

### ► Protection status:

Provincial wildlife refuge (small areas); also North American Waterfowl Management Plan sites.

## Site description

The Quill Lakes are located immediately north of the town of Wynard, in east-central Saskatchewan. The lakes are named (from west to east): Big Quill, Middle Quill (or Mud), and Little Quill Lakes. Middle Quill Lake is the smallest, while Big Quill is the largest—in fact, the largest saline lake in Canada. During periods of high water levels, the lakes drain from west to east. The lakes, however, have no outlet. All three lakes are extremely shallow, such that any fluctuation of water level, or influence of the wind, can cause great differences in even the day-to-day location of the shoreline. The muddy and gravelly lakeshores are surrounded by grasslands, aspen parkland, and numerous freshwater marshes.

## Birds

The lakes, Big Quill Lake in particular, support an exceptional number of breeding Piping Plovers. Over the last five years there has been an average of 284 birds observed (almost 7.5% of the global population, and over 25% of the Canadian northern Great Plains population). In 1996, 435 plovers were recorded, which was the largest breeding concentration in the world. During fall migration, the globally threatened Whooping Crane is also regularly observed at this site.

The Quill Lakes are also significant as a shorebird staging area (especially during the spring) with a one day peak count of 197,155 shorebirds being recorded during the spring of 1993. During a 1989–1992 study, several species were recorded in numbers (one day peak count averages) that exceed 1% of their biogeographical populations (Black-bellied Plover, Hudsonian Godwit, Least Sandpiper, Baird's Sandpiper, and dowitcher sp.) with especially large numbers of White-rumped Sandpiper (as much as 17.5% of their global population) and Stilt Sandpiper (as much as 12% of their global population) reported.

The Quill Lakes are also known as an important waterfowl breeding and staging area. Hundreds of thousands of ducks, Sandhill Cranes, Canada Geese, and Snow Geese use the area each fall.

	Season	Number
Whooping Crane	FM	1
Piping Plover	B	284 (5yr avg)
Black-bellied Plover	SM	1,277
American Avocet	SM/FM	607/776
Hudsonian Godwit	SM	1,450
Least Sandpiper	SM/FM	3,225/759
White-rumped Sandpiper	SM	8,794
Baird's Sandpiper	SM	1,781
Stilt Sandpiper	SM/FM	8,961/3,948
dowitcher	FM	3,007

## Conservation issues

In 1973, two areas on the Quill Lakes were recognized as key sites under the International Biological Program: Middle Quill Lake Islands, and Little Quill Lake South Shore. The islands in Middle Quill Lake have since been designated as provincial wildlife refuges under the *Saskatchewan Critical Wildlife Habitat Protection Act*. In 1987, the Quill Lakes were used as the first implementation site for the North American Waterfowl Management Plan (NAWMP) in Canada. The first step in this initiative was the protection and enhancement of 6,630 ha for waterfowl and other wildlife. In addition, the site has been included in the Saskatchewan Heritage Marsh Program, declared a Ramsar site (1982) and identified as a Western Hemisphere Shorebird Reserve (1994).

Some of the main threats to the site include pollution by agricultural pesticides and fertilizers, and the control of natural fluctuations in water levels. The diversion of tributaries for agricultural purposes, for example, could reduce Piping Plover habitat in low-water years. On the other hand, these projects may prevent flooding of habitat and nests in years of high runoff. An additional threat is increased public use of the area. Unrestricted use of all-terrain vehicles in particular, could result in disturbance to the nesting Piping Plovers, staging shorebirds and waterfowl.

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## Queen Maud Lowlands

*Queen Maud Gulf, Nunavut*

CANU009G

67°00' N, 100°30' W

0–50 m / 61,765 km<sup>2</sup>

### ► Habitats:

Wetland, tundra.

### ► Land-use:

Natural.

### ► Threats:

*Potential* – Mineral exploration and development activities.

### ► Protection status:

Migratory Bird Sanctuary.

## Site description

The Queen Maud Gulf Lowlands cover an area of over 60,000 km<sup>2</sup> in the central Canadian Arctic. They are located approximately 75 km south of the community of Cambridge Bay and are bounded to the north by the Queen Maud Gulf. The landscape is comprised of a flat plain of Precambrian bedrock, overlain with glacial till, marine clays and silts, that extends approximately 135 km inland. Much of the area has recently emerged from the sea. In low-lying areas the vegetation consists of wet sedge meadows and marsh tundra, while the upland areas contain lichens, mosses, and vascular plants.

The site encompasses part of the Bathurst caribou calving grounds, and is home to a large population of muskox.

## Birds

There are about 60 goose colonies scattered throughout the site. These colonies contain over 90% of the world population of Ross' Goose and more than 30% of the Alaska/northwest Canada Snow Goose population. In 1988, estimates of nesting birds were 188,000 and 279,000 for these two species, respectively. The populations have increased, however, and in 1996, the largest colony at Karrak Lake contained an estimated 291,000 Ross' Geese and 297,000 Snow Geese.

Surveys conducted in the coastal section (up to 50 km inland) of the Sanctuary in 1990 and 1991 documented globally significant numbers of several other waterfowl species, including as much as 18% of the eastern Tundra Swan population, 14% of the mid-continent Greater White-fronted Goose population, approximately 5% of the Pacific Brant population, 10 to 12% of the Short-grass Prairie Canada Goose population, about 1% of the mid-continent Northern Pintail population, about 6% of the west/central North American King Eider population, and as much as 3% of the mid-continent Sandhill Crane population.

The Sanctuary is believed to harbor significant populations of shorebirds such as Pectoral Sandpipers, Semipalmated Sandpipers, and American Golden-Plovers. The tundra Peregrine Falcon, listed as nationally vulnerable, is the third-most common raptor in the area after Rough-legged Hawk and Snowy Owl.

	Season	Number
Tundra Swan	B	15,392
Greater White-fronted Goose	B	110,000
Snow Goose	B	297,000
Ross' Goose	B	291,000
Brant	B	6,486
Canada Goose	B	59,484
Northern Pintail	B	29,082
King Eider	B	13,162
Sandhill Crane	B	13,162

### Conservation issues

The Queen Maud Gulf Lowlands are among the most extensive wetlands in the central Arctic. The Queen Maud Gulf Migratory Bird Sanctuary, Canada's largest, was established in 1961 to protect what were then the only known nesting grounds of Ross' Goose, and the nesting/feeding grounds of the largest variety of geese in any single area in North America. The area has also been recognized as a Wetland of International Importance under the Ramsar Convention.

A recent increase in mineral exploration to the east of the Queen Maud Gulf has resulted in pressure on the Canadian Wildlife Service to permit mineral exploration in the Sanctuary. The CWS recently recommended that the designation of the Sanctuary be changed to National Wildlife Area to provide stronger protection to the area. The proposal is currently on hold, pending resolution of other land use issues in the region.

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### Delta Marsh *Portage La Prairie, Manitoba*

CAMB001G

50°05' N, 98°00' W

247–250 m / 230.7 km<sup>2</sup>

#### ► Habitats:

Peat and muck soil, overlying glacial drift, marsh meadows, shrub thickets, emergent macrophytes.

#### ► Land-use:

Recreation/tourism, hunting, and, to a lesser extent, wildlife conservation/research and agriculture.

#### ► Threats:

*Critical* – Recreational development/overuse. *Major* – Housing development, diversion of water/channelization, drainage water level fluctuations. *Potential* – Non-indigenous fauna/flora, predation, lead poisoning, disease (botulism).

#### ► Protection status:

Heritage Marsh (provincial crown land—16,600 ha).

### Site description

Delta Marsh is a large wetland comprised of wide shallow bays, sloughs and meadows. It stretches westward from St. Laurent to Lynch Point along the southern end of Lake Manitoba. The marsh is separated from the lake by a sand ridge covered with deciduous trees, including green ash, Manitoba maple, hackberry, willow and cottonwood. The hackberry stand is the northernmost location for this species within Manitoba. The ridge and associated deciduous forest act as a natural migrational corridor for landbirds migrating to and from the boreal forest and aspen parklands to the west of Lake Manitoba. The 17,000 ha marsh is one of the largest of several marshes in the Lake Manitoba basin.

### Birds

Large numbers of both diving (Canvasback, Redhead, Lesser Scaup) and dabbling (Mallard, Gadwall, American Wigeon, and Northern Pintail) ducks stage in the marsh each fall. Up to 100,000 waterfowl have been detected during aerial surveys. The number of geese using the site has increased from historic levels with Canada Geese and Snow Geese staging here in large numbers during both spring and fall migration.

Large numbers of landbirds also make use of the site. Some indication of the site's significance is reflected in the banding totals reported by the Delta Marsh Bird Observatory. Between 1992 and 1996, the number of landbirds banded in a single season ranged from 3,000 to more than 5,000 individuals, suggesting even higher (much higher) totals. In 1996, a total of 3,000 Yellow Warblers and 1,100 Tennessee Warblers were banded. More than 300 individuals of several other landbird species (Yellow-rumped Warbler, American Redstart, White-throated Sparrow, Least Flycatcher, Ruby-crowned Kinglet, Common Yellowthroat, and Song Sparrow) are also regularly banded each season. Up to 50,000 Tree and Bank swallows have been estimated during daily censuses.

Concentrations of over 1,000 Western Grebes (spring 1996) and over 1,000 Franklin Gulls have also been observed.

	Season	Number
waterfowl	SM/FM	± 100,000
Western Grebe	SM	1,000+
Franklin Gull	SM	1,000+
neotropical migrants	SM/FM	no estimate

### Conservation issues

Approximately 16,600 ha of the site is in public ownership as provincial crown lands administered by the Wildlife Branch of the Manitoba Department of Natural Resources. This provincial crown land is designated as Heritage Marsh. Of this, 2,000 ha is protected as a game bird refuge and 7,700 ha as public shooting grounds. The remaining land is under private ownership.

The Delta Marsh is a major waterfowl staging area and was designated as a Wetland of International Importance in 1982 under the Ramsar Convention. The Delta Waterfowl Research Station, which controls 1,600 ha of the marsh, has been conducting waterfowl studies since 1938. A second research station, the University of Manitoba Field Station, has been conducting landbird research since 1964. In 1995, the Delta Marsh Bird Observatory was established to monitor landbird migration at this site during spring and fall migration.

Sections of the west portion of the marsh are periodically flooded by the Portage Floodway (a flood control structure), causing excessive siltation and vegetation growth. Threats to the surrounding area include pressures to develop additional cottage sites and recreational facilities on nearby Lake Manitoba beaches.

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## Rasmussen Lowlands

*Rasmussen Lowlands, Nunavut*

CANU008G

68°40' N, 93°00' W

0–50m / 5,278 km<sup>2</sup>

#### ► Habitats:

Tundra, tundra ponds, beach ridges/eskers.

#### ► Land-use:

Natural area, subsistence hunting and fishing.

#### ► Threats:

None at present.

#### ► Protection status:

None.

### Site description

The Rasmussen Lowlands are located in the central Canadian Arctic near the base of the Boothia Peninsula. They extend along the east side of Rae Strait and the Rasmussen Basin, from the south shore of Netsilik Lake to approximately 45 km north of Arrowsmith Bay. Much of the area is poorly drained, flat lowlands covered with marine silts and sand. The terrain is increasingly rugged in the eastern and northern portions of the lowlands, with the Ross Hills and Wager Highlands bordering the north and east sides respectively. Habitats in the lowlands vary from partially vegetated, dry tundra with beach ridges and eskers, to richly-vegetated sedge wetlands. Numerous tundra ponds are found throughout the area.

### Birds

Intensive wildlife surveys completed in the lowlands during 1976 documented high numbers of several waterfowl and shorebird species. Additional surveys in 1994 and 1995 confirmed the site's significance, though population estimates were lower for several of the species. At least four species were recorded in significant numbers during the 94/95 season: Tundra Swan (4.4% of the eastern population), Greater White-fronted Goose (as much as 3% of the mid-continent population), Snow Goose (3.8% of the Alaska/NW Canada population), and King Eider (as much as 12% of the west/central North American breeding population). Large numbers of Pacific Loons were also recorded.

Large numbers of nesting shorebirds have also been documented in the Rasmussen Lowlands. During the 1976 study it was estimated that the lowlands supported about 500,000 shorebirds—mostly Red Phalaropes (40%) along with White-rumped Sandpipers, Pectoral Sandpipers, American Golden-Plovers, Black-bellied Plovers and Semipalmated Sandpipers. Surveys undertaken in the 1990s, however, documented much lower numbers of Red Phalaropes, Black-bellied Plovers, and American Golden Plovers. Estimates for other shorebird species were not significantly different from those generated in the 1970s. The number of shorebird species nesting on the lowlands is higher than at most other Arctic sites where shorebird studies have been completed.

The Rasmussen Lowlands are also significant in the context of biome-restricted species assemblages. In total, 36 species have been confirmed as breeders. Of this number almost two-thirds have breeding ranges largely restricted to the tundra biome. In all, the Rasmussen

Lowlands support breeding populations of 21 out of the 33 species that have been identified as largely restricted to the tundra biome. Within the Lowlands, some of the more abundant biome-restricted species include: Greater White-fronted Goose, Pectoral Sandpiper, Red Phalarope, Semipalmated Sandpiper, White-rumped Sandpiper, and Lapland Longspur.

The escarpment bordering the Lowlands supports a large population of nesting Peregrine Falcons (ssp. *tundrius*—nationally vulnerable). In 1995, 80 pairs were recorded (possibly as much as 6% of the national population).

	Season	Number (94/95 avg.)
Pacific Loon	B	870
Tundra Swan	B	3,822
Greater White-fronted Goose	B	23,061
Snow Goose	B	38,294
King Eider	B	12,374
Peregrine Falcon (ssp. <i>tundrius</i> )	B	80 pairs
shorebirds	B	141,000
largely biome-restricted assemblages during breeding		

### Conservation issues

In the 1970s, the Rasmussen Lowlands were on the path of one of the proposed routes of the Polar Gas Project, a plan for the construction of a pipeline to transport oil from the high arctic to northern Ontario. The pipeline, which would have bisected the site, has not proven viable to date.

On the basis of wildlife studies completed in response to the Polar Gas proposal, the Rasmussen Lowlands were designated a wetland of international importance under the Ramsar Convention in 1982. In 1984, they were also identified as a Key Habitat Site for Migratory Birds.

More recently, the Rasmussen Lowlands have been identified as a priority for studies to determine their suitability as a National Wildlife Area. Currently, this is the only Ramsar site in the Nunavut or Northwest Territories that does not have legal protection.

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## Prince Leopold Island

Lancaster Sound, Nunavut

CANU006G

70°02' N, 90°00' W

0–265 m / 311 km<sup>2</sup>

#### ► Habitats:

Coastal cliffs, tundra.

#### ► Land-use:

Wildlife conservation/research.

#### ► Threats:

*Potential* – Oil pollution, disturbance.

#### ► Protection status:

Migratory Bird Sanctuary.

### Site description

Prince Leopold Island is located approximately 13 km off the northeastern tip of Somerset Island, at the junction of Prince Regent Inlet and Barrow Strait. The perimeter of the island is characterized by vertical cliffs of sandstone and limestone that rise in elevation 245 to 265 m above sea level. Other topographic features include scree slopes, numerous ledges where seabirds nest, and gravel spits. The vegetation is sparse and characterized by mosses, lichens, grasses, and a few dwarf shrubs. Several Inuit archaeological sites are located on the island.

### Birds

Prince Leopold Island supports a major seabird colony that includes approximately 17% of the Canadian Northern Fulmar population, as much as 11% of the western Atlantic Black-legged Kittiwake population, over 1% of the north Atlantic Thick-billed Murre population, and over 1% of the global Black Guillemot population. Other species known to breed on the island include Atlantic Brant, Common Raven, Common Eider, Parasitic Jaeger, Glaucous Gull, and Snow Bunting. The seabirds generally occupy the site from early May to the end of September.

	Season	Number
Northern Fulmar	B	62,000 pairs
Black-legged Kittiwake	B	29,000 pairs
Thick-billed Murre	B	86,000 pairs
Black Guillemot	B	4,000 pairs

## Conservation issues

The entire island is included within the Prince Leopold Island Migratory Bird Sanctuary (federal crown land). It encompasses 311 km<sup>2</sup>, which includes a 5 km marine buffer around the island.

Lancaster Sound is subject to a small amount of ship traffic (ore shipments, oil tankers, supply vessels, etc.), mostly during the open water season (August). Commercial shipping through Lancaster Sound could increase markedly, depending on the development of mineral deposits in either Nunavut or the Northwest Territories. Oil spills associated with shipping activities could endanger large numbers of seabirds and pollute their feeding areas.

The Sanctuary is visited annually by small numbers of ecotour groups which arrive by small plane or by ship to view the seabird colony.

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## Point Pelee National Park

*Leamington, Ontario*

CAON006G

41°54' N, 82°30' W

173–177 m / 15 km<sup>2</sup>

► **Habitats:**

Freshwater marsh, deciduous forests (mature and early successional).

► **Land-use:**

Conservation, ecotourism.

► **Threats:**

*Major* – Overuse, invasive flora and fauna, air and water pollution, erosion.

► **Protection status:**

National Park.

## Site description

Point Pelee National Park is located in southwestern Ontario, near the town of Leamington. It is the most southerly mainland point in Canada, located on a sandspit which extends approximately 17 km southward into Lake Erie.

The majority of the park is marsh (approximately 11 km<sup>2</sup>), with deciduous forest located on the higher sandy ground at the tip and along the west side of the peninsula. Within the drier areas, a variety of vegetative communities exist, all having been extensively modified by logging, housing, agriculture, and/or grazing prior to the establishment of the park. Of particular significance are the red cedar savannah and the hackberry forest communities which support several rare or threatened species of flora and fauna. Due to the park's southerly location, a large number of provincially and nationally rare vascular plant species are present. Invasive plant species, however, are becoming an increasing problem and are out-competing many of the native species. Nationally threatened mammal species are also present, including the eastern mole and the reintroduced southern flying squirrel.

## Birds

Point Pelee National Park is most renowned for its concentrations of songbirds during both spring and fall migration. On some days the numbers of migrants are astounding. As an example, recent one-day peaks reported for several songbirds include: 5,000 Golden-crowned Kinglets, 3,000 Ruby-crowned Kinglets, 400 Yellow-rumped Warblers, 620 Nashville Warblers, 280 Chestnut-sided Warblers, and 1,400 Baltimore Orioles. It is likely that several million songbirds migrate through the Park each year.

Numerous nationally threatened species are also present during migration (Prothonotary Warbler—11 reported from May 6 to 26, 1997; Hooded Warbler—53 reported from April 20 to May 21, 1995; Louisiana Waterthrush—12 reported from April 18 to May 11, 1996; and Henslow's Sparrow—11 reported from April 20 to May 23, 1996). Henslow's Sparrow is also identified as a globally near-threatened species. In addition to concentrations of threatened migrating species, over a third of eastern Canada's Yellow-breasted Chat population (as many as 32 pairs were reported in 1995) breed within the Park. Yellow-breasted Chats are identified as nationally vulnerable.

A number of waterbirds also occur at Point Pelee in significant numbers. At least two species (Red-breasted Merganser and Bonaparte's Gull) are regularly present in globally significant numbers during migration, and over the last five years three additional species have occasionally been recorded in globally significant numbers (Common Tern, Forster's Tern, and Black Tern). Double-crested Cormorants have also occurred in nationally significant numbers, with as many as 8,600 birds being recorded in September 1995.

	Season	Number
Double-crested Cormorant	S	8,600
Red-breasted Merganser	FM	45,000
Bonaparte's Gull	FM	15,000
Common Tern	SM	1,400
Forster's Tern	SM	700
Black Tern	S	725
Yellow-breasted Chat	B	10–15 pairs
landbird concentrations	SM/FM	

## Conservation issues

Point Pelee was designated as a national park in 1918. It was the first to be created primarily on the merit of its biological value. In 1987, Point Pelee was designated as a Ramsar site because of its international importance as a staging area for waterfowl. It is also recognized as an international Monarch Butterfly Reserve.

The *Point Pelee National Park Management Plan*, last revised in 1995, outlines measures to maintain and enhance the ecological integrity of the park and identifies appropriate visitor-related use and facilities. Current conservation initiatives at the park include: the Red Cedar Savannah restoration project; White-tailed deer population control; small mammal survey and monitoring; natural habitat restoration projects; organochlorine contaminant study; exotic plant management; and a groundwater quality study.

Human land-use in southern Ontario and on Lake Erie has directly effected Point Pelee National Park. Prevailing westerly winds expose the park to airborne pollution from neighboring industrial centers in the United States (Detroit, Toledo and Cleveland). Lake Erie's poor water quality, due to industrial, urban and agricultural pollution, has altered the ecology of the marsh at the park. The marsh flora and fauna have also been altered by introduced species from the lake. High Lake Erie water levels have eroded and breached the eastern barrier ridge. Consequently, increased turbidity and wave action in the open ponds has resulted in the break-up of cattail mats and the movement of floating sections. The park is also threatened by oil and toxic chemical spills because of its location along the Great Lakes shipping channel. Extensive land clearing in the greater park ecosystem has isolated the park from other natural areas.

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## Coats Island – Cape Pembroke

*Northern Hudson Bay, Nunavut*

CANU005G

62°57' N, 82°00' W

0–215 m / 3 km<sup>2</sup>

### ► Habitats:

Granitic cliffs, marine environments, low tundra.

### ► Land-use:

Natural, scientific research (Cape Pembroke).

### ► Threats:

*Potential* – Marine oil and gas exploration; disturbance.

### ► Protection status:

None.

## Site description

Coats Island is located approximately 75 km southeast of Southampton Island in northern Hudson Bay. The majority of the island is low-lying and flat, with large areas of sedge tundra, tundra ponds, and raised beaches. The bedrock in this area is predominantly limestone. At the northeastern tip of the island, a small, elevated outcrop of Precambrian gneiss occurs at Cape Pembroke. The cliffs at the Cape rise to an elevation of 215 m above sea level, and provide nesting habitat for colonial seabirds.

## Birds

Two Thick-billed Murre colonies are located on cliffs approximately 5 km west of Cape Pembroke. In 1990, the breeding population was estimated to be about 30,000 pairs (approximately 2% of the eastern Canada population). There is some evidence that the population at this colony has increased since 1972. In addition to the Thick-billed Murres, Black Guillemots, Peregrine Falcons (ssp. *tundrius*, nationally vulnerable), and Glaucous Gulls also nest in the immediate vicinity of the colony.

The sedge lowlands on the northern and western parts of Coats Island support several tundra-nesting species, including King Eider, Sabine's Gull, Canada Goose, Purple Sandpiper and Pectoral Sandpiper. Although no density or population estimates have been completed, casual investigations suggest that the area contains significant populations of these species. Additional field research is needed.

	Season	Number
Thick-billed Murre	B	30,000 pairs

## Conservation issues

There are several oil and gas leases in the marine areas adjacent to Coats Island, but currently there is no active exploration or extraction. One or two cruise ships visit the Cape Pembroke murre colony annually. Small numbers of tourists also arrive each year by boat from Coral

Harbour. Inuit have lived on Coats Island in the past, but no permanent residents have been present since the 1970s.

The murre breeding cliffs are identified as a Key Migratory Bird Habitat Site in Nunavut. In this respect, the *Keewatin Land Use Plan* recommends that the Canadian Wildlife Service consult with the community of Coral Harbour in an effort to identify the entire island as a National Wildlife Area. Consultations were undertaken in the early 1990s but were put on hold due to lack of community interest in the initiative. The island is a mix of federal crown land and parcels of private land owned by the Inuit of Nunavut.

30

**Cape Hay**  
*Bylot Island, Nunavut*

CANU004G

73°45' N, 80°22' W

0–460 m / 3.5 km<sup>2</sup>

► **Habitats:**

Cliffs, tundra.

► **Land-use:**

Natural.

► **Threats:**

*Potential* – Oil pollution, disturbance.

► **Protection status:**

Canadian Migratory Bird Sanctuary.

### Site description

Cape Hay is located at the entrance of Lancaster Sound, near the northwestern tip of Bylot Island. Bylot Island, which is situated immediately northeast of Baffin Island, is comprised mostly of Precambrian metamorphic rock. As part of the Arctic Cordillera, the island is quite mountainous, with numerous glaciers and elevations up to 1,900 m above sea level. The site that contains the colonial seabirds is comprised of vertical cliffs of Precambrian dolomite that rise 60 to 460 m above sea level.

Offshore, Lancaster Sound is a major migration route for marine mammals such as beluga, narwhals, ringed seals and harp seals. Polar bears are also numerous, and the north shore of Bylot Island is reported to be a maternity denning area and summer retreat.

### Birds

During the 1970s, surveys indicated that approximately 140,000 pairs of Thick-billed Murres were present at Cape Hay during the breeding season. No recent surveys have been completed. If these figures are still accurate, this represents approximately 1.3% of the global, 2.2% of the North Atlantic and about 9.5% of the eastern Canada Thick-billed Murre population. Historically, this site may have supported even larger numbers of murres. In 1957, approximately 400,000 pairs were estimated at this site.

Large numbers of Black-legged Kittiwakes also nest at Cape Hay (provisional estimates of 20,000 pairs). This may represent from 7.6% to as much as 10% of the western Atlantic population. This species may have also declined in numbers at Cape Hay. In 1957, 50,000 pairs were estimated at this site.

	Season	Number
Black-legged Kittiwake	B	20,000 pairs
Thick-billed Murre	B	140,000 pairs

## Conservation issues

In the 1970s and early 1980s, Lancaster Sound, Barrow Strait, and Prince Regent Inlet were under serious consideration as marine shipping routes and areas of hydrocarbon exploration and development. These proposals, however, are no longer active.

Approximately four cruise ships stop at the seabird colony each year. Viewing of the birds takes place from Zodiacs; cruise ship visitors are not permitted on shore except in cases of emergency.

Cape Hay is within the Bylot Island Bird Sanctuary and will soon become a part of the proposed North Baffin National Park. It has also been identified as a significant site under the International Biological Programme (IBP).

31

## Long Point Peninsula and Marshes

*Port Rowan, Ontario*

CAON001G

42°35' N, 80°20' W

173–181 m / 2,160 km<sup>2</sup>

### ► Habitats:

Deep and shallow marshes, wet meadows, rush swales, wooded swamps, beaches, sand dunes, grass-covered ridges, savannahs, woodlands, and tamarack-cedar ponds.

### ► Land-use:

Natural area, hunting clubs, cottages, marinas, agricultural.

### ► Threats:

Disturbance, tourism and tourism infrastructure, off-site developments interfering with shoreline sand transport.

### ► Protection status:

Portions are identified as National Wildlife Refuge and/or Provincially Significant Wetland.

## Site description

The Long Point site includes the Long Point Peninsula, Long Point Inner Bay and the Turkey Point and Big Creek marshes. Extending 32 km into Lake Erie, the Long Point Peninsula is the longest freshwater sandspit in the world. With an area of approximately 105,000 ha, it is constantly changing due to the continuous deposition and erosion of sediments through wind and wave erosion. The peninsula itself is a series of alternating ridges that are separated by ponds and swales. These wetlands and associated sand dunes are the best remaining example of this type of ecosystem in the Great Lakes basin.

Protected from the prevailing south-westerly winds by the sandspit, extensive marshes have formed in its lee on the northern side. The Inner Bay (approximately 28,000 ha) encompasses the open water from the Big Creek marshes in the west to an imaginary line drawn from Turkey Point to Pottahawk Point in the east. The northern and western shores are fringed with shallow marshes, with the extensive marshes of Turkey Point in the northeast corner and those of Long Point to the south and west. The moderating effect of Lake Erie, combined with the southern geographic location of Long Point, allows a number of plants and animals to survive here at the northern limit of their North American range.

## Birds

The Long Point area is most renowned for the concentrations of waterfowl that make use of the area during spring and fall migration. Single day counts of 70,000 to over 100,000 waterfowl are made regularly during fall migration. Over the period 1992 to 1996, nationally and/or globally significant numbers (i.e., greater than 1% of the biogeographic population) of eight waterfowl species have been recorded (Tundra Swan—eastern population, American Black Duck, Canvasback, Common Merganser, American Wigeon, Ring-necked Duck, Redhead, and scaup—Greater and Lesser Scaup combined). Of these species, Tundra Swan, American Black Duck and Canvasback consistently occur in globally significant numbers (6.0% to 13%; 2.1% to 3.6%; and 2.1% to 6.8% of their populations respectively). It should be recognized that these data are based on single-day counts; over

the course of the migration season, it is likely that the number of individuals and associated percentages for each of these species is even higher. Over the last 20 years there have been occasions when even higher numbers of waterfowl have been recorded: 10 to 15% of the Canvasback population; up to 10% of the Redhead population; and up to 35% to 45% of the Tundra Swan (eastern) population. Other waterbird species that occur in large numbers include Whimbrel (often in the hundreds), Bonaparte's Gull (regular one-day counts in excess of 5,000), and Common Tern (regular one-day counts in excess of 1,000).

In addition to waterfowl, the Long Point area also supports an exceptional number and diversity of resident and migrant landbirds. A total of 367 bird species have been recorded at Long Point to date. This represents approximately 85% of the species that have been recorded thus far in Ontario. About 120 species have nested in the area and on average, about 260 species of birds are recorded each year.

The Long Point Bird Observatory operates three migration monitoring stations on the spit. As of the end of 1995, 522,244 birds of 265 different species had been banded. Using the estimated daily totals of migrant birds in each of the three census areas, it has been estimated that the average number of migrants using the area is 2.4 million individuals in the spring and 7 million in the fall.

Several nationally threatened bird species nest in the Long Point area including nationally significant numbers of King Rail (endangered), Least Bittern (vulnerable), and Prothonotary Warbler (endangered). Red-headed Woodpecker (nationally vulnerable) are also present, but not in nationally significant numbers. Local populations of all of these species appear to have declined in recent years and some may be extirpated or only occasional breeders. Long Point formerly supported a significant breeding population of Piping Plovers (globally vulnerable; nationally endangered) but the last recorded evidence of attempted breeding was in 1981. This species is now rarely seen during migration. However, suitable breeding habitat still remains.

	Season	Number
Tundra Swan	FM	11,260
American Black Duck	FM	7,650
American Wigeon	FM	13,282
Canvasback	FM	41,865
Ring-necked Duck	FM	8,270
Greater/Lesser Scaup	FM	61,804
Redhead	FM	10,089
Common Merganser	FM	4,950
Whimbrel	SM	600
Bonaparte's Gull	SM/FM	20,000
Common Tern	FM	2,000
King Rail	B	2 pairs
Least Bittern	B	11–100 pairs

## Conservation issues

In August 1996, the Long Point area was announced as the first globally significant Important Bird Area in Canada. This international recognition is one of many: in 1982 it was designated as a Ramsar site, following the convention on Wetlands of International Importance; in 1986 it was recognized as a World Biosphere site by UNESCO within the Man and Biosphere Program; and in 1995 it was recognized as an International Monarch Butterfly Reserve.

The presence of the significant natural features at Long Point is largely due to the stewardship of the Long Point Company. They have owned and managed a large portion of the Point for duck hunting since 1866. More recently, the Canadian Wildlife Service has become active in the conservation of the area through the establishment of National Wildlife Areas in 1973 and 1979. Other major tenants who manage their land for conservation include the Ontario Ministry of Natural Resources, Long Point Region Conservation Authority, Ducks Unlimited, and at least five different private waterfowl clubs.

Although much of the area is protected through ownership by conservation interests, there are direct threats to non-protected wetlands due to proposals to convert the marsh for agricultural or recreational purposes. In addition to direct loss of habitat through development, disturbance to resting flocks of waterfowl by motor boats is also a serious concern. To counter this threat, public awareness programs have been undertaken. Other threats include the potential for off-site developments that may interfere with the shoreline transport of sand that forms Long Point, or the artificial manipulation of Great Lakes water levels.

32	<b>Cambridge Point</b> <i>Coburg Island, Nunavut</i>	
	CANU010G	75°50' N, 79°25' W

► **Habitats:**

Cliffs, tundra.

► **Land-use:**

Natural.

► **Threats:**

*Potential* – Oil pollution, disturbance.

► **Protection status:**

Nirjutiqavvik National Wildlife Area.

### Site description

Coburg Island is located at the east end of Jones Sound, midway between Ellesmere and Devon Islands. The topography is quite rugged, with much of the island being covered by an ice cap. Many prominent cliffs (150 to 300 m in elevation) are located along the coastline, especially at the southern end of the island, near Cambridge Point. A section of the North Water polynya (an area of open water surrounded by ice) is located immediately south of Coburg Island. The polynya is of critical importance to the nesting seabirds in that it provides a dependable area of open water for feeding during the early breeding season.

During the summer, walrus concentrate and haul out in the bays to the northeast and northwest of Cambridge Point. White whales, narwhals, and bowhead whales are also reported to be abundant. During the fall, winter, and spring the polynya supports several species of marine mammals (polar bears, seals, whales, etc.).

### Birds

Approximately 160,000 pairs of Thick-billed Murres were recorded at Cambridge Point during photographic surveys completed in the 1970s. The colony was rephotographed in the 1990s and populations are stable. Approximately 1.5% of the global, 3.5% of the North Atlantic, and about 11% of the eastern Canada Thick-billed Murre population breed on these cliffs. Black-legged Kittiwakes are also abundant nesters with about 30,000 pairs being reported at the colony in the 1970s. This represents from about 11% to as much as 15% of the western Atlantic breeding population.

In addition to Thick-billed Murres and Black-legged Kittiwakes, Glaucous Gulls and Black Guillemots also nest at the colony. During the spring, large numbers of King Eider, and some Oldsquaw stage in the bays along the south end of Coburg Island.

Princess Charlotte Monument (a small islet located about 17 km to the east of Cambridge Point, immediately off the Marina Peninsula) supports about 3,000 Northern Fulmars and smaller numbers of Black Guillemots (200) and Glaucous Gulls (20).

	Season	Number
Black-legged Kittiwake	B	30,000 pairs
Thick-billed Murre	B	160,000 pairs

### Conservation issues

In the past, oil exploration has been proposed in western Baffin Bay. If conducted, such activities could result in disturbance to the birds and pollution of their feeding areas.

Previously, cruise ships have stopped at the breeding colony. Presently, however, cruise ships require a permit before they may enter the National Wildlife Area. Cruise ships are not permitted to land visitors on the island, except in the case of emergency. Birds are viewed from Zodiacs.

Coburg Island was designated a National Wildlife Area in 1995. The area was also identified as a significant site under the International Biological Programme (IBP) and as a Key Migratory Bird Terrestrial Habitat site in Nunavut.

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## Niagara River

*Niagara Falls, Ontario*

CAON002G

43°07' N , 79°04' W

74–177 m / 6,000 km<sup>2</sup>

#### ► Habitats:

Gorge habitats, cliffs, ledges, rich feeding sites at upwellings.

#### ► Land-use:

Tourism, urban and industrial development, parkland areas.

#### ► Threats:

Pollutants in Niagara River, urban and industrial development.

#### ► Protection status:

No comprehensive protection.

### Site description

The Niagara River flows 60 km from Lake Erie to Lake Ontario. In addition to being a major tourist destination, it provides drinking water, recreational fishing, employment, and electrical power to millions of people. The river is bordered by urban areas, industrial developments, and agricultural lands, with parkland areas and remnant natural areas being interspersed. For a 15 km stretch downstream of the falls, the river flows through a 100 m-deep and 1 km-wide gorge. The riverine habitats are quite varied, ranging from large lake-like areas, exposed boulder beds, rapids, falls, whirlpools, and stretches with swift currents. Within the gorge, the cliff rim, cliff face, and talus communities support one of the highest concentrations of rare plant species in Ontario.

### Birds

The Niagara River annually supports one of the largest and most diverse concentrations of gulls in the world. More than 100,000 individuals can be observed foraging along the river during fall and early winter. A total of 19 gull species have been recorded (60% of all New World gull species), with up to 14 species being recorded on a single day. The number of gulls and diversity of species generally peak in November. Two species occur in globally significant numbers: Bonaparte's Gull and Herring Gull.

During fall and early winter 10,000 or more Bonaparte's Gulls can regularly be observed along the river (over 2% of the global population). Peaks of more than 40,000 individuals have been observed on several occasions (1973, 1977, 1990, 1991) representing over 8% of the global population. Over the course of the fall and early winter season up to 100,000 birds have been estimated to pass through this site (over 20% of the global population).

Herring Gulls are also abundant; 20,000 or more individuals can be observed regularly with a maximum of 50,000 individuals being reported on a single day. This represents the regular occurrence of almost 6% of the North American Herring Gull population (ssp. *smithsonianus*) with upwards of 14% of the population being reported on a single day. The national threshold for Ring-billed Gulls is also regularly exceeded during spring migration.

Waterfowl concentrations during fall and winter also regularly exceed 20,000 individuals of more than 20 species. At least two species (Canvasback and Common Merganser) are

regularly present during late fall and early winter in numbers just above 1% of their estimated North American populations; Greater Scaup are occasionally present in significant numbers, and Common Goldeneyes are regularly present in numbers approaching the 1% threshold.

Due to the regional geography, large numbers of migrating raptors and landbirds cross the river during migration. Normally they do not stop in large numbers along the river corridor. Some specific sites along the river corridor are also significant for colonial nesters such as Black-crowned Night Heron, Common Tern, and Ring-billed Gull.

	Season	Number
Bonaparte's Gull	F/W	10,000
Herring Gull	F/W	20,000

### Conservation issues

The Niagara River corridor was the first globally significant IBA to be jointly identified by cooperating organizations in Canada and the United States. It was formally dedicated as an IBA in December 1996.

There is no comprehensive protection for the Niagara River corridor. Currently, pollutants remain one of the largest potential threats. The Niagara River is targeted as an Area of Concern under the Great Lakes Remedial Action Plan, and is the focus of the Niagara River Toxics Management Plan. Substantial reductions of key pollutants have been achieved at several point sources along the river.

The corridor comprises several municipal jurisdictions and the pressure for urban development is high. Retention of natural habitats and land use planning will be important. Little is known about the food or other ecological resources that support these large populations of gulls. A conservation plan for this IBA is being developed through a coalition of interested groups.

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## Presqu'île Provincial Park

*Brighton, Ontario*

CAON004G

44°00' N, 77°43' W

247–250 m / 9.4 km<sup>2</sup>

#### ► Habitats:

Sand beaches, marshes, offshore islands, mixed forests.

#### ► Land-use:

Recreation, ecotourism.

#### ► Threats:

Recreational overuse, disturbance.

#### ► Protection status:

Provincial Park.

### Site description

Presqu'île Provincial Park is located on the north shore of Lake Ontario, approximately 135 km east of Toronto. It is a boot-shaped peninsula that juts 10 km out into Lake Ontario. The outer section of the peninsula is formed from a limestone island, with the isthmus to the mainland being formed from sand. Two offshore islands, Gull and High Bluff, are located immediately to the southwest of the peninsula, and an extensive cattail and open water marsh is located in the lee of the peninsula. The park is about 937 ha in area, with 427 ha being water and 510 ha being land. Within this area, diverse habitats are present, including large marshes, sand dunes, wide sandy beaches, old fields, a variety of forest types and productive lake areas.

### Birds

Presqu'île Provincial Park is well known for its bird life. During the spring and fall, large numbers of migrants move through the area, and during the late spring and summer, a diverse community of breeding birds is present. In all, a total of 318 bird species have been confirmed within the park, with over 130 species being recorded as breeders (among the highest totals for any area in Ontario).

At least four species are regularly present at this site during spring migration in globally significant numbers (i.e., greater than 1% of their biogeographical population): Brant, Greater Scaup, Dunlin and Whimbrel. In addition, the park supports globally significant breeding populations of two additional species: Ring-billed Gull (possibly 7% of the North American population) and Caspian Tern (about 2.5% of the North American population). Nesting Double-crested Cormorants are also present in nationally significant numbers. Nesting King Rails (nationally endangered) and Least Bitterns (nationally vulnerable) have also been recorded in the park, but detailed surveys to establish their regularity (in the case of King Rail) and estimate their numbers (in the case of Least Bittern) have not been completed. Numbers of Least Bitterns, however, are likely close to being nationally significant. Historically, large numbers of Black Terns have also nested in the marsh, but in recent years their numbers have declined.

Presqu'île is also an important stopover site for migrating landbirds, with a diversity comparable to other concentration sites on the lower Great Lakes. In the past, up to

60,000 swallows regularly roosted in the park in late summer, although more recently numbers have been in the order of 7,000. Large flocks of blackbirds, and occasionally winter finches, have also been reported.

	Season	Number
Double-crested Cormorant	B	4,015 pairs
Brant	SM	2,500 (peak)
Greater Scaup	SM	10,500 (peak)
Dunlin	SM	10,000 (peak)
Whimbrel	SM	1,000 (hist. peak)
Ring-billed Gull	B	69,417 pairs
Caspian Tern	B	466 pairs

### Conservation issues

Although designated a provincial park since 1922, the management of Presqu'île is controversial, due to the high demands placed on this small, ecologically sensitive area. Beach management needs for shorebirds differ from those of recreational beach users; a controlled waterfowl hunt has occurred in the park; intensive browsing by a large population of white-tailed deer and the spread of non-native species are affecting the native flora and fauna; and human disturbance of resting shorebirds and breeding gulls and terns is sometimes a problem. To address these concerns, park staff, along with local naturalist clubs, are working to ensure that the park's ecological values are protected and enhanced, while accommodating the broad range of annual park users.

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## Digges Sound

*Northeastern Hudson Bay, Nunavut*

CANU001G

62°33' N, 77°35' W

0–300 m / 12 km<sup>2</sup>

#### ► Habitats:

Granite cliffs, marine environments.

#### ► Land-use:

Natural.

#### ► Threats:

Disturbance.

#### ► Protection status:

None.

### Site description

Digges Sound is located near the northern tip of the Ungava Peninsula (northeastern Hudson Bay) between Digges Islands and Cape Wolstenhome. The Sound is lined by granite cliffs that range in height up to nearly 200 m on East Digges Island and to a height of over 300 m along the mainland. In all, there are approximately 4 km of cliffs on East Digges Island and nearly 8 km of cliffs along the Quebec shoreline. The rock is mostly granitic schist, which fractures, forming stacks and ledges.

### Birds

Digges Sound is significant for the large numbers of Thick-billed Murres that nest on its cliffs. Colonies are located at both East Digges Island and Cape Wolstenhome. In 1980, the size of the East Digges colony was estimated to be about 180,000 breeding pairs; the Cape Wolstenhome colony was estimated to be somewhat smaller at about 107,000 breeding pairs. The East Digges colonies were revisited in 1990 and again in 1992; there was no evidence of a marked change in population. The total number of Thick-billed Murres nesting along Digges Sound is roughly 287,000 breeding pairs. This represents approximately 2.6% of the global, 4.4% of the North Atlantic, and almost 20% of the eastern Canada Thick-billed Murre population.

In addition to Thick-billed Murres, approximately 860 pairs of Black Guillemots nest on islands in Digges Sound. Approximately 350 pairs of Iceland Gulls (Kumlien's form) are also present in the area. A small number of Atlantic Puffins nest in a colony on Dome Island to the south of West Digges Island.

	Season	Number
Thick-billed Murre	B	287,000 pairs

## Conservation issues

Thick-billed Murres are present at the colony from late April until late August. During this period they raise their young and forage as far as 100 km from the colonies. While nesting, murres are particularly vulnerable to disturbance. Gun shots or the thump of a paddle against the side of a boat will cause a panic departure of adults from the colony. Heavy losses of eggs and chicks can often occur.

Digges Sound was designated as a significant site under the International Biological Programme (IBP). Although there are no special regulatory controls in place for protecting IBP sites, the designation serves to highlight the ecological importance of the area. Digges Sound has also been identified as a Key Habitat Site for migratory birds in Nunavut and a priority for conservation area status. The Canadian Wildlife Service is awaiting the conclusion of the Nunavut Marine Area land claim negotiations before beginning conservation area consultations with the Inuit of Northern Quebec.

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**Prince Edward Point**  
*Picton, Ontario*

CAON003G

43°56' N, 76°53' W

250–280 m / 5.6 km<sup>2</sup>  
(plus adjacent aquatic areas)

► **Habitats:**

Freshwater lake, grassland (abandoned farmland), some forest and wetland.

► **Land-use:**

Conservation, research, bird watching, recreation, fishing access.

► **Threats:**

*Potential* – Succession, human disturbance.

► **Protection status:**

National Wildlife Area

## Site description

Prince Edward Point is located along the north shore of Lake Ontario within southern Ontario. It is a narrow point of land that extends approximately 10 km into the lake. Shoals and areas of deeper water are located off the tip. The point is comprised of shallow soil over limestone bedrock. Much of the habitat consists of old field (savannah) and shrub thickets, with small deciduous and coniferous stands being present. In addition to being important for migrating birds, the site also supports several rare vascular plants, including Ontario aster, downy wood mint, clammyweed, among others. Largely undisturbed sites are important to ensure survival of these plants.

## Birds

In total, some 298 species of birds have been recorded at Prince Edward Point, with about 220 species being recorded during the average year. Most of these species are recorded during migration, although at least 74 species nest within the area. The number and diversity of landbirds that concentrate in this small area during spring and fall migration is outstanding. A total of 162 landbird species (excluding raptors) has been recorded at this site including 36 species of wood warbler, 20 species of sparrow, and 12 species of flycatcher.

Daily censuses during migration indicated that peak numbers of common migrants such as Tree Swallow, Blue Jay, Black-capped Chickadee, Golden-crowned Kinglet, Ruby-crowned Kinglet, Yellow-rumped Warbler, Dark-eyed Junco and White-throated Sparrow were regularly in the range of 200 to 500 individuals. When weather conditions caused particularly large concentrations, numbers of these species were occasionally in excess of 2,000 birds and in some cases as high as 10,000 (Tree Swallow, Yellow-rumped Warbler, White-throated Sparrow) or even 70,000 (Dark-eyed Junco).

The shoals and deep waters off the tip of the peninsula are an important waterfowl staging and wintering area, particularly for diving and sea ducks such as Greater Scaup, Oldsquaw and White-winged Scoter. Numbers of scaup (mostly Greater Scaup) approach 10,000 regularly (greater than 1% of their estimated North American population), with a one-day peak of 39,000 in January 1995. Over the past three years Oldsquaw have also regularly occurred in numbers greater than 1% of their estimated North American population, with one-day

peaks of 37,700 and 37,785 in January of 1996 and 1997. White-winged Scoters also occur in numbers that regularly exceed 5,000, with one day peaks in 1995 and 1996 that exceeded 1% of their estimated North American population (12,500 and 15,000 respectively). Other waterbirds regularly recorded in large numbers include Common Loon, Horned Grebe, Common Goldeneye, Common Merganser and Red-breasted Merganser.

During fall migration, large numbers of raptors, both diurnal and nocturnal, move over the Point. Up to 2,000 hawks a day can regularly be observed, including large numbers of Sharp-shinned, Red-shouldered, and Red-tailed Hawks. Large numbers of Northern Saw-whet Owls also move through the area in the fall.

This site formerly supported nesting Henslow's Sparrows (globally near-threatened, nationally endangered) but nesting by this species has not been reported in recent years.

	Season	Number
Greater Scaup	W	39,000
Oldsquaw	W	37,750
White-winged Scoter	W	15,000
landbird concentrations	SM/FM	
raptors	FM	

## Conservation issues

Bird migration has been monitored at Prince Edward Point from 1975 to 1981 and from 1995 to the present. As a result of these monitoring initiatives, especially during the late 1970s, Prince Edward Point was designated as a National Wildlife Area in 1980, specifically to protect the large numbers and diversity of landbirds which use the area during spring and fall migration. The point was also designated as an International Monarch Butterfly Reserve in 1995.

Much of this area consists of long-abandoned fields that are succeeding into shrub thicket habitats. As a result, various species which formerly bred or foraged in the grasslands are no longer present. This includes the globally near-threatened, nationally endangered Henslow's Sparrow. A plan to manage portions of the habitat for Henslow's Sparrow and other grassland species is currently under consideration.

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## Foxe Basin Islands

*Foxe Basin, Nunavut*

CANU011G

62°57' N, 82°00' W

0 m / 3,000 km<sup>2</sup>

### ► Habitats:

Mudflats, sedge meadows, tundra, tundra ponds, beach ridges.

### ► Land-use:

Natural.

### ► Threats:

None at present.

### ► Protection status:

None.

## Site description

The Foxe Basin Islands site consists of Prince Charles Island, Air Force Island, and Foley Island. These islands are located in the east-central Foxe Basin, immediately south of central Baffin Island. Their coasts have extensive intertidal mud flats, with gently sloping, well-vegetated shorelines. The inland areas, particularly on Prince Charles and Air Force Islands, have low topographic relief and are dotted with small lakes and ponds. A series of beach ridges are also present on the northwest coast of Prince Charles Island. The vegetation on the islands is characterized by rich sedge-grass communities.

## Birds

Globally significant populations of at least nine bird species are present on the Foxe Basin Islands. These species include: Snow Goose (just over 1% of the estimated mid-continent population); Brant (over 15% of the estimated Atlantic (ssp. *hrota*) population); Sabine's Gull (the estimate of 36,053, ± 5,758, is the largest known concentration in the world—the total population for this species is unknown); Semipalmated Sandpiper (approaching 1% of the estimated population), Black-bellied Plover (as much as 14% of the estimated North American population); Lesser Golden Plover (greater than 6% of the estimated world population); Ruddy Turnstone (23% to as much as 76% of the North American estimated population, suggesting that the overall North American population estimate is low), Red Phalarope (as much as 28% of the estimated world population); and White-rumped Sandpiper (the estimate of 126,162 pairs, ± 34,725, is the largest known breeding concentration in the world, and exceeds the previous estimate of 50,000–100,000 birds by 2.5 to 5 times).

The Foxe Basin Islands have been recognized as a significant nesting area for Atlantic Brant since the first detailed surveys of the Prince Charles and Air Force Island coasts were completed in 1979. Subsequent surveys in the early 1980s also documented large numbers of Sabine's Gull. But the magnitude of the nesting shorebird populations was not recognized until detailed remote sensing studies were completed in the late 1980s. Studies to confirm these estimates are currently on-going, with the preliminary results suggesting estimates of the same magnitude for a number of the shorebird species.

In 1996 and 1997, 26 bird species were confirmed as breeders on the islands, with another 16 being present but not confirmed as nesting. Nesting King Eiders, Common Eiders, Oldsquaws, and Herring Gulls were common along the coast and on inland pools.

	Season	Number
Snow Goose (mid-continent population)	B	59,895 (± 10,986)
Brant (Atlantic population)	B	19,809 (± 6,905)
Sabine's Gull	B	36,053 (± 5,758)
Semipalmated Sandpiper	B	9,506 p (± 8,611)
Black-bellied Plover	B	3,531 p (± 5,824)
Lesser Golden Plover	B	1,726 p (± 2,414)
Ruddy Turnstone	B	11,721 p (± 8,989)
Red Phalarope	B	141,599 p (± 21,882)
White-rumped Sandpiper	B	126,162 p (± 34,725)

## Conservation issues

The site is listed as a Key Migratory Bird Habitat Site in Nunavut and is considered by the Canadian Wildlife Service to be a priority for studies to determine whether it merits conservation area status. At this time, there are no conservation issues associated with these islands. Generally, however, nesting and molting birds are sensitive to disturbance. Pollution of surrounding marine areas would be detrimental to local bird populations as well.

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**Cap Tourmente**  
*Saint-Joachim, Quebec*

CAQC002G

47°04' N, 70°48' W

0–370 m / 240 km<sup>2</sup>

### ► **Habitats:**

Tidal marshes, wet meadows.

### ► **Land-use:**

Wildlife conservation/research, tourism, and, adjacent to the site, agriculture.

### ► **Threats:**

*Major* – Oil pollution, disease. *Potential* – Disturbance.

### ► **Protection status:**

National Wildlife Area.

## Site description

Cap Tourmente is located on the north shore of the St. Lawrence River, approximately 55 km downstream from Quebec City. Within the site there are four main habitat types: intertidal marsh, coastal marsh, coastal plain, and a mixed-forest plateau. The Cap Tourmente intertidal marsh, which is especially significant for staging Snow Geese, is part of the vast bulrush marshes that have developed along the north channel of Ile d'Orléans, and Montmagny Islands in the St. Lawrence River. In all, these marshes occupy 2,500 ha and include close to 60% of all the bulrush marshes in Quebec.

The heterogeneous habitats within the Cap Tourmente site support a diverse vascular plant community, with nearly 700 species having been identified. Several of these plant species are rare in both Quebec and Canada. Cap Tourmente is the northernmost recorded site for several of these species.

## Birds

During fall migration, Cap Tourmente hosts practically the entire population of the Greater Snow Goose (ssp. *atlanticus*). A significant proportion also stages here during the spring migration as well. At the turn of the century fewer than 3,000 individuals remained. The population has since expanded: a recent spring survey (1996) estimated a population of about 585,100. At the peak of migration, more than 50,000 Greater Snow Geese can be observed daily on the Cap Tourmente mudflats and marshes. During recent years, the geese have started to expand their staging area. Lake Saint-Pierre and northern Lake Champlain to the southwest have become increasingly significant sites, especially during the spring.

In addition to Greater Snow Geese, thousands of ducks also stop over at Cap Tourmente in the fall. However, none of these species occur in nationally significant numbers. A variety of waterfowl species are also present in the lowlands during the nesting season with some of the more common ones including: American Black Duck, Mallard, Northern Pintail, Blue-winged Teal, Green-winged Teal, American Wigeon, Northern Shoveler and Wood Duck. Numerous land birds are also present, including the nationally endangered *anatum* subspecies of the Peregrine Falcon. In all, more than 250 bird species have been identified at Cap Tourmente.

	Season	Number
Snow Goose (ssp. <i>atlanticus</i> )	SM	>50,000
Snow Goose (ssp. <i>atlanticus</i> )	FM	>50,000

### Conservation issues

Cap Tourmente was acquired by the Canadian Government in 1969 and identified as a National Wildlife Area in 1978. In 1981 it was also recognized as a wetland of international significance under the Ramsar Convention.

Due to the massive concentration of Snow Geese at this site, this species is especially vulnerable to threats such as oil pollution and disease. In addition, given the site's location downstream from the heavily industrialized St. Lawrence River valley, chronic water and air pollution are also a concern.

Approximately 60,000 people visit Cap Tourmente each year to watch the spectacular flocks of migrating geese. Disturbance is minimal, however, due to the inaccessible nature of most of the site. Some hunting and agriculture is permitted under closely monitored systems, but the impacts on the population are minimal.

39	<b>Akpatok Island</b> <i>Ungava Bay, Nunavut</i>	
	CANU007G	60°25' N, 68°08' W
		0 to 300 m / 32 km <sup>2</sup>

► **Habitats:**

Cliffs, tundra.

► **Land-use:**

Natural.

► **Threats:**

*Potential* – Oil pollution, disturbance.

► **Protection status:**

None.

### Site description

Akpatok Island is located approximately 70 km from the mainland of northern Quebec, near the center of Ungava Bay. Steep cliffs rise approximately 250 meters from the sea to a mostly flat-topped plain that is vegetated by sparse upland tundra. The bedrock is mostly limestone of Ordovician origin.

In addition to being important for colonial seabirds, the waters surrounding the island are important for many marine mammals, including walruses and seals. The island is also thought to be an important summer retreat and possible maternity denning area for polar bears.

### Birds

Akpatok Island is identified as an Important Bird Area due to the large numbers of Thick-billed Murres that nest on cliffs. There are two main colonies: one located on the north coast, and the other on the southeast coast. In 1983, the northern colony extended for approximately 14 km along the coast and contained an estimated 173,000 breeding pairs. The southern colony, which was surveyed in 1982, occupied approximately 15 km of coastline and was estimated to contain 120,000 breeding pairs. Both of these estimates are believed to be low, with the total population on Akpatok Island thought to be between 300,000 and 400,000 pairs in 1986 and, more recently, as high as 600,000 pairs. A detailed survey, however, has not been completed recently, though some banding operations have been carried out since the 1983 surveys. Based on these data, Akpatok Island may contain 2.7% to 3.6% (possibly as high as 5.4%) of the global and possibly as much as 9% of the North Atlantic Thick-billed Murre population.

In addition to Thick-billed Murres, approximately 300 to 500 pairs of Black Guillemots breed along the rocky coasts. Numerous Peregrine Falcons (ssp. *tundrius*—nationally vulnerable) and Gyrfalcons are thought to nest on the island as well.

	Season	Number
Thick-billed Murre	B	>600,000 pairs

### Conservation issues

As with most seabird colonies, the murre are particularly susceptible to disturbance while nesting. The isolated location of the colony, however, results in minimal disturbance, although there is some subsistence hunting by Inuit, occasional research on the seabirds, and some tourism. While the murre are foraging at sea, and later during their swim migration to the Grand Banks of Newfoundland, they are especially susceptible to oiling.

Akpatok Island has also been identified as a Key Habitat Site for migratory birds in Nunavut and a priority site for conservation area status. The Canadian Wildlife Service is awaiting the conclusion of the Makivik land claim negotiations for this area before beginning consultations with the Inuit of Northern Quebec to identify protected area status for Akpatok Island. The island has also been designated as a significant site under the International Biological Programme (IBP). Although there are no special regulatory controls in place for protecting IBP sites, the designation serves to highlight the ecological importance of the area.

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## Restigouche River Estuary

*Dalhousie, New Brunswick*

CANB002G

48°05' N, 66°05' W

0 m / 77 km<sup>2</sup>

#### ► Habitats:

Primarily submerged mud flats, with concentrations of mussels and other marine life.

#### ► Land-use:

Some salmon and lobster fishing.

#### ► Threats:

*Major/Local* – Oil and other pollutants. *Potential* – Disturbance, tourism, urban expansion.

#### ► Protection status:

None.

### Site description

The Restigouche River Estuary, which is located on the south side of the Gaspé Peninsula, eventually widens into Chaleur Bay, on the Gulf of St. Lawrence. The boundary between the provinces of New Brunswick and Quebec is located down its middle.

Locally, the site can be identified as the area between McLeod's Siding to the west, the west wharf of Dalhousie to the east, and extending north to the Quebec shoreline. The width of this area varies from four to six km and is approximately 15 km in length.

The river estuary is generally shallow, with an average depth of less than three to four meters. A deeper channel is located down the middle. Much of the substrate on the south side of the estuary is comprised of submerged mud flats that have concentrations of mussels and other marine life. The water is of sufficient salinity to support a diversity of marine life.

### Birds

The Restigouche River Estuary is identified as an Important Bird Area primarily due to the number of Black Scoters that stage there during spring migration. During the last few years over 11,000 Black Scoters have been observed at the site between mid-to-late April and the end of May. It has been reported that the birds arrive within 24 hours of ice-out and consistent numbers remain until the end of May (i.e., there is no gradual buildup or decline). This number of birds represents between 3% and 14% of the eastern North American population (the status and size of the population is poorly known).

In addition to Black Scoters, the estuary is also used as a staging area by Surf Scoters, Red-breasted Mergansers and (to a lesser degree) Common Mergansers. During the breeding season, at least five pairs of Ospreys make use of the estuary. Common Eiders also use the site as a feeding area.

	Season	Number
Black Scoters	SM	11,000+

### Conservation issues

The port of Dalhousie regularly handles oil, mining concentrates, chemical products from the local chemical plant, and large shipments of paper products. The paper mill currently discharges little or no pollution directly into the water.

No conservation measures are currently in progress.

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## Bon Portage Island

*Shag Harbour, Nova Scotia*

CANS015G

43°28' N, 65°45' W

0–10 m / 2.5 km<sup>2</sup>

► **Habitats:**

Coniferous forest, inlets and coastal features.

► **Land-use:**

*Primary* – Wildlife conservation/research. *Secondary* – Some fishing and hunting.

► **Threats:**

*Potential* – Recreational development/overuse.

► **Protection status:**

Owned and managed as a research station by Acadia University.

### Site description

Bon Portage Island is located about 3 km off the southwest coast of Nova Scotia, near Cape Sable. It is a low island, being comprised of two drumlins that are connected by a gravel and marsh isthmus. The vegetation is characterized by open coastal areas, with inland areas of coniferous forest (spruce and fir), and small areas of freshwater marsh. The climate is maritime, with much fog and high humidity. There is little snow in the winter, and the tide ranges from three to four meters.

### Birds

Bon Portage Island supports the largest known Leach's Storm-Petrel colony in the Maritimes (few others have been studied seriously). During the late 1980s, a breeding population of over 50,000 pairs was estimated. This is greater than 1% of the estimated western Atlantic population.

Of additional ornithological interest is the presence of a mixed species heronry. Great Blue Herons are the most abundant and about 10 pairs of nesting Black-crowned Night-Herons have also been recorded. Since the late 1980s, Snowy Egrets have been present during the breeding season, but nesting has yet to be confirmed. The only other place Snowy Egrets have bred in Canada is in Southern Ontario.

Since the fall of 1995, a migration monitoring station has been operated on Bon Portage Island as part of the Atlantic Bird Observatory (a second station is operated on nearby Seal Island, which is located about 15 km to the west). Migration monitoring occurs during both the spring and fall with about 2,500 birds of 75 species banded every year.

	Season	Number
Leach's Storm-Petrel	B	50,000 pairs

## Conservation issues

The former lighthouse-keepers (the Richardsons) were keen naturalists and helped in the transfer of the island to Acadia University for use as a research station. Currently, the seasonal presence of research staff and students results in controlled visitation. Ecotourism/birding is encouraged, and regulated, but more restrictions may be required in the future. While the majority of this site is owned by Acadia University, a small parcel of land is owned by the coast guard, and the marine and intertidal areas are overseen by the federal Fisheries and Oceans Department.

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## Tabusintac Lagoon and River Estuary

*Tabusintac, New Brunswick*

CANB001G

47°20' N, 64°56' W

0–8 m / 43.8 km<sup>2</sup>

► **Habitats:**

Marine shores and beaches, estuarine and intertidal flats, intertidal marshes, freshwater lagoons and marshes, coastal boreal forest and coastal bogs.

► **Land-use:**

Natural area, wildlife observation, hunting, clam digging, some overnight camping.

► **Threats:**

*Major* – Human disturbance (tourism development, squatters, clam diggers, picnickers).

► **Protection status:**

Ramsar site. The Black Lands provincial ecological reserve covers part of the site. Part of the Tabusintac River estuary is closed to migratory bird hunting.

## Site description

The Tabusintac lagoon and River Estuary is located on the Acadian Peninsula (NE New Brunswick), approximately 50 km northeast of Chatham, New Brunswick. The 4,382 ha site contains a variety of habitats, including estuarine flats, salt marsh, sand dunes and beaches, saline ponds, inshore islands and shoreline black spruce–jack pine forests. The inner bay is protected from the sea by a 15 km-long barrier beach and dune system. Within this protected area, extensive eelgrass beds are found which contribute to the overall productivity of the system, especially for waterfowl. It is typical of other beaches in the region, with the dominant plant species being marram grass, beach pea and sea rocket.

## Birds

The Tabusintac beach system is an important breeding site for the globally vulnerable and nationally endangered Piping Plover. In 1996, 5 pairs were found nesting, along with 2 additional birds. This represented almost 3% of the 1996 Canadian Maritimes population and is thus of national significance. Six pairs were present in 1997. The site has a long history of Piping Plover usage, with the average number of individual plovers over the last ten years being 14.5.

In addition to Piping Plovers, the Tabusintac beach system is also extremely important for Common Terns. It supports the second largest colony of Common Terns in Atlantic Canada. In 1992, 3,700 pairs were recorded, and in recent years the population has increased (a recent estimate has not been completed). The 1992 estimate indicates the Common Tern population at the site to be approximately 7.4% of the North American population, thus of global significance.

The area also has high levels of waterfowl use during spring and fall migration, with flocks in excess of 1,000 individuals being present regularly. Waterfowl species often occurring at the site include American Black Duck, Canada Goose, teal, scaup, and Red-breasted Merganser.

A large Great Blue Heron colony is located in the Covedell Peninsula area, and numerous Osprey nests are in the uplands of the Tabusintac Black Lands. Populations of both these species may have declined somewhat in recent years.

	Season	Number
Piping Plover	B	12
Common Tern	B	3,700 pairs

### Conservation issues

Land stewardship is one of the most significant conservation issues within the site. A large portion of the barrier beach remains undeveloped, resulting in problems with squatters. Small areas are provincial Crown land, but the remaining area is owned privately by several landowners. The provincial government has initiated a land stewardship program to help increase ecological awareness in the area.

The entire Tabusintac Lagoon and River Estuary was designated as a Ramsar site in 1993. This has assisted in highlighting the ecological significance of the site. Currently, several initiatives are underway to increase the amount of protected land. Within the complex, approximately 124 ha of the Black Lands (a large wetland) have been designated as a provincial ecological reserve. Over the past few years, the Nature Conservancy of Canada has purchased 5 properties, totaling over 200 ha. In addition, a specific area within the Tabusintac River estuary is closed to migratory bird hunting.

The Tabusintac sandspit has been identified as a core Piping Plover nesting site in the *New Brunswick Atlas of Piping Plover Beaches*. Current management/conservation activities in the area include: stewardship agreements with private landowners, fencing to close off sensitive areas, and Piping Plover nest monitoring (to determine reasons for poor productivity). Throughout the Maritimes, a Piping Plover Guardian Program has been developed to assist in the conservation and recovery of the species.

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## Kouchibouguac National Park Sand Spits and Barrier Islands

*Kouchibouguac, New Brunswick*

CANB003G

46°46' N, 64°52' W

0–10 m / approx. 7 km<sup>2</sup>

#### ► Habitats:

Sand islands within an extensive barrier beach / dune system.

#### ► Land-use:

Natural.

#### ► Threats:

*Major* – Predation from gulls, disturbance, high water levels.

#### ► Protection status:

Kouchibouguac National Park.

### Site description

The Kouchibouguac National Park Sand Spits and Barrier Islands are located on the east coast of New Brunswick adjacent to the Northumberland Strait. The site includes the entire barrier beach and sand island area. Locally, these islands and dunes are known as: North Island, North Kouchibouguac dune, North Richibucto dune, Pointe Sapin dune, Portage River dune, South Kouchibouguac dune, and Tern Islands. Much of the area is low and flat, with the dominant vegetation being beach grass and strand wheat. Every few years, storms wash over the islands and beaches, removing all debris and vegetation. This is an important natural process, in that it sets back succession and favors the long-term use of the islands, beaches, and dunes by terns and plovers.

### Birds

The sand spits and barrier islands of Kouchibouguac National Park are especially important as breeding sites for Common Terns and Piping Plovers. Piping Plovers have been identified as both globally vulnerable and nationally endangered.

The main colony of nesting Common Terns (Tern Island) has been inventoried yearly since 1989 and sporadically between 1971 and 1989. Numbers of tern nests have varied from a few thousand in 1971 to a peak of 7,000 nests in 1991. In 1996, 4,292 nests were counted. It has consistently been the largest tern colony in the Maritimes, containing approximately 35% to 40% of the Maritimes' Common Tern population. Not only are the islands significant at the regional level, but also at the global level with, on average, about 14.5% of the North American Common Tern breeding population being present.

Piping Plovers also breed throughout the sand spit and barrier island area. Over the last five years (1992 to 1997), populations have varied from a low of nine pairs (1994) to a high of 17 pairs (1993). On average, over 12 pairs have been present. In this respect, Kouchibouguac supports as much as 6% of the Atlantic Canada Piping Plover population and about 1% of the Atlantic coastal Piping Plover population. During recent years, the North and South Kouchibouguac dunes have supported the majority of the Piping Plover territories.

The beach and barrier island system, however, is naturally dynamic, and habitats are occasionally changed as a result of storms. When this happens other beaches in the system may become more important as nesting areas.

Other nesting species include Red-breasted Mergansers and Ring-billed, Herring and Great Black-backed gulls.

	Season	Number
Common Tern	B	10,000–15,000
Piping Plover	B	12 pairs

### Conservation issues

By virtue of their location within Kouchibouguac National Park, the sand spits and barrier islands are relatively well protected. One of the major concerns, however, is the amount of predation on both terns and plovers as a result of the increasing gull numbers throughout the general area (mostly Herring and Great Black-backed Gulls, although numbers of Ring-billed Gulls are also increasing). In 1988, gulls were observed nesting on the Tern Islands for the first time, and have increased in number since then. Recently, a nearby waste disposal facility (St. Ignace) was closed, which, over the longterm, may help to reduce numbers of gulls overwintering in the local area. Fish offal from fish plants in the region and leftovers from the winter smelt fishery, however, are contributing to the overwintering of gulls in the park area. Parks Canada is currently conducting a gull control program in collaboration with the Canadian Wildlife Service.

Other major concerns include control of visitor access to the Piping Plover and Common Tern nesting areas during the sensitive nesting periods. Most of the more significant locations are posted as areas closed to visitors during the nesting season. High water levels can also reduce the productivity of both the terns and the plovers; however, there is little that can be done to reduce this threat.

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## Ile Bonaventure

*Percé, Quebec*

CAQC001G

48°30' N, 64°15' W

0–135 m / 4.16 km<sup>2</sup>

#### ► Habitats:

Coastal rocky cliffs, some with arctic/alpine vegetation, coniferous forest.

#### ► Land-use:

Tourism/recreation, conservation.

#### ► Threats:

*Potential* – Oil pollution, excessive disturbance of birds by tourists.

#### ► Protection status:

Provincial Park—Parc de L'Île-Bonaventure-et-du-Rocher-Percé.

### Site description

Bonaventure Island is located on the Gulf of St. Lawrence, approximately 3.5 km from the shore of the Gaspé Peninsula. The 416 ha island is roughly circular in shape, with cliffs on the southeastern and northeastern shores rising to a height of approximately 75 m. The island lies within the Atlantic Highlands biome, with balsam fir and spruce being dominant species. The cliffs and shorelines are generally devoid of vegetation, with the exception of some arctic/alpine species that are able to withstand the harsh microclimate. Thus far, 572 vascular plant species have been recorded on the island, including eight that are rare in the province of Quebec and five that are provincially vulnerable or threatened.

### Birds

Bonaventure Island is renowned for its Northern Gannet colony. In 1994, over 32,000 breeding pairs were observed, making it the largest colony in North America. Using population estimates from the late 1980s, there may be as much as 9% of the global population and approximately 50% of the North American population present at Bonaventure Island during the breeding season.

In addition to Northern Gannets, equally impressive numbers of Black-legged Kittiwakes and Common Murres also nest on the cliffs. In 1989, over 23,000 pairs of Black-legged Kittiwakes were recorded, representing as much as 9 to 12% of the western Atlantic population. In the same year, almost 28,000 pairs of Common Murres were recorded. This represents approximately 5% of the eastern North American Common Murre population. The island is clearly of global significance for nesting colonial seabirds.

Other seabird species nesting on the island include Double-crested Cormorant, Great Black-backed Gull, Herring Gull, Black Guillemot, Razorbill, Atlantic Puffin, and Leach's Storm-Petrel. In all, ten different seabird species nest on the island. During the summer and early fall, Harlequin Ducks from the eastern population (nationally endangered) concentrate around both the island and Percé Rock. Numbers observed have been as high as 118 individuals (early September 1989).

In addition to seabirds, the island supports a typical community of boreal forest birds (i.e., Blackpoll Warbler, Boreal Chickadee, etc.) and other habitat generalists in the abandoned fields. As of 1985, 218 bird species had been observed within the park.

	Season	Number
Northern Gannet	B	32,000 pairs
Black-legged Kittiwake	B	23,650 pairs
Common Murre	B	27,857 pairs
Harlequin Duck	S	50–100

### Conservation issues

Bonaventure Island was permanently settled from 1787 to 1963. Over this period, much of the island was cleared for agriculture, and during the 19th century the seabird colonies were heavily exploited for food and other uses. At the turn of the century declining numbers of seabirds became an increasing concern and resulted in the government declaring the eastern and northern cliffs a federal migratory bird sanctuary (1919).

A few summer residents remained after this date until the Quebec Government purchased the island in 1971. The provincial park (Parc de L'Ile-Bonaventure-et-du-Rocher-Percé) was declared in 1985. As a “conservation park”, the conservation of ecological features is of prime importance. Currently the park has 15 km of hiking trails, conservation zones where access is controlled, and an “intense conservation zone” which prohibits direct access to some seabird colonies.

The park is a popular tourist destination, with the seabirds being the main attraction. Approximately 60,000 people visit the island each year. Fences, observation platforms, and programs to increase public awareness are used to minimize disturbance to the birds.

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## Cape Searle

*Baffin Island, Nunavut*

CANU003G

67°14' N, 62°28' W

0–450 m / 2 km<sup>2</sup>

► **Habitats:**

Cliffs.

► **Land-use:**

Natural.

► **Threats:**

*Potential* – Oil pollution, disturbance.

► **Protection status:**

None.

### Site description

Cape Searle is located on the northeastern tip of a small island (Qaqaqut) along the east coast of Baffin Island. The cape is comprised of two huge outcrops that rise to over 430 m above the sea. The cliffs are rugged, with numerous jagged pinnacles and crevices; flatter sections are covered with tundra vegetation. Harp seals and walruses frequent the area, with polar bears occasionally being present. The bears likely use the seaward tips of the peninsulas for maternity dens.

### Birds

The two rock towers of Cape Searle support what may be the largest Northern Fulmar colony in Canada. In the early 1970s approximately 100,000 pairs of nesting fulmars were estimated. This may represent as much as 2.5% of the global population and as much as 27% of the Canadian population. A census of the colony has not been conducted since 1973, and an update is needed. Glaucous Gulls and Black Guillemots are also reported to nest in the area in small numbers.

	Season	Number
Northern Fulmar	B	100,000 pairs

### Conservation issues

Fulmars arrive at the Cape Searle colonies by mid-April and leave by early October. While there, they forage within an 80 km radius of the site. The birds nest at all heights on the cliffs, with the greatest density occurring near the top. Nests are also located on grassy flat areas of the summit.

Like other seabirds, nesting fulmars are sensitive to disturbance at the colony and to pollution of their feeding area. Due to the isolated location of the colony, human disturbance is minimal, but local people visit the colony and cruise ship tourism along the Baffin Island coast is increasing. Potential pollution of feeding areas is also a concern (especially oil

pollution). The Davis Strait has the potential to become a marine shipping route and an area of oil exploration and development.

Cape Searle has been identified as a significant site under the International Biological Program (IBP), and is recognized as a Key Terrestrial Bird Habitat Site by the Canadian Wildlife Service. A proposal to designate Cape Searle as a Bird Sanctuary was put forth by the CWS in the mid-1970s. Consultations have been held over the years with the nearby community of Broughton Island, but they have not indicated clear support for the Bird Sanctuary designation. The proposal is presently on hold. The site is located on private land owned by the Inuit of Nunavut.

46	<b>Gannet Islands</b> <i>Grady Harbour, Labrador</i>	
	CALB001G	53°42' N, 56°12' W
		0–58 m / 2 km <sup>2</sup>

► **Habitats:**

Rocky shores, dwarf heath scrub, tundra.

► **Land-use:**

Wildlife conservation.

► **Threats:**

*Potential* – Oil pollution.

► **Protection status:**

Provincial ecological reserve.

### Site description

The Gannet Islands are a remote group of seven islands at the mouth of Sandwich Bay. The nearest point on the mainland is Grady, approximately 17 km away. Six of the islands, the Gannet Clusters, are located in close proximity to one another. The seventh island, Outer Gannet, is located approximately 7 km to the north. All of the islands are low lying and rocky. The vegetation is dominated by dwarf heath scrub, with sedges and grasses characteristic of the tundra also present.

### Birds

The site hosts significant breeding populations of Razorbills, Atlantic Puffins, and Common Murres. The largest Razorbill colony in eastern North America occurs here, with approximately 5,400 pairs being present (over 31% of the eastern North America population). Large populations of Atlantic Puffins (50,000 pairs—approximately 13% of the eastern North America population) and Common Murre (63,000 pairs—approximately 11% of the eastern North America population) are also present. There is some evidence that the populations of both Common and Thick-billed Murres have increased at the Gannet Islands. In the early 1950s, 11,650 pairs of Common Murres and 315 pairs of Thick-billed Murres were recorded.

Other seabird species breeding on the islands include Black Guillemot, Northern Fulmar, Black-legged Kittiwake, Great Black-backed Gull and Leach's Storm-Petrel. Northern Gannets, ironically, do not breed on Gannet Island; the islands were named after a British Admiralty survey ship, the HMS Gannet.

The Gannet Islands support breeding populations of all the auk species occurring in eastern Canada, including the most southerly colony of a substantial number of Thick-billed Murres (964 pairs on the Gannet Clusters, and 441 pairs on Outer Gannet Island). Large flocks of molting Harlequin Ducks (70 to 150) from the eastern population (nationally endangered) are also present around the islands in summer.

	Season	Number
Razorbill	B	5,400 pairs
Common Murre	B	63,000 pairs
Atlantic Puffin	B	50,000 pairs
Harlequin Duck	S	70–150

### Conservation issues

The islands are protected as a provincial ecological reserve. Although disturbance and potential oil pollution are concerns with most seabird colonies, the remoteness of these islands makes this threat minimal.

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### Cape St. Mary's *Point Lance, Newfoundland*

CANF001G

46°50' N, 54°12' W

0–130 m / 27.06 km<sup>2</sup>  
(including adjacent marine areas)

#### ► Habitats:

Mainland cliffs, grassy barrens (on cliff top).

#### ► Land-use:

Ecotourism, wildlife research.

#### ► Threats:

Oil pollution, depletion of forage fish stocks, gill-net mortality, human disturbance.

#### ► Protection status:

Provincial Ecological Reserve.

### Site description

Cape St. Mary's is located on the southwestern tip of the Avalon Peninsula at the entrance to Placentia Bay. The cliffs along the mainland rise to approximately 130 m above sea level, with grassy barrens being present on top. An isolated sea stack (Bird Rock) is located offshore. Colonial seabirds nest along approximately 4 km of mainland cliff and on the isolated stack.

### Birds

Cape St. Mary's supports a large colony of breeding seabirds. In all, over 30,000 breeding pairs are present. Common Murres and Black-legged Kittiwakes are the most abundant, with their populations being conservatively estimated at approximately 10,000 pairs each in the late 1980s. This represents approximately 2% of the eastern North America population of Common Murres and 4 to 5% of the western Atlantic breeding population of Black-legged Kittiwakes. A large population of Northern Gannets is also present, with breeding populations being estimated at 5,485 pairs in the late 1980s. This represents approximately 2% of the global population and as much as 12% of the North American population. Other seabirds nesting at Cape St. Mary's include Thick-billed Murres, Razorbills, Black Guillemots, Herring Gulls, Great Black-backed Gulls, and Great and Double-crested Cormorants.

The Cape St. Mary's area also supports large numbers of migrant seaducks (Oldsquaw, scoters, eiders), including large numbers of the eastern population of Harlequin Ducks (nationally endangered). About 30 to 40 Harlequin Ducks are reported in some years. This may be greater than 1% of the eastern North America population.

	Season	Number
Northern Gannet	B	6,000 pairs
Common Murre	B	10,000 pairs
Black-legged Kittiwake	B	10,000 pairs
Harlequin Duck	FM/W	30–40

### Conservation issues

In 1983, Cape St. Mary's was established as a Provincial Ecological Reserve under the *Wilderness and Ecological Reserves Act*. The reserve is a popular tourist attraction and draws many tens of thousands of visitors each summer. During the summer months, the reserve is staffed by provincial naturalists.

Historically, gannet populations were severely reduced by direct human predation and more recently by the accumulation of toxic chemicals. Oil pollution, both chronic and catastrophic is also a concern, especially considering the colonies' location near a major shipping route from the Hibernia oilfields to refineries and oil storage facilities in Placentia Bay. There is also a high level of shipping traffic in the area, especially in winter.

A number of seabird studies and surveys have been conducted by researchers from Memorial University of Newfoundland and the Canadian Wildlife Service.

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### Funk Island

*Valleyfield, Newfoundland*

CANF004G

49°45' N, 53°11' W

0–14 m / 80 km<sup>2</sup>  
(including adjacent marine area)

#### ► Habitats:

Low rocky shores and coastal cliffs.

#### ► Land-use:

Wildlife conservation.

#### ► Threats:

*Potential* – Depletion of forage fish stocks, oil pollution, human disturbance, gill-net mortality.

#### ► Protection status:

Provincial ecological reserve.

### Site description

Funk Island is located approximately 60 km northeast of Cape Freels, off the northeastern coast of Newfoundland. The granitic island is generally flat, although there are some low cliffs and boulder-strewn areas. The island is characterized mostly by bare rock, which is washed over by the sea in the fall and winter. One small area supports grassy turf, lichens and mosses. This meadow has grown up on soil formed by the rotting carcasses of Great Auks, which were exterminated at the beginning of the 19th century. Around the island, the cold productive waters of the Labrador Current support an abundance of zooplankton and fishes.

### Birds

Funk Island supports a globally significant population of Common Murre during the breeding season. The breeding colony, whose size has been estimated at 396,000 breeding pairs, is the largest in Canada. Approximately 4% of the global population and as much as 67% of the eastern North American population is present. The island also supports large numbers of breeding Northern Gannets. Approximately 6,000 breeding pairs have been estimated, representing over 2% of the global population and almost 14% of the North American population.

Large breeding populations of both these species have been consistently recorded at Funk Island since formal surveys were initiated in the early 1950s. Several other species of seabirds breed on the island, including the Atlantic Puffin, Razorbill, Northern Fulmar, Herring Gull, Great Black-backed Gull, Black-legged Kittiwake, and the largest, southernmost colony of Thick-billed Murres (~300 pairs).

	Season	Number
Common Murre	B	396,000 pairs
Northern Gannet	B	6,000 pairs

## Conservation issues

Historically, Funk Island supported a breeding population of Great Auk. This species was hunted to extinction in the early 1800s. After a long history of exploitation, Funk Island is now a provincial ecological reserve. Although the island is protected from all unauthorized human activity, unauthorized visits are still made to the island fairly commonly.

The Common Murre colony is highly sensitive to disturbance during the breeding season (approximately 15 May to 1 August). Murres are also sensitive to the health of fish stocks, particularly capelin, which are their most important food during the breeding season. The fishing and diving habits of these birds make them particularly vulnerable to oil pollution and to gill-net mortality.

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## Witless Bay Islands

*Mobile, Newfoundland*

CANF002G

47°15' N, 52°47' W

0–86 m / 29.36 km<sup>2</sup>  
(including marine area)

► **Habitats:**

Coniferous forest, grassy slopes, low cliffs, areas of bare rock and bare soil.

► **Land-use:**

Seabird research, eco-tourism.

► **Threats:**

Human disturbance, gill-net mortality, oil pollution, depletion of forage fish stocks.

► **Protection status:**

Gull Island, Green Island, Great Island and Pee Pee Island are part of the Witless Bay Seabird Sanctuary Ecological Reserve.

## Site description

The Witless Bay Islands are located 4 km off the east coast of the Avalon Peninsula, approximately 35 km south of St. John's, Newfoundland. The site consists of four small islands: Green, Great, Gull, and Pee Pee. All are rocky, with low cliffs and steep, grassy slopes. The two larger islands, Great and Gull, also support coniferous forest communities.

## Birds

The Witless Bay islands support a globally significant colony of breeding seabirds. Great Island, in particular, supports the largest colony of Atlantic Puffins in eastern North America. A breeding population of more than 216,000 breeding pairs (some on Gull Island as well) was estimated in 1994. This represents approximately 3.6% of the global population and possibly as much as 57% of the eastern North America population.

Also present on the Witless Bay islands are impressive numbers of Leach's Storm-Petrels, Common Murres, Black-legged Kittiwakes and Herring Gulls. Nearly 780,000 pairs of Leach's Storm-Petrels have been recorded in the area (the majority breeding on Great and Gull Islands). This estimate represents approximately 9.5% of the global and 16% of the western Atlantic population. Approximately 77,500 pairs of Common Murres have also been reported (almost 2% of the Atlantic and over 13% of the eastern North American breeding population). Black-legged Kittiwakes also breed on the islands. Approximately 43,500 pairs have been estimated, which represents as much as 16 to 22% of the western Atlantic breeding population.

Approximately 7,000 pairs of Herring Gulls (approximately 5% of the eastern North America population) have also been recorded. Other species of seabirds nesting on these islands include Great Black-backed Gull, Black Guillemot, Thick-billed Murre, Razorbill, and Northern Fulmar. The marine areas surrounding the islands are also important for migrating sea ducks, such as White-winged and Surf Scoters, Oldsquaw, and Common Eider.

	Season	Number
Atlantic Puffin	B	216,000 pairs
Leach's Storm-Petrel	B	780,000 pairs
Common Murre	B	77,500 pairs
Black-legged Kittiwake	B	43,500 pairs
Herring Gull	B	7,000 pairs

### Conservation issues

The Witless Bay Seabird Sanctuary Ecological Reserve, which includes Gull, Green, Great and Pee Pee Islands, was established in December, 1983, under the *Wilderness and Ecological Reserves Act*. As a result, the islands are shielded from most direct threats. There is, however, increasing concern about the levels of ecotourism. During the peak of the season, as many as 10 to 15 tour boats per day visit the area. The auks, in particular, appear to be sensitive to the disturbance.

The colony is a base for a series of long-term ecological studies of seabirds, sponsored by the Canadian Wildlife Service and Memorial University of Newfoundland.

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**Baccalieu Island**  
*Red Head Cove, Newfoundland*

CANF003G

48°07' N, 52°48' W

0 -137 m / 22.56 km<sup>2</sup>  
(including adjacent marine area)

► **Habitats:**

Coastal cliffs, tundra.

► **Land-use:**

Wildlife conservation and research; ecotourism.

► **Threats:**

Oil pollution, disturbance, hunting, gill nets.

► **Protection status:**

Provincial ecological reserve.

### Site description

Baccalieu Island is located 5.5 km off the northern tip of the Avalon peninsula, Newfoundland. It is characterized by rugged topography, with cliffs rising over 100 meters from sea level, to a maximum elevation of 137 meters. The vegetation community is dominated by heath, with large areas of grassy turf and patches of old growth black spruce and balsam fir.

### Birds

Baccalieu Island hosts a globally significant breeding population of Leach's Storm-Petrel. Approximately 3.4 million breeding pairs have been estimated, which represents approximately 40% of the global population and about 70% of the western Atlantic population of this species. Baccalieu Island supports the largest Leach's Storm Petrel colony in Canada, the largest known colony in the world.

The island also supports continentally and globally significant populations of Atlantic Puffin (45,000 pairs—approximately 12% of the eastern North America population); Black-legged Kittiwake (~13,000—approximately 5 to 7% of the western Atlantic breeding population); and Northern Gannet (677 pairs—approximately 1.5% of the North American population). The island has the greatest abundance and species diversity of seabirds in eastern North America.

Other seabirds nesting on the island include Common Murre, Thick-billed Murre, Razorbill, Black Guillemot, Northern Fulmar, Herring Gull and Great Black-backed Gull.

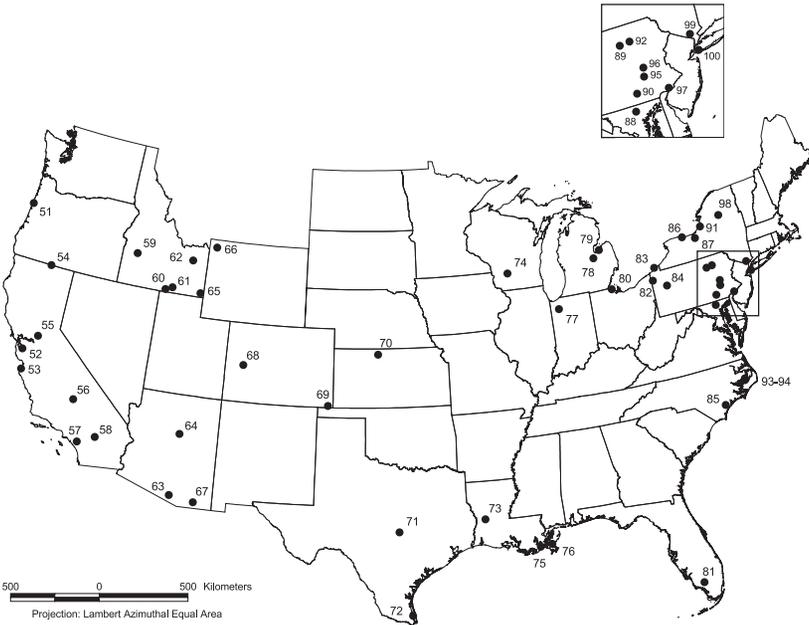
North American Important Bird Areas

	Season	Number
Leach's Storm-Petrel	B	3,360,000 pairs
Atlantic Puffin	B	45,000 pairs
Black-legged Kittiwake	B	12,975 pairs
Northern Gannet	B	677 pairs

**Conservation issues**

The island has historically been the site of an intensive seabird hunt. It is now an official ecological reserve. However, chronic oil pollution is still a concern, and levels of disturbance are difficult to manage.

# United States



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## Introduction to the US Sites

*Fred Baumgarten*  
*National Audubon Society*

*Jeff Price*  
*American Bird Conservancy*

In the US, the IBA program is a cooperative effort between the American Bird Conservancy (ABC) and the National Audubon Society (NAS); ABC has concentrated on sites throughout the entire country meeting the global, North American and national criteria whereas NAS has taken a state-by-state approach, in the process identifying not only sites of global and North American but of national and state importance.

As of 1998, the network of IBAs has grown to more than 1,600 sites—including all sites identified by the American Bird Conservancy’s US IBA Program and those identified through NAS’s state-based programs, which began as a pilot project in Pennsylvania and now number close to twenty. In this publication, 25 of the US sites presented were identified through NAS’s state-based IBA Programs, while the other 25 were identified through ABC’s program. Some of the sites within each group are the result of a joint project of the National Audubon Society, American Bird Conservancy, and Bureau of Land Management (BLM), conducted in 1996, to name ten IBAs on BLM public lands for the agency’s 50th Anniversary.

The state IBA Programs serve as particularly good vehicles for conservation, since the greatest opportunities to have a measurable and long-lasting impact on saving habitats exist at the state and local levels. In the current US political climate—and for the foreseeable future—conservation will only take place through the cooperation of the public and private sectors, working in local partnerships. Thus, state IBA Programs have been designed to facilitate the greatest possible cooperation and participation by state and local organizations, volunteers, and government agencies.

State IBA Programs use the same overall methodology employed at national, continental, and global levels, with a few important distinctions. Each state has designated a technical committee to set criteria at the state level, review nominated sites, and approve a state list of Important Bird Areas. The technical committee is composed of top ornithologists from around the state, helping to ensure the scientific accuracy, completeness, and credibility of each state program. State IBA criteria follow the same overall format of those used at the national, continental, and global levels, with some variation to account for regional differences in avifauna. Most important, numerical thresholds for state IBAs have been set at lower levels than those for national, North American, and global sites. Nevertheless, the state criteria have been made to be as consistent as possible with those used by BirdLife International and its partners.

Nominations for state IBAs have been elicited from local volunteers, private landowners, public land managers, birders, and others. National Audubon has an extensive network of local chapters and a membership of over 500,000 people, many of whom are birders. This provides an important source of motivated volunteers with a natural interest in the IBA Program. The state technical committees and paid IBA coordinators have helped to supplement the data provided by volunteers and to ensure their accuracy.

Some states have also formed IBA conservation committees composed of representatives from a broad array of government agencies, state and national NGOs, local land trusts, and other groups. These committees have had a pivotal role in defining and furthering the conservation objectives of the IBA Program, both for specific sites and for each state’s IBA network as a whole.

Launching programs and completing state IBA inventories requires a substantial investment of time, energy, and resources and the process is a lengthy one. The National Audubon Society's goal is to have all states underway by the end of 2000. Because Pennsylvania, New York, and Idaho were the first three states to complete statewide IBA inventories, a majority of the 25 sites listed here generated from state programs are from those three states. Additional sites have been selected from the California IBA Program and the special BLM project mentioned previously.

### Key Results

The 50 US sites described here are found in 19 states; 33 are significant at the global level, 4 at the North American, 5 at the national and 8 at the state. They illustrate a variety of criteria which qualify them as IBAs, while demonstrating the importance of federal lands in the IBA network.

Among the sites documented through ABC's program are Yellowstone National Park, a congregation point for waterfowl and a representative avian community for its biome, and the Balcones National Wildlife Refuge, where up to 17% of the world's population of the endangered Golden-cheeked Warbler breeds. Several refuges noted for large concentrations of migrating and/or wintering waterfowl are included; among them are the Upper Mississippi/Trempealeau National Wildlife Refuge, in which up to 22% of the world's population of Canvasback congregate, and the Don Edwards San Francisco Bay National Wildlife Refuge, where globally significant numbers of at least 8 species of shorebirds are found during migration. State lands also play an important role in the network; Jasper-Pulaski Fish and Wildlife Area, owned by the State of Indiana, is a stopover point for nearly one quarter of the world's population of Greater Sandhill Crane.

Ten sites of the 73 identified for Pennsylvania through NAS's state program are presented in this directory, representing the considerable diversity of habitats found there, as well as illustrating the state's key geographical position on the Atlantic Flyway. For example, Hawk Mountain/Kittatinny Ridge attains global ranking as a migratory corridor for raptors, with ten-year averages running over 20,000 birds of 18 species during fall raptor counts—including more than 20% of the Sharp-shinned Hawk population, 3% of Cooper's Hawk, 2% of Osprey, and 1% of Red-tailed Hawk, Northern Goshawk, and Red-shouldered Hawk. Blue Marsh Lake is a globally important migratory staging area in spring for Common Merganser, with numbers peaking at 5,000, and Pymatuning Lake hosts up to 2% of the population of Common Goldeneye.

Pennsylvania also has some of the most extensive remaining forests in the northeastern US, including high-quality patches of old growth. Two of the sites are included here, Tionesta Natural Scenic and Research Area and Wyoming State Forest, contain excellent examples of these forests. Although quantifying the birdlife in these areas is difficult, they are undoubtedly breeding reservoirs for many neotropical species. For instance, breeding density of Blackburnian Warbler in Tionesta has been documented as 40 times greater than in the surrounding forest.

Of the 127 sites identified as IBAs through NAS's program in New York, six are included here; among them are Braddock Bay and Derby Hill Bird Observatory, representing two globally significant IBAs along the Lake Ontario shore which annually record some of the highest spring hawk counts in the world (over 100,000 individuals regularly at Braddock Bay). Derby Hill's numbers include more than 1% of the world population of Broad-winged Hawk and more than 2% of Red-tailed Hawk. Doodletown Road contains significant breeding populations of state-listed species of concern such as Cerulean and Golden-winged warblers and Least Bittern.

### Conservation Issues and Actions

A presentation of the US sites would be incomplete without some discussion of the threats which face them. If nothing is done to address conservation issues—that is the threats—at the sites, the program will have failed. The 50 US sites presented here are predominantly publicly owned and managed, either by the federal, state or municipal government—yet it is a mistake to think that public lands (e.g., National Wildlife Refuges and National Parks) truly protect all the bird species found there. Those who nominated these sites (usually the land managers or one of their staff) are well aware of this fact; they identified a considerable number of conservation issues—that is, threats to the integrity of their sites—that diminish the effectiveness of protection provided to birds on these lands.

In the nomination form, the nominators were given a checklist of issues and asked to rank them as either critical, major, local or potential. Where provided, the site descriptions incorporate the degree of severity assigned by the nominator to each threat at the site. Critical issues are those affecting more than 50% of the land area of the site; major issues, 10%–50% and local issues less than 10%. Potential issues are those currently not having an impact but expected to do so in the near future. Efforts must be made to identify ways of eliminating or reducing as many of these threats as possible if these sites are to continue to be effective for avian protection. Additional information as to which issues affect which sites is included in the individual site accounts.

The most serious threat to the sites, as identified by the nominators, is the introduction and spread of non-indigenous species. These include both plants (e.g., purple loosestrife, melaleuca and salt cedar) and animals (e.g., zebra mussel and lake trout). Some are species native in one part of the country but introduced into another part (e.g., red fox). Many site managers are forced to devote a great deal of their resources to controlling these non-indigenous species. Related to this problem is that of cattle grazing, which can have not only a direct impact resulting in loss of habitat, but an indirect impact caused by the introduction and proliferation of noxious plants (native and non-native), or an increase in the numbers of Brown-headed Cowbirds, a nest parasite which severely affects the populations of several endangered species.

A close second among the problems identified by site nominators are issues dealing with recreational development, visitor overuse and bird disturbance. This includes mechanized recreation vehicles such as boats, jet skis, and all-terrain vehicles, as well as generalized impacts from human visitation. Related issues include over-hunting, over-fishing and over-browsing, the latter resulting from too many deer or other native ungulates on these sites, the populations of which are being kept at abnormally high levels at some sites to provide recreational opportunities. Impacts from all the foregoing are likely to increase in the future as the amount of land available for recreation decreases and the number of people seeking recreational activities increases. An effort needs to be made now to identify ways of minimizing recreational impacts and excessive disturbance of the birds at sites where these are a problem.

Development, particularly suburbanization, is the third most-cited issue of concern. This development has direct impacts in loss of habitat and increased demand for recreation as well as indirect impacts from nonpoint source pollution. Conversion to agriculture was frequently identified as occurring along the borders of sites. This is likely related to the number of sites where potential issues with pesticides were indicated. Deforestation resulting in loss of habitat is also of concern. As in conversion of habitat to agriculture, this was mostly occurring along the borders of the sites. Lakes and lakeshore sites were especially likely to be facing development threats, as were wetland areas and coastal sites. Often the development threat is adjacent to or surrounding, rather than directly on, the IBA. Such development could limit the ability of these sites to support migratory birds as the surrounding habitat is chopped into smaller pieces. It also limits options for expanding the boundaries of protected areas. Places such as the John Heinz Refuge are rapidly becoming hemmed in by

surrounding development. In the case of Hawk Mountain/Kittatinny Ridge, development in the future could diminish foraging and resting areas for migratory raptors and songbirds.

Issues relating to water come a close fourth. Taken together, they represent a major threat to the integrity of some sites. These issues include diversion, drainage of wetlands, over-extraction of ground-water, flooding, erosion, inadequate water supply, irrigation, and damming. Respondents noted that drought, although a natural process about which little can be done, serves to exacerbate conservation issues relating to water use. This is only likely to become more significant if climate changes take place as predicted.

Several sites listed natural pests/disease, predation and parasitism as problems. Pests included white-tailed deer—a significant threat to forests in the northeastern United States—beavers, cowbirds, and several insect pests that threaten forest health. For birds, the disease of greatest concern was avian botulism. As the amount of available habitat decreases, bird concentrations increase. If a disease outbreak occurs, the impacts are much more severe than if the birds were spread over more sites. Predation here refers to both native species such as raccoons and introduced species such as rats and domestic cats, both feral and otherwise. Some of these predators have decimated nesting colonies of shorebirds and seabirds. Parasitism refers to population impacts from brood parasitism by Brown-headed Cowbirds.

Succession was an issue at several sites. Problems occur when natural processes such as fire are interrupted by human activities. This means that an active management approach (e.g., prescribed burning, tree planting) may be required to restore the habitat to its original state, a potentially expensive process at a time when many areas face dwindling budgets. Related to succession were sites for which concern was expressed regarding fire. In some cases this was due to lack of fire, while in others it was concern about habitat destruction by fire.

Oil, other toxic pollution and pesticides were also mentioned by land managers as problems related to their sites. There is a relationship between oil pollution and other sorts of pollution. At some sites, there is a threat from potential spills from ships and barges transporting not only oil but other toxic chemicals.

Particularly in coastal parts of the Southeast, hurricanes can present a real threat to sites. While nothing can be done to protect a site from their impact, this would be less of a problem if there were a network of sites representing the same type of habitat. In many cases these sites are the best of very few remaining examples of that habitat type, and losses from hurricanes can be devastating to the birds that depend on them.

A separate but related issue is that at some sites there is a lack of funding, not only for operations and management, but for acquisition of additional habitat needed to turn the site into a viable and protectable preserve. For example, in two of the sites presented here, both National Wildlife Refuges, much of the land authorized for the refuge has yet to be acquired and monies for acquisition have largely dried up. This is occurring at the same time these lands are being purchased and developed for housing. Once this habitat is lost it cannot be recovered, leading to fragmentation in what was otherwise scheduled to become a contiguous patch of “protected” habitats.

### Conservation Measures

A number of key conservation measures have come about through the efforts of state IBA Programs in the first three years of their existence. Most significantly, the New York State government enacted a law in 1997 modeled after the state IBA Program. The New York “Bird Conservation Area” law uses the IBA criteria to identify areas on state-owned lands to be managed as bird habitat and created an advisory committee made up of high-ranking government officials and nongovernmental representatives to identify sites and make management recommendations. The law could end up protecting more than 200,000 ha of habitat in the state.

Both New York and Pennsylvania have incorporated IBAs into their open-space protection plans. In Pennsylvania, IBAs are automatically given “bonus points” on a priority list for open-space funding. A local land conservancy was able to complete the acquisition of a 1,200 ha site when the state provided matching funds, largely as a result of the area being an IBA. Designation of the Montezuma National Wildlife Refuge in New York State as an IBA helped bring about the addition of key wetlands adjacent to the refuge, and the US Fish and Wildlife Service earmarked funds for IBA-related projects.

Perhaps of greatest consequence, coalitions of local conservation groups have begun to form around Important Bird Areas to promote better conservation and management of these sites. In more and more local issues, IBA designation has helped to make a case for resolving conflicting uses or proposals in favor of protecting habitat for birds. As it was designed to do, the IBA Program has focused new attention and resources on conserving the highest priority areas for bird habitat.

51	<b>Yaquina Head Outstanding Natural Area</b>	
	<i>Lincoln, Oregon</i>	
USOR01G	44°40' N, 124°04' W	0–122 m / 0.4 km <sup>2</sup>

► **Habitats:**

Primarily coniferous woods and shrubland, with rocky cliffs and offshore rocky islands.

► **Land-use:**

Primarily recreation, with some wildlife conservation.

► **Threats:**

*Major* – Excessive disturbance of birds. *Local* – Recreational overuse and aircraft flyovers. *Potential* – Oil pollution.

► **Ownership:**

US Bureau of Land Management, US Fish and Wildlife Service.

### Site description

A distinctive promontory extending 1.6 km into the Pacific Ocean. There are numerous rocks and islands just offshore, many managed as part of the Oregon Islands National Wildlife Refuge. The promontory has a lighthouse, and a visitors' center is located nearby. The headland is covered by a complex mixture of a herb/shrub-dominated plant community and shore pines. This small area has 165 plants, shrubs and trees, representing 46 plant families. Rare plants include seaside gold-fields and sea kale.

The area receives more than 500,000 visitors per year and there is a viewing platform within 100 meters of the main seabird colony.

### Birds

The most visible breeding birds on the offshore rocks are the 24,000 Common Murres. Mixed in among the murres are 740 Brandt's Cormorants (1% of the world's population) and 610 Western Gulls (2% of the *occidentalis* population).

	Season	Number
Western Gull	B	610
Brandt's Cormorant	B	740

### Conservation issues

The primary threat to the area is recreational overuse. This includes aircraft flying too low over the nesting birds. The area would be difficult to protect from a major oil spill.

There is controlled access to the seabird viewing platform, with night restrictions, access gates, patrols, limits on hang gliding and informational signs.

52	<b>Don Edwards San Francisco Bay National Wildlife Refuge</b> <i>Alameda, San Mateo and Santa Clara, California</i>	
	USCA02G	37°30' N, 122°07' W
		-1.5–43 m / 87 km <sup>2</sup>

► **Habitats:**

Primarily tidal wetlands, salt ponds and mud flats, with non-tidal wetlands, natural grasslands and shrubland.

► **Land-use:**

Primarily wildlife conservation, with some industrial (salt evaporation ponds), hunting and other recreation.

► **Threats:**

*Critical* – Introduction of non-indigenous species and predation. *Major* – Housing and other development, landfills and pollution.

► **Ownership:**

US Fish and Wildlife Service.

### Site description

This site consists of most of the remaining undeveloped land in the South San Francisco Bay area. Habitats consist of a complex of tidal salt and brackish marshes, vernal pools, seasonal wetlands, salt ponds, mudflats, open water and uplands. The tidal salt marsh is dominated by pickleweed and cordgrass, and the brackish marsh by bulrush. The uplands consist of coyote bush, forbs, native and nonnative grasses. The refuge is home to Contra Costa goldfields, salt marsh harvest mouse, tadpole shrimp (all federally endangered) and California tiger salamander (a federal candidate).

The refuge receives more than 300,000 visitors per year, including 10,000 school children who participate in one-day environmental education field trips. Recreation-related expenditures associated with visits to the refuge provided nearly \$1.6 million to local economies in 1995.

### Birds

The refuge and surrounding areas supply habitats for an outstanding number of birds. The refuge itself is home to 600 of the endangered California Clapper Rails (60% of the world's population) and provides breeding habitat for 120 Western Snowy Plovers (8% of that population). Wintering waterfowl make extensive use of the refuge and adjacent salt ponds in South San Francisco Bay, with average populations of 45,000–75,000. Of these, as many as 40,000 are Northern Shovelers (1.5% of the population) and 18,000 are Ruddy Ducks (3% of the population). Overall, San Francisco Bay is a key wintering area for diving ducks in the Pacific Flyway, with 100,000 to 225,000 present most winters. The mud flats and salt ponds provide habitats for an impressive number of shorebirds. More than 500,000 shorebirds have been seen on migration. During spring migration the vast majority of these are Western Sandpipers (as many as 500,000), but there may be as many as 65,000 Dunlin (10% of the population) and 5,000 Black-bellied Plovers (10% of the population). Overall, globally significant numbers of at least eight species of shorebirds occur during migration at this refuge.

More than 227 species of birds have been found here or at nearby San Pablo Bay NWR. Of these, 84 species breed, 23 (27%) of which winter, at least in part, in the neotropics. An additional 59 nearctic migrants are seen on the refuge annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
California Clapper Rail	A	600
Western Snowy Plover	B	120
Black-bellied Plovers	SM	5,000
Northern Shoveler	W	25,000–40,000
Ruddy Duck	W	13,000–18,000
Western Sandpiper	SM	330,000–500,000
Dunlin	SM	32,000–65,000

### Conservation issues

Only 87 km<sup>2</sup> of the originally authorized 174 km<sup>2</sup> have been acquired to date. Additional acquisition is being delayed by declining budgets and unwilling sellers. The tidal marshes are being invaded by alien plant species, such as *Spartina alterniflora* and *Lepidium*. Non-native red foxes arrived in the mid-1980s and have been decimating the population of California Clapper Rail. Measures are being taken to control these invading species.

Housing and industrial developments are increasing around the refuge, leading to increased freshwater flows, contaminants and predatory domestic animals. Feral cats kill threatened and endangered species both on the refuge and in adjacent areas, and also prey on other native shorebird species. There is pressure from animal rights and other groups to allow feral cat colonies in parks, open space and other public lands.

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## Andrew Molera State Park

*Monterey County, California*

USCA03NA

36°30'N, 121°53'W

0–1,036 m / 20 km<sup>2</sup>

#### ► Habitats:

Primarily coastal scrub and grassland, with riparian, riverine, estuarine, chaparral, wet meadow, and redwood communities.

#### ► Land-use:

Recreation and tourism.

#### ► Threats:

*Major* – Introduced plants and animals, water pollution, and recreational overuse. *Potential* – Over-extraction of groundwater, drought, cowbird parasitism.

#### ► Ownership:

California Department of Parks and Recreation.

### Site description

Andrew Molera State Park includes a portion of the Big Sur River and the river mouth, associated lands, and waters out to 12 nautical miles. It contains a great topographic and biotic diversity, river/ocean interface, and a nearby lighthouse that probably attracts nocturnal migrants. There are two major drainages in the park, the Big Sur River and the south fork of the Little Sur River, and approximately 5 km of coastline. Northern and southern biogeographical regions meet in a kind of suture zone, making for some seemingly incongruous habitat associations. Most notably, mesic canyons, with redwoods, salamanders, and Winter Wrens, are flanked by semi-arid grasslands, with yuccas, spiny lizards, and Rufous-crowned Sparrows. This gives rise to a remarkable floral diversity of 17 described plant communities in the park. The Big Sur River maintains a relatively pristine cottonwood-willow woodland that provides excellent forage and protection for residents, breeders, and migrants.

Endangered species found at this site are the steelhead, red-legged frog, and Smith's blue butterfly. The California horned lizard and southwest pond turtle are found here (California special concern), as are Little Sur manzanita (endemic and rare) and the Monterey Indian paintbrush and adobe sanical (local and rare).

### Birds

This area contains a high diversity of riparian species, including many endangered, threatened, and species of concern. Among the breeders are Peregrine Falcon and possibly Marbled Murrelet. Migrants include Southwest Willow Flycatcher, Yellow Warbler, and Yellow-breasted Chat. Seabird numbers offshore during migration range into the tens of thousands. The site is close to an area where California Condors (federally endangered) are being released.

	Season	Number
Peregrine Falcon	B	5 pairs
Southwest Willow Flycatcher	SM, FM	50
Marbled Murrelet	SM, B	5
Yellow Warbler	SM, FM	350
Yellow-breasted Chat	SM, FM	35–40
seabird spp.	SM, FM	10,000+

### Conservation issues

Competition from European Starlings for nesting space is threatening the local population of Purple Martins in the park. Cowbirds are undoubtedly affecting local breeders. Much of the original grassland and riparian habitat has been reduced, changed, and destroyed. The California State Park and the Ventana Wilderness Sanctuary (Big Sur Ornithology Lab) are working to restore habitat. A long-term bird-banding program is monitoring and assessing avian populations, and the park hosts a very pro-active environmental education program. Between 70,000 and 200,000 people visit the park annually.

54

## Tule Lake and Lower Klamath National Wildlife Refuges

*Siskiyou and Modoc, California*

USCA05G

41°57' N, 121°40' W

1,229–1,311 m / 375 km<sup>2</sup>

#### ► Habitats:

Primarily non-tidal wetlands and agricultural lands, with desert and shrubland.

#### ► Land-use:

Primarily wildlife conservation, agriculture and rangeland, with some water supply, hunting and other recreational uses.

#### ► Threats:

*Major* – Introduction of non-indigenous species, drainage of wetlands, irrigation, drought and agricultural conversion. *Potential* – Over-extraction of ground water, predation, excessive disturbance of birds, over-grazing, pesticides and inadequate water supply.

#### ► Ownership:

US Fish and Wildlife Service.

### Site description

These two refuges are high desert wetland areas within the Klamath Basin. The wetlands consist of permanent marshes, with cattails, hardstem and alkali bulrushes. There are also temporary wetlands, with red goosefoot and smartweed. The surrounding habitats are agricultural lands, grasslands consisting of Great Basin wildrye, and uplands containing sagebrush, juniper and greasewood. The area is home to two federally endangered fish that are endemic to the Klamath Basin, the Lost River sucker and the short-nosed sucker.

The refuge area has had documented human habitation for over 10,000 years and contains numerous archeological sites. Recreational activities on the refuge contribute approximately \$700,000 to local economies annually.

### Birds

Nearly 1,000,000 waterfowl, more than 8% of all of the waterfowl migrating in the Pacific flyway, pass through these refuges on migration. This includes more than 50,000 Cackling Canada Geese (greater than 30% of the world's population). Greater than 1% of the lower 48 states population of Bald Eagle breeds on these refuges and more than 1,000 of them can be found there in winter (nearly 10% of the population). In addition, the refuges are home to 3,000 pair of breeding White-faced Ibis (perhaps 30% of the US population).

	Season	Number
Bald Eagle	B	40–60 pairs
Bald Eagle	W	1,000
Cackling Canada Goose	SM, FM	50,000
White-faced Ibis	B	3,000 pairs
waterfowl	SM, FM	1,000,000

More than 260 species of birds have been found in the area. Of these, 189 species breed, 63 (33%) of which winter, at least in part, in the neotropics. An additional 27 nearctic migrants are seen on the refuge annually, either coming from or returning to their wintering grounds in the neotropics.

### Conservation issues

In an area receiving only 25 to 30 cm of precipitation annually, the primary conservation threat facing these refuges is competition for the regional water supply. The allocation and use of water within the basin is currently under review. Other studies are looking at the feasibility of rotating land out of long-term agricultural use. As in many parts of the country, the introduction and establishment of non-native species is a growing problem.

55

## Cosumnes River Preserve

*Sacramento County, California*

USCA02G

38°20'N, 121°21'W

0–6 m / 26.8 km<sup>2</sup>

#### ► Habitats:

Primarily riparian, with non-tidal wetland and deciduous woods.

#### ► Land-use:

Wildlife conservation and research, recreation and tourism.

#### ► Threats:

*Critical* – Introduction of non-indigenous fauna. *Major* – recreational development and overuse.

#### ► Ownership:

US Bureau of Land Management.

### Site description

Cosumnes River Preserve contains California's largest stand of valley oak riparian forest, interspersed with deciduous woodlands and wetlands.

The giant garter snake (state threatened) can be found at this site, as well as the valley elderberry long-horn beetle (federally threatened).

### Birds

This preserve is a globally significant wintering area for Greater Sandhill Crane (4,000, or 6% of the population) and Lesser Sandhill Crane (6,000, or greater than 1% of population). It is also an important wintering site for Tundra Swan (up to 1% of the population in western North America), and a major breeding area for Tricolored Blackbird. A total of over 200 species of birds occur in the area, including 37 species of shorebirds.

	Season	Number
Greater Sandhill Crane	W	4,000
Lesser Sandhill Crane	W	6,000
Tundra Swan	W	500
Tricolored Blackbird	B	2,000
Swainson's Hawk	FM	200
White-faced Ibis	W	60

## Conservation issues

The site is threatened by the introduction of non-native annual grasses and is vulnerable to potential over-recreation and disturbance due to development. It is within easy driving distance of 1.5 million people. The preserve receives \$150,000 a year from Farming for Wildlife projects.

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## South Fork Kern River Valley

*Kern, California*

USCA04G

35°40' N, 118°17' W

780–915 m / 40 km<sup>2</sup>

### ► Habitats:

Primarily riverine and riparian woodlands, with desert, grasslands and shrublands.

### ► Land-use:

Primarily wildlife conservation and rangeland, with some agriculture and recreation.

### ► Threats:

*Critical* – Parasitism. *Major* – Damming, over-grazing and development. *Local* – Introduction of non-indigenous species, deforestation, diversion of water and agricultural conversion. *Potential* – Ground-water over-extraction, agricultural increase and pesticides.

### ► Ownership:

US Forest Service, Bureau of Land Management, The Nature Conservancy and the State of California.

## Site description

Lying at the southern terminus of the Sierra Nevada mountains, the South Fork Kern River valley is an alluvial valley, 24 km in length. Approximately 10% of the valley is in agricultural crops, 50% is commercially grazed and 40% is in conservation ownership. The primary habitat is valley-foothill riparian, with Fremont cottonwood, red willow and Goodding's black willow. Joshua tree woodlands, annual grasslands, wet meadows, emergent wetlands and desert scrub are also found in the valley.

## Birds

The riparian habitat provides critical habitat for a number of species. Up to 70 federally endangered Southwest Willow Flycatchers (10% of the world's population) breed there, as do 40 Western Yellow-billed Cuckoos (1% of the world's population). The wetland areas provide breeding habitat for 4,000 Kern Red-winged Blackbirds (99% of the world's population of this endemic subspecies). The position of the valley at the terminus of the Sierra Nevada mountains acts as a funnel for migrating raptors. In fall, more than 27,000 Turkey Vultures have been counted flying over.

	Season	Number
Southwest Willow Flycatcher	B	70
Western Yellow-billed Cuckoo	B	40
Kern Red-winged Blackbird	A	4,000
Turkey Vulture	FM	27,000 +

### Conservation issues

Brood parasitism by Brown-headed Cowbirds is a major immediate threat, especially to the Southwest Willow Flycatcher. The two other major, short-term threats are the periodic inundation of the westernmost 5 km of the riparian forest by releases from Isabella Reservoir, and the over-grazing of the riparian areas on private lands. More long-term threats include over-extraction of ground-water, agriculture intensification in the valley and urban/suburban development.

More than 120 ha of riparian habitat has been planted in an active restoration program. Grazing has been removed from another 645 ha. There is an active Brown-headed Cowbird control program. Mitigation for forest flooding is being pursued and may result in additional habitat acquisition, improvement and restoration. A minimum of 400 additional hectares of riparian habitat is needed to have a viable population of Western Yellow-billed Cuckoos.

57

## Starr Ranch Sanctuary

Orange County, California

USCA04N

33°37'N, 117°33'W

183–533 m / 16 km<sup>2</sup>

#### ► Habitats:

Primarily coastal scrub and grassland, with riparian, oak woodland, and chaparral habitat.

#### ► Land-use:

Preserve.

#### ► Threats:

*Major* – Introduced plants, water pollution, residential and commercial development. *Minor* – Drainage. *Potential* – Predation, mining.

#### ► Ownership:

National Audubon Society.

### Site description

The Starr Ranch Sanctuary of the National Audubon Society consists of a mosaic of vegetational communities, including annual grasslands, perennial bunchgrass grassland, coastal sage scrub, chaparral, oak woodland, and riparian woodland. It is located at the foothills of the Santa Ana Mountains and has a Mediterranean climate.

Two rare plants (*Calochortus catalinae* and *C. weedii*) are found at this site, as well as mountain lion (dwindling population in southern California).

### Birds

The sanctuary has 11 breeding raptor species and a significant number of breeding California Gnatcatchers, a federally threatened species.

	Season	Number
California Gnatcatcher	B	28 pairs
Bell's Sage Sparrow	B	Unknown
Rufous-crowned Sparrow	B	Unknown
Grasshopper Sparrow	B	Unknown
White-tailed Kite	B	Unknown
Cooper's Hawk	B	Unknown
raptor spp.	B	11 spp.

## Conservation issues

Runoff from adjacent golfcourse, rapid suburban development, invasive plants, and feral animals are all major threats. Plans exist for runoff to be pumped back into the water district. Research on artichoke thistle (invasive species) is in progress. The sanctuary conducts research (10 active projects) and public nature walks and is used as an outdoor laboratory by college students.

58

## Big Morongo Canyon Preserve

*San Bernardino County, California*

USCA01S

34°02'N, 116°32'W

396–1,326 m / 10 km<sup>2</sup>

► **Habitats:**

Primarily desert riparian, with Joshua tree and shrub habitat.

► **Land-use:**

Recreation and tourism, conservation, water supply, and research.

► **Threats:**

*Major* – Over-extraction of groundwater; landfill. *Minor* – Fire, residential development, and cowbird parasitism.

► **Ownership:**

US Bureau of Land Management.

## Site description

Located within the little San Bernardino Mountains and adjacent to Joshua Tree National Park, Big Morongo Canyon Preserve is one of the largest desert oases in California. It lies in the transition zone between the Mojave and Sonoran deserts, and at the transition between coastal and desert climates, creating an unusual blend of sympatric plant and animal species. Both riparian woodlands and marsh habitats meet creosote bush and scrub and mesquite thickets within the canyon.

The preserve is a significant ecotourism site and is also the site of a Native American village. It provides habitat for federally and state-endangered desert tortoise, state protected desert big horn sheep, mule deer and mountain lion.

## Birds

The federally and state-listed Least Bell's Vireo breeds on the preserve, as does the Yellow-breasted Chat, a state species of concern. Summer Tanager, Brown-crested Flycatcher and Yellow Warbler breed here, at the western edges of their ranges. The site is the only area in California where Vermilion Flycatcher, Brown-crested Flycatcher, Blue Grosbeak, and Yellow-breasted Chat (among others) all occur together.

	Season	Number
Least Bell's Vireo	B	2 pairs
Yellow-breasted Chat	B	10 pairs
Summer Tanager	B	6 pairs
Yellow Warbler	B	5 pairs
Brown-crested Flycatcher	B	4 pairs
Vermilion Flycatcher	B, W, S, FM	6
Cooper's Hawk	B, W, S, FM	2
Nuttall's Woodpecker	B, W, S, FM	12

### Conservation issues

Threat of over-extraction of groundwater exists if the adjacent community becomes more developed than the water table can support. A county landfill 0.8 km above the preserve may cause contamination of stream water. Cowbird parasitism affects Vermilion Flycatcher and Least Bell's Vireo. Local conservation groups strive for decreased housing density on all proposed developments. The preserve manager is asking for help from The Nature Conservancy to establish water rights in the preserve. A water quality monitoring program is being initiated, with Bureau of Land Management hydrologists. BLM has also applied for a grant to build a visitors' center. A cowbird trapping program has begun.

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### Boise Ridge

*Ada and Boise Counties, Idaho*

USID03S

43°37'N 116°04'W

1,462–2,311 m / 1,000+ km<sup>2</sup>

#### ► Habitats:

Shrub-steppe, ponderosa pine/Douglas-fir forest, mountain brush, with aspen and riparian communities.

#### ► Land-use:

Wildlife conservation, forestry, livestock grazing, and urban (private lands).

#### ► Threats:

*Critical* – Introduction of non-indigenous fauna and flora, recreational overuse, and residential and commercial development. *Potential* – Wildfire.

#### ► Ownership:

US Bureau of Land Management, State, and Private.

### Site description

Boise Ridge is a north-south trending series of peaks located in the Boise Mountains of southwest Idaho, stretching from Horseshoe Bend to Mountain Home, which makes up the northern boundary of the Snake River plains. The IBA site consists of the portion of ridge between Shafer Butte and Lucky Peak. Many vegetation types are present on the ridge, including shrub-steppe dominated by sagebrush, bitterbrush, native bunchgrasses and exotic annual grasses on the lower slopes; mountain shrub communities dominated by chokecherry and buckbrush on upper slopes; mixed conifer containing ponderosa pine and Douglas-fir on upper and north-facing slopes; and cottonwood/willow/birch communities in riparian areas.

The Boise River Wildlife Management Area (Lucky Peak) is owned and managed by Idaho Fish and Game as big game winter range for Mule Deer and Rocky Mountain Elk.

### Birds

The Boise Ridge supports one of the largest known concentrations of migratory raptors in the western United States. Its topography is likely the primary feature that causes it to be important to migrating birds. Updrafts from the Snake River plain, create ideal wind conditions for migrants. Yearly fall counts conducted from Lucky Peak range from 3,000–5,000 raptors. Average numbers for the most common species are given in the table below. A total of 25 species of special concern in Idaho occur on the ridge. A Bald Eagle winter communal roost site occurs on Lucky Peak, used by 10–30 or more eagles nightly. The site has exceptional concentrations and diversity of many other species, including passerines. Standardized monitoring of fall raptor migration has occurred since 1994 (Boise Ridge Raptor Migration project), and banding of raptors and songbirds is also conducted. The site is believed to be a concentration point for raptors in spring migration, and there are plans to conduct spring monitoring.

	Season	Number
American Kestrel	FM	700–1,500
Sharp-shinned Hawk	FM	500–1,500
Red-tailed Hawk	FM	500–1,000
Cooper’s Hawk	FM	300–1,000
Turkey Vulture	FM	300–500
Northern Harrier	FM	100–300
Golden Eagle	FM	50–100
Swainson’s Hawk	FM	30–120
Northern Goshawk	FM	20–100
Bald Eagle	W	10–30

**Conservation issues**

The major conservation problems and threats to the habitats on the Boise Ridge are wild-fire, timber harvest, and urban development. Other potential problems include overgrazing, conversion or loss of shrub-steppe plant communities to exotic annuals, and overuse or misuse by recreationists with off-road vehicles. The Boise Ridge is very close to the Boise valley and provides residents with countless opportunities for outdoor recreation.

60	<b>City of Rocks National Reserve</b> <i>Cassia County, Idaho</i>	
	USID05S	43°46’N, 112°08’W 1,753–2,703 m / 57.63 km²

► **Habitats:**

Primarily sagebrush and juniper-pinyon-mountain mahogany, with rock outcrops, grassland, and Douglas-fir.

► **Land-use:**

Recreation and tourism, hunting, and rangeland.

► **Threats:**

*Major* – Soil erosion. *Minor* – Natural pests/disease, introduced plants, disturbance, succession. *Potential* – Overgrazing, drought, recreational overuse, development.

► **Ownership:**

National Park Service, state, and private.

**Site description**

City of Rocks is a unique geological site, exhibiting towering granite spires (up to 180 m), windows, arches, natural bridges, and numerous wind-sculpted features. The area has been designated a National Natural Landmark and a National Historic Landmark. Several kilometers of the California Trail (1843–1860s) are protected within the reserve. The reserve encompasses federal, state, and private lands. Facilities include 78 campsites, group camps, a horse camp, 32 km of trails, and wayside exhibits. The area is primarily a secluded, primitive experience.

This site contains populations of mountain lion (subject of a local long-term study), cliff chipmunk (*Tamias dorsalis*) and pygmy rabbit (*Brachylagus idahoensis*), the latter two of which are both species of concern. Rare plant species include Simpson’s hedgehog cactus, Davis’ wavewing, and single-leaf pinyon.

**Birds**

The site has a high diversity and exceptional representation of characteristic breeding species, including numerous species of special concern in Idaho: Prairie Falcon, Sage Grouse, Red-naped Sapsucker, Gray Flycatcher, Plumbeous Vireo, Virginia’s Warbler, Green-tailed Towhee, and Brewer’s Sparrow. A total of 157 species have been documented on or adjacent to the site.

	Season	Number
Prairie Falcon	B (W,S,F)	5
Sage Grouse	B (W,S,F)	15
Red-naped Sapsucker	B	15
Gray Flycatcher	B	5
Plumbeous Vireo	B	10
Virginia's Warbler	B	15
Green-tailed Towhee	B	50
Brewer's Sparrow	B	100
Pinyon Jay	W, F	80–250

### Conservation issues

Road improvements, grazing, social trails, and campsites have contributed to a serious erosion problem. Gully erosion and sediment loading in riparian areas are causing loss of habitat, especially habitat crucial to birds. Fire exclusion is a concern. City of Rocks has mitigated the effects of erosion in some areas. Tourism at the site contributes revenue to southern Cassia County. The site is culturally important and is considered one of the country's premier rock-climbing sites.

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## Raft River–Curlew Valley Ferruginous Hawk Area

*Oneida and Cassia Counties, Idaho*

USID02G

42°15'N, 113°15'W

1,463–2,073 m / 1,200 km<sup>2</sup>

► **Habitats:**

Primarily sagebrush, with extensive grasslands.

► **Land-use:**

Wildlife and game management.

► **Threats:**

*Critical* – Introduction of non-indigenous fauna and flora. *Minor* – Irresponsible hunting and disturbance. *Potential* – predation and wildfire.

► **Ownership:**

US Bureau of Land Management, State, and Private.

### Site description

This site consists of a broad area covering eastern Cassia County and southwestern Oneida County, including the Raft River valley and the Juniper and Curlew valleys. It is made up predominately of sagebrush/grass rangelands within the valleys of southcentral Idaho, particularly those areas along alluvial fans/*bajadas*/flats adjoining the Jim Sage, Cotterel, and Black Pine Mountains. Nest areas of Ferruginous Hawks are generally characterized by lone juniper trees or isolated patches of junipers, although ground nests have also been documented to a limited extent. Public lands associated with the Raft River Valley portion of the area are under the management of BLM's Snake River Resource Area. Those associated with the Curlew-Juniper valleys are under BLM's Malad Resource Area.

The northern extension of the Curlew valley, between Black Pine Mountain and Interstate 84, has been identified as one of the most likely areas in Idaho in which kit fox may occur.

### Birds

This is a globally important area for Ferruginous Hawk, a species of special concern (46 nests were occupied in 1996; over 1% of the global population). The Curlew valley also has breeding concentrations of Columbian Sharp-tailed Grouse (150) and Sage Grouse (50), both also species of concern.

	Season	Number
Ferruginous Hawk	B	46 pairs
Columbian Sharp-tailed Grouse	B	150
Sage Grouse	B	50

### Conservation issues

Introduction of bulbous bluegrass and crested wheatgrass has led to these species outcompeting many native species of grasses. Some illegal shooting of hawks on nests and other nest disturbances near desert roads occur. Occasional wildfires may threaten nest trees and habitat. Some nest predation, harassment, and/or occupancy by ravens and magpies also take place. Shrub/steppe habitats and nest-tree areas are recognized as being ecologically important and thus are protected from wildfire to the extent possible.

62

### Market Lake Wildlife Management Area Jefferson County, Idaho

USID04G

43°46'N, 112°08'W

1,451–1,463 m / 20.28 km<sup>2</sup>

► **Habitats:**

Primarily freshwater marsh and wet meadows, surrounded by sagebrush and desert grassland.

► **Land-use:**

Primarily wildlife conservation, with some hunting, recreation, and agriculture.

► **Threats:**

*Critical* – Introduced non-indigenous flora and over-extraction of groundwater.

► **Ownership:**

Idaho Fish and Game.

### Site description

The site consists of 680 ha of bulrush/cattail marshes and wetland meadows, surrounded by sagebrush/grassland desert. There are approximately 80 ha of agricultural fields and approximately 1.2 km of riparian habitat on the Snake River. All water to the wetlands comes from springs, seeps, and artesian wells.

### Birds

The site is a spring staging area for 50,000–150,000 ducks, 400 Canada Geese (close to 1% of the flyway population), 40,000 Snow Geese (>1% of the global population), 1,000 Tundra Swans (>1% of the western North American population), and 150 shorebirds of several species. There is a Peregrine Falcon (federally endangered species) nesting/hacking tower on the management area and a staging area for an average 50 White Pelicans. Breeding species include White-faced Ibis (500–1,000), Snowy Egret (30), Black-crowned Night-Heron (25), Franklin’s Gull (800–1,200, nationally significant), Northern Harrier, Sage Grouse, Black Tern, Sage Sparrow, and Yellow-headed Blackbird.

	Season	Number
White-faced Ibis	B	500–1,000
Franklin’s Gull	B	800–1,200
Duck spp.	SM	50,000+
Tundra Swan	SM	400+
Snow Goose	SM	25,000+
Bald Eagle	W	10–30

### Conservation issues

Noxious weed species include Canada thistle, musk thistle, Russian knapweed, field bindweed, and whitetop. Biological, mechanical, and chemical methods are being used to control and eliminate weeds. The water output of the feeder springs has decreased 75% since the 1970s because of groundwater extraction for irrigation. The state is investigating the possibility of purchasing water from the Jefferson County reservoir system for use in the marshes.

The area has over 15,000 visitor “user days” per year; approximately 11,000 (73%) of which are for wildlife and nature viewing.

<b>63</b>	<b>Empire-Cienega Resource Conservation Area</b> <i>Santa Cruz and Pima, Arizona</i>	
	USAZ02NA	31°47' N, 111°37' W 1,311–1,463 m / 182 km <sup>2</sup>

- ▶ **Habitats:**  
Primarily natural grasslands (75%), with shrublands (20%) and riparian vegetation (5%).
- ▶ **Land-use:**  
Primarily wildlife conservation, rangeland and recreation.
- ▶ **Threats:**  
*Critical* – Introduction of species and over-extraction of groundwater. *Major* – Over-grazing, fire and recreational overuse. *Local* – Afforestation, diversion of water, succession, soil erosion and parasitism. *Potential* – Excessive disturbance of birds, housing development and drought.
- ▶ **Ownership:**  
US Bureau of Land Management.

### Site description

The Chihuahuan desert grasslands within the Empire-Cienega Resource Conservation Area are some of the finest remaining predominantly native grasslands in the desert Southwest. The area contains three rare vegetation communities, including sacaton grassland, cottonwood-willow riparian and natural *cienega* (marsh). The extant sacaton grassland currently has no introduced grass species. There are over 30 km of cottonwood-willow riparian habitat. A total of four federal endangered species, 11 federal candidate species and 24 State of Arizona listed species are found on this site. This includes the Gila topminnow (federally endangered, largest US population), Gila chub, Chiricahua and lowland leopard frogs (all three federal candidates) and the lesser long-nosed bat (federally endangered).

### Birds

The cottonwood-willow riparian area provides habitat for more than 25 Western Yellow-billed Cuckoos (almost 1% of the world’s population) and tens of thousands of neotropical migratory birds that pass through the area each spring. The sacaton grasslands provide wintering habitat for several grassland species whose populations are declining including Sprague’s Pipit and Baird’s Sparrow.

	Season	Number
Western Yellow-billed Cuckoo	B	25 +
Sprague’s Pipit	W	25 +
Baird’s Sparrow	W	25 +

### Conservation issues

There is the potential for grazing practices to lead to mesquite invasion and increased rates of parasitism from Brown-headed Cowbirds. If the grazing is not properly managed, it has the potential to promote non-native plant introductions and disrupt the natural fire regimes. The close proximity to Tucson, Sonoita and Sierra Vista may cause threats from increased recreational activities. Areas around the Conservation Area are being developed into residential areas. This housing development is leading to a potential over-extraction of ground-water that will have negative impacts on the cienega and riparian areas.

The Bureau of Land Management has established a rotational grazing system and excluded livestock from riparian areas. A Resource Management Plan is being developed that will address prescribed fire regimes, recreation management and grazing management programs. A watershed restoration project has been funded. When complete, this will restore 3 km of riparian habitat.

<b>64</b>	<b>Mormon Lake</b> <i>Coconino, Arizona</i>	
	USAZ02N	34°57' N, 111°27' W
		2,165–2,207 m / 36.9 km <sup>2</sup>

- ▶ **Habitats:**  
Natural lake (38%), natural grassland (25%), coniferous woodland (15%), wetland (10%), shrubland (5%), mixed woodland (5%), developed (2%).
- ▶ **Land-use:**  
Primarily unprotected wildlife sanctuary and recreation. Some cattle grazing, hunting, fishing and residential use.
- ▶ **Threats:**  
*Major* – Recreational development/overuse and drought. *Potential* – Over-grazing/browsing.
- ▶ **Ownership:**  
US Forest Service.

### Site description

Mormon Lake is the largest natural lake in Arizona (one of only two). It is primarily filled by run-off but there are two springs on the west side of the lake. The lake is surrounded by ponderosa pine and pinyon-juniper habitats. Small areas of deciduous woodland contain cottonwoods, oaks and walnuts. Wetlands include sedge meadows and seasonal marshes with smartweed and rushes. Areas of the lake contain duckweed and pondweed.

### Birds

Mormon Lake is the only large body of water for more than 160 km in any direction. Principal use is by migrating waterbirds, with some winter use until the lake freezes. Birds using the lake and surrounding habitats include up to 120 Bald Eagles in winter (1% of the US population). During migration, the lake is visited by up to 3,000 White-faced Ibis (10% of the population). Significant numbers of Sora breed there, and up to 25,000 waterfowl use the lake during fall migration.

Mormon Lake is thought to potentially be a migration stop-over site and is regularly surveyed. Overall, more than 196 species of birds have been found in the vicinity of the lake. Of these, at least 68 species breed, 20 (29%) of which winter, at least in part, in the neotropics. An additional 54 nearctic migrants are seen around the lake, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
White-faced Ibis	SM/FM	500–3,000
Bald Eagle	W	40–120
Sora	B	40–110

## Conservation issues

Since the lake is largely filled by run-off, it is susceptible to drought. There is a high potential for growth and development on the private lands surrounding the lake and the probability of developing more campgrounds on the public land. Rules against off-road vehicle use in the south and southeast portions of the lake are not always enforced. The lake bed and the shoreline have been fenced to discourage cattle grazing.

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## Bear Lake National Wildlife Refuge

*Bear Lake County, Idaho*

USID01G

42°11'N, 111°19'W

114–120 m / 72 km<sup>2</sup>

► **Habitats:**

Primarily freshwater marsh and wet meadow, with some mountain brush.

► **Land-use:**

Wildlife and game management.

► **Threats:**

*Serious* – Introduction of non-indigenous fauna and flora, water pollution.  
*Potential* – Water diversion.

► **Ownership:**

US Fish and Wildlife Service.

## Site description

Most of Bear Lake National Wildlife Refuge is bulrush and cattail marsh with associated sedge, rush and saltgrass meadows. A small portion includes part of Merkley Ridge (mountain brush habitat), which is used as a deer wintering range. Utah Power and Light Company owns the right to store water on the refuge. Located in a valley bottom, the refuge is the remnant of a large natural marsh (Dingle Swamp). The Bear River was diverted through the refuge in the early 1900s to store irrigation water. The marsh is a mix of hard-stem bulrush, cattail, and open water. Wet meadows around the marsh contain sedges, rushes, beardless wild rye, and saltgrass. Drier sites have sagebrush, greasewood, and small amounts of willow.

## Birds

The refuge is a primary waterfowl production area, with dense breeding populations of Canada Goose, Mallard, and Redhead. Large colonies of nesting gulls, including 4,000 pairs of Franklin's Gull (>1% of the global population) and other waterbirds also breed at the site. The refuge is a fall staging area for Sandhill Cranes and a migration stopover for waterfowl. Efforts are underway to introduce Trumpeter Swans as a nesting species. An asterisk (\*) on the chart below indicates the number of young produced annually.

	Season	Number
Canada Goose	B	1,800*
Duck spp.	B	4,500*
Duck spp.	FM	10,000–20,000
White-faced Ibis	B	150–3,000 pairs
Snowy Egret	B	70–80 pairs
Black-crowned Night Heron	B	75–80 pairs
Franklin's Gull	B	4,000 pairs
Lesser Sandhill Crane	FM	300–500

### Conservation issues

Introduced carp and noxious weeds are major management problems in the refuge. Water diversion (flow of Bear River) through the refuge is adding nutrients and sediments to the marsh. There is an active mine portal on the edge of the refuge; the ore body is off the refuge, but it presents the threat of mine drainage pollution. Utah Power and Light could negatively affect water levels by changing water storage regimes. The company cooperates actively with the refuge personnel to minimize impacts of its water management. Mechanical, biological, and chemical control of weeds and carp has been undertaken. Cattle grazing has been discontinued. Efforts are being made to reduce non point nutrient and sediment input upstream.

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## Yellowstone National Park

Park, Wyoming, Idaho and Montana

USWY01G

44°35' N, 110°35' W

1,610–3,463 m / 8,983 km<sup>2</sup>

#### ► Habitats:

Primarily coniferous woodlands (80%), with some grasslands (15%) and lacustrine/riverine habitat (5%).

#### ► Land-use:

Primarily wildlife conservation, with some recreation.

#### ► Threats:

*Critical* – Recreational development and overuse. *Local* – Introduction of non-indigenous species and other development. *Potential* – Over-browsing.

#### ► Ownership:

US National Park Service.

### Site description

Yellowstone National Park is one of the most intact natural areas in the temperate zone of North America. This area contains the largest concentration of free-roaming wildlife in the global temperate zone. Approximately 80% of the coniferous forest is lodgepole pine, with the remainder being comprised of seven other conifer species. There are also large expanses of subalpine meadows and montane sagebrush grasslands and more than 10,000 thermal features including 200–250 active geysers. The park is home to an endemic grass species—Ross' bent grass, and more than 1,000 other species of vascular plants. The park contains populations of bison and grizzly bear, and the gray wolf was recently reintroduced.

### Birds

Yellowstone National Park is an important breeding, migratory stopover and wintering area for Trumpeter Swans. Approximately 30 Trumpeter Swans breed in the park (greater than 1% of the Rocky Mountain population of this species). During fall migration, 700 Trumpeter Swans (greater than 3% of the world's population; 28% of the Rocky Mountain population) are present in the area. The park also has one of the highest concentrations of breeding Peregrine Falcons in the northern Rocky Mountains, one of the highest concentrations of Great Gray Owls in North America and one of the highest breeding concentrations of Barrow's Goldeneyes in the lower 48 states. Yellowstone Lake is an important regional molting area for waterfowl. The extensive lodgepole pine forests and its extant bird community provides one of the best representative examples of this habitat type in North America.

More than 207 species of birds are found annually within the boundaries of the park. Of these, 144 species breed, 41 (28%) of which winter, at least in part, in the neotropics. An additional 11 species of nearctic migrants are seen in the park annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
Trumpeter Swan	B	30 +
Trumpeter Swan	FM	700
Peregrine Falcon	B	22
waterfowl	FM	20,000

## Conservation issues

Recreational use is the primary threat to the area, in the form of tourism and outdoor recreation. Increased human developments within and bordering the park are local threats. Several non-native species, including lake trout, New Zealand mud snail, spotted knapweed and other weeds have been introduced to the park.

A lake trout removal program is being evaluated at this time, as are the potential risks associated with the recent introduction of the mud snail. An active weed eradication program is in place. Growing populations of native ungulates could lead to habitat impacts from over-browsing.

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## San Pedro Riparian National Conservation Area

*Cochise, Arizona*

USAZ01G

31°35' N, 110°10' W

1,275 m / 230 km<sup>2</sup>

### ► Habitats:

Desert scrub (30%), shrubland (25%), grassland (20%), riparian (20%), agriculture (5%).

### ► Land-use:

Primarily wildlife conservation and recreation with some water supply.

### ► Threats:

*Critical* – Over-extraction of ground-water. *Major* – Introduction of non-indigenous species, fire, soil erosion, toxic pollution. *Local* – Excessive disturbance of birds, diversion of water, drought, development and pollution.

### ► Ownership:

US Bureau of Land Management.

## Site description

The San Pedro Riparian National Conservation Area is one of the finest examples of desert riparian woodland left in the world. The riparian area has a healthy overstory of Fremont cottonwood over Goodding's willow, ash and an understory of baccharis. Extending out from the riparian zone is a mesquite bosque surrounded by sacaton grasslands. These are three of the rarest habitat types in North America. The San Pedro is one of the last undammed and free-flowing rivers in the American Southwest. The site is home to the Huachuca water umbel (*Lilaeopsis schaffneriana recurva*, a federally endangered species) and may occasionally host jaguar. There are historic records of ocelot and recent reports of jaguarundi. The combination of the birds, 82 species of mammals and 42 species of reptiles and amphibians makes this one of the most diverse vertebrate faunal areas in North America.

## Birds

The extent of the riparian vegetation supports large numbers of breeding and migrating birds. Surveys have estimated that between 1 million and 4 million passerines migrate through the riparian zone each spring. The vast majority of these are Wilson's and Yellow Warblers. At times, bird density within the riparian zone averages 40 birds per hectare and can be as high as 75–100 birds per hectare. The area supports a breeding population of 200 pairs of Yellow-billed Cuckoos (more than 16% of the world's known population and close to 30% of the US population). It also contains the highest number of breeding pairs of Gray Hawks of any site in the United States. The diversity and extent of habitat also supports an avifauna representative of this biome type.

More than 252 species of birds are found annually in the San Pedro conservation area. Of these, 102 species breed, 45 (44%) of which winter, at least in part, in the neotropics. An additional 82 nearctic migrants are seen in the area annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
migrating passerines	SM	1,000,000–4,000,000
Western Yellow-billed Cuckoo	B	200 pairs

### Conservation issues

The primary threat facing this area is loss of in-stream flow due to groundwater depletion in the area. This is a serious issue and there is some evidence that some reduction in flows might have already occurred, leading to a reduction in vegetation along portions of the riparian zone. The current grazing exclusion is only a moratorium and grazing could be reintroduced to the area early in the 21st century. Salt cedar has become established on parts of the riparian area, displacing native vegetation. Years of grazing have led to large amounts of soil erosion. There have been several instances of toxic pollutants washing into the river from mining activities in Sonora, Mexico. The surrounding area is undergoing rapid development and recreation pressures are increasing on the riparian area, leading to some impacts on the birds. This is likely to increase in the future and bird disturbance will become a problem.

An international conservation plan is being developed that should help with the groundwater issues. The mines in Sonora have taken steps to minimize any further introduction of toxic pollutants into the river. Management plans need to address the growing impacts from recreation. This might include temporary closures of some areas to protect nesting birds.

68	<b>Fruitgrowers Reservoir</b> <i>Delta, Colorado</i>	
	USCO01G	38°50' N, 107°56' W
		1,655–1,732 m / 2.4 km <sup>2</sup>

#### ► Habitats:

Primarily lake, stream, riparian and non-tidal wetlands, with some other grasslands.

#### ► Land-use:

Primarily water supply, with some wildlife conservation, recreation and hunting.

#### ► Threats:

*Major* – Excessive disturbance of birds and recreational development/overuse. *Local* – Introduction of non-indigenous flora/fauna.

#### ► Ownership:

US Bureau of Reclamation.

### Site description

Fruitgrowers Dam and Reservoir provides irrigation water to approximately 11 km<sup>2</sup> of orchards and croplands. The reservoir is shallow, with extensive mudflats developing during the irrigation season. Most of the surrounding land is private. Habitats range from sagebrush to greasewood in the uplands. There are two cottonwood groves and cottonwoods and willow fringe the reservoir. An extensive marsh is located at the north end of the reservoir and several smaller marshes are found around the reservoir.

### Birds

During the spring, upwards of 20,000 Greater Sandhill Cranes (26% of the world's population) can be found in the marshes surrounding the reservoir. In spring and fall there can be as many as 6,500 White-faced Ibis (nearly 20% of the world's population) at the reservoir. More than 30 species of shorebirds have also been seen there. Willow Flycatchers, thought to be Southwestern Willow Flycatchers (federally endangered), have been seen at the reservoir throughout the summer and may be breeding in the area.

	Season	Number
Greater Sandhill Crane	SM/FM	20,000
White-faced Ibis	SM/FM	6,500

### Conservation issues

Recreational development/overuse leading to excessive bird disturbance is a major potential threat to both breeding and wintering birds. This includes a renewed use of the reservoir by motor boats and personal watercraft and the possibility of developing a more extensive

trail system. An increase in residential development around the lake leading to increased disturbance of the birds is also a potential threat.

Current reservoir operation is compatible with nesting and migrating birds. Conservation easements have been acquired downstream of the reservoir. The possibility of acquiring additional easements as a buffer around the reservoir is being studied. The Black Canyon Audubon Society assists the Bureau of Reclamation with the management of lands around the reservoir.

<b>69</b>	<b>Comanche National Grassland</b> <i>Baca, Colorado</i>	
	USCO02G	37°02' N, 102°22' W
		1,113–1,302 m / 89 km <sup>2</sup>

► **Habitats:**

Primarily natural grassland composed of sand sagebrush–mixed grass rangeland and shortgrass prairie.

► **Land-use:**

Primarily rangeland for livestock, with some wildlife conservation and recreation.

► **Threats:**

*Local* – Excessive disturbance of birds, fire and over-grazing. *Potential* – Drought and soil erosion.

► **Ownership:**

US Forest Service.

**Site description**

This site consists primarily of gently rolling hills, with sandy soils covered with sand sagebrush (*Artemisia filifolia*) and various short grass species. The area is dissected by a number of dry washes. Winters are cold and summers are hot and dry.

**Birds**

These grasslands support greater than 25% of the Lesser Prairie Chicken population in Colorado and possibly greater than 5% of the world’s population. The distribution of Lesser Prairie Chicken has declined by more than 92% since the 1880s and the population has declined by 97%. The area also provides habitat for a number of other shortgrass prairie birds, many of which are neotropical migrants.

	Season	Number
Lesser Prairie Chicken	A	10 leks (> 500)

**Conservation issues**

The primary threats facing this site are drought, soil erosion and habitat degradation due to over-grazing by livestock. The US Forest Service cooperates with the Colorado Division of Wildlife and the National Resources Conservation Service to enhance the grasslands and manage grazing. Some localized human disturbance of leks also occurs.

70	<b>Kirwin National Wildlife Refuge</b> <i>Phillips, Kansas</i>	
	USKS01G	39°40' N, 99°10' W

520 m / 43.6 km<sup>2</sup>

► **Habitats:**

Lakes and river (47%), grassland (35%, 10% of which is undisturbed natural grassland), cropland (15%), riparian and shelterbelts (3%).

► **Land-use:**

Primarily wildlife conservation and irrigation/flood control, with some agriculture, grazing, hunting, fishing and other recreation.

► **Threats:**

*Critical* – No control over water levels, excessive disturbance to birds, succession and introduction of non-indigenous species. *Major* – Drought. *Potential* – Pesticides and recreational development/overuse.

► **Ownership:**

US Fish and Wildlife Service.

### Site description

This site consists of rolling grass-covered hilltops and croplands above wooded creek bottoms surrounding Kirwin Reservoir. Kirwin Reservoir was established for irrigation and flood control and has fluctuating water levels.

### Birds

Up to 100,000 geese and 220,000 waterfowl use the refuge annually. During spring migration this includes up to 39,000 Greater White-fronted Geese (26% of the population), with a long-term annual average of 7,800 (5% of the population). Fall and winter numbers of Canada Geese range from an average of 28,000 (11% of the population) to a maximum of 70,000 (27% of the population). Of the duck species wintering on the refuge, the Mallard is usually the most abundant, with an average population of 40,000. The numbers of Bald Eagles (federally threatened) wintering on the refuge have increased in recent years, with 105 counted in 1995. Interior Least Terns (federally endangered) sometimes nest on the refuge and Piping Plovers (federally endangered) are occasionally seen during migration.

More than 189 species of birds have been found in the area. Of these, 46 species breed, 13 (28%) of which winter, at least in part, in the neotropics. An additional 65 nearctic migrants are seen on the refuge annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
Canada Goose	FM/W	28,000–70,000
Greater White-fronted Goose	SM	7,800–39,000
Mallard	W	40,000
Bald Eagle	W	15–105

### Conservation issues

Water levels in the reservoir fluctuate widely. This makes long-term planning and management of the refuge difficult. Goose and duck numbers on the refuge have fallen since their peak in the mid-1970s. This is thought to primarily be due to reduced water levels in the reservoir.

An increase in non-compatible recreation/public uses could lead to excessive disturbance of the birds. Succession and invasion of noxious weeds require intensive management.

The refuge is currently implementing a comprehensive management plan. Within the limits of personnel and budgetary constraints, the refuge can address most conservation issues except control of water levels.

71	<b>Balcones Canyonlands National Wildlife Refuge</b> <i>Travis, Burnet and Williamson, Texas</i>	
	USTX01G	30°35' N, 98°02' W
		207–433 m / 57 km <sup>2</sup>

► **Habitats:**

Primarily deciduous woodlands, mixed woodlands and shrublands with some natural and other grasslands and riparian woodland.

► **Land-use:**

Primarily wildlife conservation and rangeland, with some agriculture, rural housing and hunting.

► **Threats:**

*Critical* – Housing development and excessive disturbance of birds. *Major* – Over-browsing, succession, soil erosion, introduction of non-indigenous species, parasitism. *Local* – Over-grazing, deforestation, natural diseases and quarries. *Potential* – Fire.

► **Ownership:**

US Fish and Wildlife Service.

### Site description

The refuge is a complex of diverse Texas Hill Country habitats located on the Edward’s Plateau. Some of the habitats include shinoak shinnery, live oak–ashe juniper woodland, live oak–midgrass savannah, canyon forests containing oak, ash, cherry and elm, live oak–elm–sycamore riparian woodland and post oak–juniper woodlands. More than 525 species of plants have been identified on the refuge to date. Rare species include the Texabama croton (*Croton alabamensis texensis*, a federal candidate) and sycamore-leaf snowbell (*Styrax platanifolia*, an endemic). There is a major monarch butterfly migration corridor on Post Oak Ridge.

### Birds

The refuge provides breeding habitat for as many as 800 pairs of the globally endangered Golden-cheeked Warbler (between 4% and 17% of the world’s population). This is the largest known population on public land. At least 62 pairs of the endangered Black-capped Vireo (greater than 1% of the world’s population) also nest on the refuge. The eastern edge of the Edward’s Plateau is one of the sharpest biogeographic boundaries in North America. The refuge provides habitat for a complete cross-section of the breeding avifauna of the eastern Edward’s Plateau.

More than 172 species of birds are found annually on the refuge. Of these, 77 species breed, 32 (42%) of which winter, at least in part, in the neotropics. An additional 43 nearctic migrants are seen on the refuge annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
Golden-cheeked Warbler	B	500–800 pairs
Black-capped Vireo	B	62 + pairs

### Conservation issues

Only 57 km<sup>2</sup> of the originally authorized 186 km<sup>2</sup> have been acquired to date. Additional acquisitions are being delayed by declining budgets and unwilling sellers. As this area is one of the fastest growing in the US, it is important that acquisition be completed before the land is converted from ranch land to suburban housing.

Land acquisition is slowly taking place. Cooperative efforts and easements with persons holding land within the refuge boundaries have been proposed but none have occurred to date. Brood parasitism by Brown-headed Cowbirds can have a major impact on the Black-capped Vireo populations. An active cowbird trapping program is underway. Habitat manipulation and management (including prescribed burning) occurs regularly.

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## Laguna Atascosa National Wildlife Refuge Cameron, Texas

USTX03G

26°15' N, 97°22' W

0–11 m / 191 km<sup>2</sup>

#### ► Habitats:

Primarily coastal prairie (31%) and tidal wetlands (29%), with shrubland (18%), lakes (16%), natural grasslands (2%), cropland (2%), other grasslands (1%) and non-tidal wetlands (1%).

#### ► Land-use:

Primarily wildlife conservation and recreation, with some agriculture and hunting.

#### ► Threats:

*Critical* – Diversion of water, drought and hurricane. *Major* – Pesticide use. *Potential* – Natural pests/diseases, introduction of non-indigenous species, excessive disturbance of birds, fire, oil pollution and recreational overuse.

#### ► Ownership:

US Fish and Wildlife Service.

### Site description

Laguna Atascosa is the largest protected area of natural habitat left in the Lower Rio Grande Valley. The refuge is a mosaic of coastal prairie, upland thorn scrubland (consisting of Texas ebony, huisache, honey mesquite, granjeno, brasil, coyotillo and other species), tidal wetlands along the Lower Laguna Madre, and lakes, grasslands and agricultural fields. The area is home to both ocelots and jaguarundis (both federally endangered), American alligator (federally threatened) and the rare plant lila de los llanos (*Anthericum chandleri*). Overall, 403 species of birds, 40 species of mammals, 29 species of reptiles and 10 species of amphibians have been recorded on the refuge.

The refuge is a common destination for birders. A study found that in 1994 birders visiting the refuge provided between 3.98 and 5.63 million dollars to the local economy.

### Birds

Laguna Atascosa has recorded more species of birds within its boundaries than any other unit within the refuge system. To date, more than 110 endangered Aplomado Falcons have been released on the refuge as part of a reintroduction program. In winter, up to 40 of the globally vulnerable and endangered Piping Plover (nearly 1% of the world's population) have been found on the refuge. More than 250,000 waterfowl have been counted on the refuge including 31,000–45,000 Redheads (greater than 5% of the world's population) and 10,725–18,300 Canvasbacks (greater than 2% of the world's population). During migration, globally significant populations of Black-bellied Plover, Stilt Sandpiper, Semipalmated Sandpiper, Least Sandpiper and White-rumped Sandpiper occur on the refuge. The refuge also provides stopover habitat for large numbers of migrating passerines and is an excellent representation of this type of habitat within its biome.

More than 282 species of birds are seen annually on the refuge. Of these, 90 species breed, 42 (47%) of which winter, at least in part, in the neotropics. An additional 118 nearctic migrants are seen on the refuge annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
Aplomado Falcon	A	110 released
Piping Plover	W	40
Redhead	W	31,000–45,000
Canvasback	W	10,725–18,390
Black-bellied Plover	SM	975
Stilt Sandpiper	SM	2,400
Least Sandpiper	SM	13,400

### Conservation issues

The primary threat to the area is the conversion of brush habitat outside the refuge to agricultural and residential uses. This interrupts the continuity of brush linkages with the refuge and directly impacts the ocelot population within the area. Diversion of water upstream from the refuge, especially during drought, diminishes water resources for refuge use.

The refuge is trying to work with private landowners to conserve brush habitat. It is also attempting to establish revegetation projects to re-establish brush habitats.

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## Vernon Parish Woodpecker Colonies

*Vernon Parish, Louisiana*

USLA01G

31° N, 93° W

49–135 m / 283 km<sup>2</sup>

### ► Habitats:

Coniferous woodlands (70%), mixed woodlands (20%), deciduous woodlands (5%), other grasslands (5%).

### ► Land-use:

Primarily forestry, with some wildlife conservation, hunting and other recreation.

### ► Threats:

*Local* – Excessive soil erosion/degradation.

### ► Ownership:

Mixed.

### Site description

This site is one of the best examples of longleaf pine–bluestem forest in the United States. The forest is composed of longleaf pine and grasses. There are some mixed bottomland hardwood forests containing loblolly pine, red and post oak, and black hickory. A few pitcher plant bogs occur in the area. There are seventeen sensitive plant species in the area.

### Birds

There are 260 active clusters of the endangered Red-cockaded Woodpecker in this area. The estimated number of birds in these clusters is 700 or approximately 7% of the world's population of this species. This habitat also supports a healthy population of Bachman's Sparrow and provides wintering habitat for Henslow's Sparrow.

	Season	Number
Red-cockaded Woodpecker	A	700

### Conservation issues

Areas containing Red-cockaded Woodpecker clusters are actively managed for the conservation of the species.

74	<b>Upper Mississippi /Trempealeau National Wildlife Refuge</b> <i>Wisconsin, Minnesota, Iowa, Illinois</i>	
	USWI01G	43°20' N, 90°06' W

186–190 m / 785 km<sup>2</sup>

► **Habitats:**

Open water (35%), deciduous woodland (22%), non-tidal wetlands (16%), urban/developed (8%), submergents (7%), grasslands (5%), agriculture (5%), shrub/scrub (3%).

► **Land-use:**

Primary uses include wildlife conservation, agriculture, water supply, fisheries, urban/industrial and hunting/recreation, with some rangeland and forestry.

► **Threats:**

*Critical* – Introduction of non-indigenous species, soil erosion. *Major* – Predation, drainage, drought, agricultural conversion and intensification, parasitism, recreational and other development and flooding. *Local* – Housing development, over-fishing and pesticides. *Potential* – Excessive bird disturbance, oil and other pollution.

► **Ownership:**

US Fish and Wildlife Service.

### Site description

This site consists of approximately 78,500 ha extending along a 421 km stretch of the Mississippi River in Wisconsin, Minnesota, Iowa and Illinois. The refuge begins at the Chippewa River in Wisconsin and ends at Rock Island, Illinois. Navigation locks and dams create a series of pools along the length of the refuge producing a mosaic of open water, extensive marshes and floodplain forests. The refuge contains one of the largest hardwood forests in the Upper Midwest (silver maple, green ash, elm cottonwood and swamp white oak). The marsh and associated habitats are dominated by river bulrush, arrowhead, cattails, American lotus, water lily and wild celery. The uplands consist of shrub carr, sand prairie and southern hardwood forests.

The river is an important navigation system. The economic value of the recreation industry is estimated to exceed \$4 billion annually. There are numerous cultural features, including American Indian mounds, along the length of the refuge. The refuge receives over 3 million visitors a year.

### Birds

More than 136,200 Canvasbacks (22% of the world's population), 16,900 Tundra Swans (20% of the eastern population), 96,700 Lesser Scaup and 271,000 other waterfowl pass through the refuge each fall. The 60 pairs of Bald Eagles breeding on the refuge represents more than 1% of the US population of this species. In winter, this number swells to 600. The refuge also has 5,700 pairs of nesting Great Blue Herons. Thousands of raptors use the river corridor during fall migration. The forested areas provides habitat for large numbers of the breeding passerines (up to 25 birds per hectare) characteristic of floodplain forests.

More than 263 species of birds have been found on the refuge. Of these, 128 species breed, 57 (44%) of which winter, at least in part, in the neotropics. An additional 58 nearctic migrants are seen on the refuge annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
Canvasback	FM	136,200
Tundra Swan	FM	16,900
Lesser Scaup	FM	96,700
other waterfowl	FM	271,000
Bald Eagle	B	60 pairs
Bald Eagle	W	600
Great Blue Heron	B	5,700 pairs

### Conservation issues

Nonpoint source pollution is contributing to the loss of backwater habitats due to sedimentation. The introduced zebra mussel has become established throughout the refuge, resulting in reductions in numbers of native mussels and potential food chain impacts. Increasing recreational use and local urban development have the potential to erode habitat quality through cumulative impacts.

Plans and programs are in place to manage upland habitats for migratory birds and to manage other habitats. Federal ownership of most of the flood-prone land in the floodplain has prevented extensive development and habitat loss.

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## Queen Bess Island

*Jefferson Parish, Louisiana*

USLA03G

29°18' N, 89°57' W

0–1.5 m / 0.2 km<sup>2</sup>

#### ► Habitats:

Primarily tidal wetlands, with marine habitat and shrubland.

#### ► Land-use:

Primarily wildlife conservation, with some fishing and other recreation.

#### ► Threats:

*Potential* – Natural diseases, excessive disturbance to birds, hurricane, oil and toxic pollution.

#### ► Ownership:

State of Louisiana.

### Site description

Queen Bess Island is a low-lying natural island surrounded by a rock dike for shoreline protection. Gaps in the dike allow tidal exchange. The shallow tidal saltmarsh is dominated by *Spartina alterniflora*. Small stands of planted black mangrove and a few scrub species are present on the dikes. The waters next to the island provide important recreational and commercial fisheries.

### Birds

Queen Bess Island is home to a breeding colony of 2,700 Brown Pelicans (3% of the population). More than 2,500 other wading birds breed on or otherwise use the island.

	Season	Number
Brown Pelican	B	2,700
Tricolored Heron	B	500–1,000
White Ibis	O	100–500
other herons	O	600–1,900
Caspian Tern	O	50–100

### Conservation issues

The island is located in the Barataria Waterway, a major navigational channel. Chemicals and petroleum products are frequently transported past the island. An oil terminal is located less than two miles from the island. The adjacent Bayou Rigaud is contaminated with heavy metals in the sediment.

The US Army Corps of Engineers has built a dike around the island to stabilize it. It has also pumped dredged material into the dikes. If the island erodes in the future, additional fill material will likely be added.

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## Baptiste Collette Bird Islands

*Plaquemines Parish, Louisiana*

USLA04G

29°22' N, 89°17' W

0–3.5 m / 2 km<sup>2</sup>

► **Habitats:**

Primarily tidal wetlands (30%), with shrubland (30%), bare ground (25%) and marine habitat (15%).

► **Land-use:**

Primarily wildlife conservation, with some hunting, fishing and other recreation.

► **Threats:**

*Major* – Predation. *Potential* – Excessive disturbance to birds, hurricanes, succession, oil and other toxic pollution.

► **Ownership:**

State of Louisiana.

### Site description

This site consists of a series of six (soon to be seven) low-lying islands made up of dredge material. These islands range from bare sand to those covered by willows and marsh vegetation. Several low-lying mashes have also been created. The marshes contain *Spartina alterniflora*, *Sagittaria latifolia*, *Scirpus validus* and scattered rafts of *Eichornia crassipes*. Upland areas contain grasses, herbaceous plants and a shrub/scrub community, with trees under twenty feet tall. The waters next to the islands provide important recreational fishing opportunities.

### Birds

Baptiste Collette Bird Islands are home to a breeding colony of 250 Gull-billed Terns (4% of the western Atlantic population) and 1,100 Caspian Terns (nearly 50% of the western Atlantic population). Up to 1,500 Brown Pelicans (2% of the Atlantic population) have been counted around the islands, although they have not been recorded breeding there as yet, and 400–800 Black Skimmers breed on the islands. More than 10,000 waterfowl winter in the area.

	Season	Number
Brown Pelican	O	200–1,500
Gull-billed Tern	B	250
Caspian Tern	B	1,100
Black Skimmer	B	400–800

## Conservation issues

The islands are located adjacent to the Baptiste Collette Waterway, a major navigational channel. Chemicals and petroleum products are frequently transported past the islands and spills will always be a potential problem. Bird predation by coyotes has been a problem in the past, although there are currently no coyotes on the islands.

Predator control may occasionally be necessary in order to protect seabird breeding colonies. The Army Corps of Engineers will be depositing dredge spoil on the outermost islands to setback vegetative succession and keep the area clear for breeding seabirds.

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## Jasper-Pulaski Fish & Wildlife Area

*Jasper, Pulaski and Stark, Indiana*

USIN01G

41°09' N, 86°57' W

209–229 m / 32 km<sup>2</sup>

### ► Habitats:

Primarily non-tidal wetlands and deciduous woodlands, with coniferous woodlands and shrublands.

### ► Land-use:

Primarily wildlife conservation, hunting and other recreational uses, with some agriculture.

### ► Threats:

*Major* – Residential development. *Potential* – Natural diseases and excessive disturbance of birds.

### ► Ownership:

State of Indiana.

## Site description

The Jasper-Pulaski Fish and Wildlife Area is made up of a mix of upland woods, shallow freshwater marshes and open fields, surrounded by agricultural land. The upland woods are composed of oak woodlands (black oak and white oak, with bracken ferns and blueberries), oak savannahs (black oaks, with prairie grasses and forbs) and pin oak flats. These are interspersed with seasonal wetlands and freshwater marshes. A total of 38 state endangered, threatened or rare plants are found on the site.

Thousands of nature enthusiasts visit the area in the fall to watch the cranes. It is an important hunting area in the fall and winter and has nonconsumptive uses year-round.

## Birds

Virtually the entire eastern population of Greater Sandhill Crane stops over at this site in the fall. Since 1987, fall counts of greater than 15,000 birds (24% of the world's population) have been recorded. In spring, 1,000–2,000 individuals (about 2% of the world's population) stopover at this site. Some individuals have wintered in the area and a few are now breeding there.

More than 217 species of birds are found in the area annually. Of these, 114 species breed, 48 (42%) of which winter, at least in part, in the neotropics. An additional 51 nearctic migrants are seen on the site annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
Greater Sandhill Crane	FM	15,000–32,000
Greater Sandhill Crane	SM	1,000–2,000

## Conservation issues

The surrounding area is being subdivided for homes, threatening the integrity of the site. Because of the large number of cranes congregating at this site, a disease outbreak could be devastating.

Some additional land acquisition is taking place in the area. Additional crane staging areas are desirable. These could be established through land acquisition, development and management.

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## Shiawassee National Wildlife Refuge

*Saginaw, Michigan*

USMI01G

43°21' N, 84°01' W

177–180 m / 36.8 km<sup>2</sup>

► **Habitats:**

Primarily deciduous woods, non-tidal wetlands, riparian and riverine habitats. Some shrublands, natural grasslands and cropland.

► **Land-use:**

Primarily wildlife conservation, with some agriculture, hunting and other recreation.

► **Threats:**

*Major* – Introduction of non-indigenous species, excessive disturbance of birds, drainage of wetlands, over-browsing, pesticides. *Local* – Deforestation, suburbanization, succession, soil erosion, toxic pollution, increased frequency and severity of river flooding.

► **Ownership:**

US Fish and Wildlife Service.

## Site description

This area is an expanse of floodplain marshes, forests and grasslands in the midst of an agricultural and urban/suburban landscape. Established in 1953, this historically extensive wetland area had been diked, drained and cleared for farming. This site is a level floodplain located at the confluence of four major rivers (Flint, Cass, Tittabawassee and Shiawassee) and several smaller streams, representing a drainage area of more than 1500 km<sup>2</sup>. The freshwater marshes are dominated by cattail and bulrush with adjacent seasonal wetlands composed of grasses, sedges and forbs, most bordered by shrub willow. The floodplain bottomland forest consists of silver maple, green ash, poplar, hickory and elm, with a heavily shaded understory of forbs, bordered by stands of shrub willow and dogwood.

## Birds

Shiawassee NWR is a critical stopover site on the migratory route of the Southern James Bay population of the Canada Goose. During fall migration, 48,000 waterfowl use these marshes for feeding and resting. Of these, approximately 20,000 are Canada Geese (21% of the Southern James Bay population), and 23,000 are Mallards. During spring migration these marshes support 19,000 waterfowl. Of these, approximately 14,000 are Canada Geese (15% of the Southern James Bay population).

The habitat in this area is used by more than just waterfowl. The wetlands may support a breeding population of King Rail (threatened in Michigan), as well as other nesting wetland species, including large numbers of Sedge Wrens. The forested area supports one of the few breeding populations of Prothonotary Warblers (Partners in Flight WatchList) in Michigan.

Overall, more than 250 species of birds have been found on the refuge. Of these, 84 species breed, 33 (39%) of which winter, at least in part, in the neotropics. An additional 42 nearctic

migrants are seen on the refuge annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
Canada Goose	FM	19,500
Canada Goose	SM	13,750

### Conservation issues

Introduced purple loosestrife is invading the native wetland plant community. Active biological control measures have been put into place. Introduced carp increase water turbidity, negatively affecting aquatic plants. Control would be difficult, as the refuge is seasonally flooded from the surrounding rivers. There is public pressure to maintain the deer herd on the refuge at levels that are adversely affecting vegetation. There is additional pressure to open up more of the refuge to recreation. This comes at a time when the refuge's budget and staffing have been reduced, which can be a limiting factor in the management of these additional activities.

Conservation activities underway include the acquisition of additional habitat, conversion of cropland to natural habitats—primarily marsh and seasonal wetlands. A program to restore some of the bottomland hardwood forest has been initiated.

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## Fish Point Wildlife Area

*Tuscola, Michigan*

USMI04G

43°42' N, 83°31' W

177–183 m / 20 km<sup>2</sup>

#### ► Habitats:

Primarily non-tidal wetlands, lakes, rivers and shrubland, with deciduous woods and other grasslands.

#### ► Land-use:

Primarily wildlife conservation and hunting, with some agriculture and other recreational uses.

#### ► Threats:

*Major* – Introduction of non-indigenous species. *Local* – Natural diseases. *Potential* – Excessive disturbance of birds, diversion of water, wetland drainage, drought, agricultural conversion, succession, pesticides, irresponsible hunting and recreational overuse.

#### ► Ownership:

State of Michigan.

### Site description

Fish Point Wildlife Area is made up of a series of large diked units, croplands and sand ridges running along the Saginaw Bay shoreline of Lake Huron. Many of the diked units are filled with cattails and support a wide variety of wetland bird species. The area contains a few small prairie remnants that are among the last remaining lake plain prairies in Michigan. These remnants contain a number of state-listed plant species. The cropland is used to feed the numerous waterfowl stopping over in spring. The sand ridges are used by migrating passerines in spring and fall.

Hunters, trappers, fisherman and birders made a minimum of 16,000 trips to this wildlife area in 1996.

### Birds

Principal bird use of this area is by waterfowl stopping over during their spring migration. More than 30,000 waterfowl have been counted in the area, including more than 5,000 Tundra Swans (greater than 5% of the eastern population of this species). The area was once used by a number of shorebirds on migration but habitat degradation has reduced the importance of this site. Efforts are underway to improve management for shorebirds by creating an invertebrate pool.

	Season	Number
Tundra Swan	SM	5,000 +
waterfowl	SM	30,000 +

## Conservation issues

Lack of funding for the management of this area is a critical problem. This is compounded by the increasing spread of the non-native purple loosestrife in the wetlands. Succession from grasslands to shrublands may cause a decline in the extent of the prairie remnants. Avian botulism is a problem, especially in the summer.

A management plan has been developed for the area. Shrub control and maintenance of the prairie remnants is ongoing but needs to be increased.

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## Ottawa National Wildlife Refuge

*Ottawa, Ohio*

USOH01G

41°37' N, 83°12' W

174–176 m / 18 km<sup>2</sup>

### ► Habitats:

Primarily non-tidal wetlands, with grasslands, deciduous woodlands and shrubland.

### ► Land-use:

Primarily wildlife conservation, with some hunting, fishing, trapping and other recreational uses.

### ► Threats:

*Local* – Introduction of non-indigenous species, natural pests and diseases; *Potential* – Pesticides.

### ► Ownership:

National Wildlife Refuge.

## Site description

This site consists of a conglomerate of open pools, marshes, grasslands, deciduous woodlands and shrublands along the shoreline of Lake Erie. The marshes are composed of cattails, bulrushes, smartweed, millets, pickerel weed and other marsh plants.

Ecotourism on the refuge and surrounding areas contributes 5 million dollars annually to the surrounding communities.

## Birds

The position of the refuge at the mouth of Crane Creek leading into Lake Erie concentrates waterfowl and other birds. During fall migration, 50 Bald Eagles pass through the area. These are largely birds that have hatched that year in Michigan and Ohio. More than 45,000 waterfowl pass through the refuge during spring and fall migration. This includes 4,760 American Black Ducks (5% of the Mississippi flyway population).

More than 275 species of birds are recorded on the refuge annually and another 50 accidentals have been recorded. Of these, 128 breed, 48 (38%) of which winter in the neotropics. An additional 58 nearctic migrants are recorded annually, either coming from or returning to their wintering grounds in the neotropics. There is an active bird banding program on the refuge, with more than 15,000 neotropical migrants banded annually.

	Season	Number
Bald Eagle	FM	50
American Black Duck	SM/FM	4,800

## Conservation issues

The primary threat facing the refuge is invasion by purple loosestrife. Biological control measures are being implemented with the introduction of *Hylobius spp.* and *Galerucella spp.*, insects which are natural predators of the plant.

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## Big Cypress National Preserve

*Collier, Monroe and Dade, Florida*

USFL01G

26°00' N, 81°07' W

3–7 m / 2,898 km<sup>2</sup>

### ► Habitats:

Cypress prairies (43%), sawgrass prairies (24%), coniferous woodlands (18%), tropical hardwoods (8%), marshes (4%).

### ► Land-use:

Protection of the water supply to Everglades National Park while providing for wildlife conservation, recreation (including hunting and fishing) and mining.

### ► Threats:

*Critical* – Diversion of water, draining and recreational development/overuse. *Major* – Introduction of non-indigenous plants/animals and pollution. *Local* – Natural pests, suburbanization, mining, succession, oil and other toxic pollutants and irresponsible hunting. *Potential* – Excessive disturbance of birds, hurricanes and over-extraction of ground-water.

### ► Ownership:

US National Park Service.

## Site description

Big Cypress is an expanse of flat cypress and sawgrass prairies, with an average standing water depth of 15 cm throughout the preserve. Located in south Florida, the site has a subtropical climate and receives more than 130 cm of rain a year. The preserve also contains pine forest with palmetto understory, mixed swamp forest, tropical hardwoods, marshes and marine habitat. This site contains seven orchid species found nowhere else, 15 species of plants considered endangered and 96 species considered threatened in Florida. It also provides critical habitat for the Florida panther, Big Cypress fox squirrel and Florida tree snail.

## Birds

This is an important area for breeding birds, especially those associated with wetlands in the southeastern United States. An aerial survey in 1996 counted 1,250 Wood Storks (10% of the biogeographic population). There are 16 other species of wading birds in the preserve, including all 12 species of North American herons. The preserve also contains around 100 Everglades Snail Kites (10% of the US population), more than 100 American Swallow-tailed Kites (2.5% of the US population), and 125 Red-cockaded Woodpeckers (1% of the world's population of this endangered species). There are significant populations of Sandhill Cranes and possible Cape Sable Seaside Sparrows as well.

	Season	Number
Wood Stork	A	1,250
A. Swallow-tailed Kite	B/SM/FM	> 100
Everglades Snail Kite	A	< 100
Red-cockaded Woodpecker	A	125

### Conservation issues

Principal concern is the diversion of natural water flow due to the construction of houses, roads and the Miami Canal. Citrus plantations are located to the north of the preserve and there is some run-off of agricultural pollutants from them. Melaleuca, a tree imported from Australia currently occupies approximately 6% of the preserve and has proven difficult to control. Brazilian pepper tree and casuarina (Australian pine) have also invaded the preserve. Off-road vehicle use may be causing problems in parts of the preserve. The 2,300 vehicles (annual permits) carve trails through the preserve altering water flow and destroying vegetation.

A water resources plan was completed in 1996 and an off-road vehicle management plan is being developed. Control of non-indigenous plants and animals is ongoing. The casuarina has been effectively controlled, and the Brazilian pepper is being managed as a naturalized species until an effective method is developed to prevent seed dispersal. The melaleuca is an aggressive colonizer. Current management activities are limiting its spread.

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## Pymatuning Lake and Hartstown Marsh

*Crawford County, Pennsylvania*

USPA09G

41°33' N, 80°22' W

308–310 m / 100 km<sup>2</sup>

#### ► Habitats:

Lake, freshwater marsh, shrub swamp, agricultural land.

#### ► Land-use:

Wildlife conservation and management, recreation.

#### ► Threats:

*Major* – Non-indigenous flora, disturbance to birds.

#### ► Ownership:

Pennsylvania Game Commission.

### Site description

Pymatuning Lake was created when a former swamp was flooded. The upper lake is maintained at a steady level, about 4.5 meters at its deepest. The larger, lower lake area extends into Ohio and is heavily used for recreation. The important area includes the adjacent freshwater wetlands. An adjoining upland area contains several ponds used by shorebirds in migration. To the south of the upper lake is Hartstown Marsh, extending as a shrub and forested swamp south into a second watershed. A diversity of wetland types, from floating pond plants to extensive forested swamps, is found in the wildlife area and south into State Game Lands 214.

### Birds

The area supports significant concentrations of waterfowl in fall migration and winter, including up to 2% of the population of Common Goldeneye, 1% of Canada Goose, and 1% of Hooded Merganser. The site has the largest concentration of nesting Bald Eagles in the state.

	Season	Number
Common Goldeneye	FM/W	18,000
Canada Goose	FM/W	10,000
Hooded Merganser	FM/W	4,000
Bald Eagle	B	4 pairs

### Conservation issues

Threat from purple loosestrife and populations of introduced carp, which compete with waterfowl for resources, is critical. Recreational use of the lower lake by personal watercraft poses a disturbance to birds. This wetland complex is maintained by the Pennsylvania Game Commission for wildlife management and hunting. The upper lake is a wildlife refuge with limited public access.

83	<b>Presque Isle State Park</b> <i>Erie County, Pennsylvania</i>	
	USPA08G	42°10'N, 80°04'W

341–457 m / 12.8 km<sup>2</sup>

► **Habitats:**

Shoreline; freshwater marsh and deciduous forest.

► **Land-use:**

Wildlife conservation and recreation.

► **Threats:**

*Major* – Recreational overuse, deer overbrowsing and beaver damage.  
*Potential* – Excessive hunting.

► **Ownership:**

Pennsylvania Bureau of Parks.

### Site description

Presque Isle State Park is a low-lying peninsula on the shore of Lake Erie, composed mainly of broad-leaved deciduous woodland and freshwater marshes. The peninsula is basically sandy and has been formed by long-shore drift. Mature forest dominates the old sand dune ridges—mainly oak, maple, and cherry. The newer ridges at the east end of the park are dominated by cottonwood and willow. There are extensive freshwater marshes in the areas between the ridges, dominated by phragmites, button-bush, and spatterdock. Abundant stands of bayberry dominate the open areas.

This is the only known site in Pennsylvania for Kalm's lobelia, and is also a site for hoary puccoon (rare). A total of more than 500 species of flowering plants can be found at this site, including 50 rare species. It is also the only known site in the state for Blanding's turtle.

### Birds

The peninsula protects Erie Bay from storms coming from the Northwest, making it a haven for migratory birds. Waterfowl concentrations average a total of 100,000 birds, and high concentrations of wintering gulls are also present (250,000). Approximately 325 species have been recorded at the site.

	Season	Number
waterfowl spp.	FM/W/SM	100,000
gull spp.	FM/W/SM	250,000

### Conservation issues

Designation as a state park provides some measure of protection, but recreational overuse is a serious threat. Twenty-six ha of the park known as Gull Point were closed to public entry several years ago to protect migratory shorebirds and to encourage former nesting species

such as the Common Tern and Piping Plover to recolonize the park. Waterfowl hunting pressure is intense during the hunting season and there has been talk of opening all ponds to hunting. Beaver and deer populations are causing damage to the habitat.

<h1>84</h1>	<b>Mount Zion (Piney Tract)</b> <i>Clarion County, Pennsylvania</i>	
	USPA07N	41°08'N, 79°30'W
341–457 m / 9.2 km <sup>2</sup>		

- ▶ **Habitats:**  
Grasslands (revegetated), deciduous forest, ponds.
- ▶ **Land-use:**  
Recreation and wildlife conservation (mine reclamation).
- ▶ **Threats:**  
*Major* – Succession. *Potential* – Recreational overuse, pollution.
- ▶ **Ownership:**  
Corporate; unprotected.

**Site description**

The Mount Zion area is situated on high ground in Clarion County, south of the Clarion River. High, rolling hilltops, stripmined in the late 1970s, were revegetated with grasses and tree plantations. The extensive grasslands have attracted prairie species of birds previously unknown in the region, originally a wooded plateau. Grasslands now occupy mainly the hilltops. Lower slopes, which have been planted to locusts and pines, are quickly becoming revegetated. Still further down, where no mining occurred, are patches of the original deciduous forest.

**Birds**

Mount Zion is one of only two areas in the state where Short-eared Owls (Pennsylvania threatened species) are known to breed. The extensive grasslands support high breeding densities of Henslow’s, Grasshopper, and Savannah sparrows, Eastern Meadowlark, and other characteristic species. First known breeding site in the state for Dickcissel since 1887.

	Season	Number
Short-eared Owl	B	4+ pairs
Northern Harrier	B	2+ pairs
Upland Sandpiper	B	2+ pairs
Henslow’s Sparrow	B	50+ pairs
Grasshopper Sparrow	B	50+ pairs
Savannah Sparrow	B	50+ pairs
Eastern Meadowlark	B	50+ pairs

## Conservation issues

Fragmentation of the area is likely if no effort is made to keep the entire tract intact. Natural succession could increase shrub and brush components so as to make the area unsuitable for grassland birds. Periodic burning of patches of the habitat will be necessary to maintain the grassland stage. Pollution from acid mine drainage is a potential problem, as is recreational overuse. In December 1995, the Pennsylvania Game Commission designated the area as a Forest Game Project. This increases the area's potential for recreational overuse. Attempts are being made to put the area under the jurisdiction of the commission.

85

## Holly Shelter Game Land

*Pender, North Carolina*

USNC01N

34°30' N, 77°43' W

1.8–19 m / 197 km<sup>2</sup>

### ► Habitats:

Primarily non-tidal wetlands and coniferous woodlands, with riparian, deciduous woodlands and shrubland.

### ► Land-use:

Primarily wildlife conservation/research, with some forestry and hunting.

### ► Threats:

*Major* – Hurricane and fire. *Local* – Property line encroachments. *Potential* – Housing and other development.

### ► Ownership:

State of North Carolina.

## Site description

Managed primarily to provide wildlife habitat and public recreational opportunities, this site contains characteristic Atlantic coastal plain plant communities, including pine savanna/flatwoods, pocosins, riverine swamp and upland forests dominated by a pine canopy. Holly Shelter Game Land also contains populations of rough-leaved loosestrife (federally endangered), Carolina Grass-of-Parnassus (state endangered), Carolina goldenrod (state endangered) and yellow fringeless-orchid (state threatened).

## Birds

This area supports 25 breeding colonies of Red-cockaded Woodpecker, an endangered species. Total number of birds at the site varies depending on the time of year but is usually greater than 50 (approx. 0.5% of the world's population). Additional colonies probably exist within inaccessible pocosin habitats on the site. The colonies at Holly Shelter Game Land make up 10% of the North Carolina Southern Coastal Plain population of the Red-cockaded Woodpecker.

	Season	Number
Red-cockaded Woodpecker	A	53+

## Conservation issues

Surrounding residential and commercial development isolates this area from other habitat units. The potential for wildfires has increased with open burning in surrounding residential areas. Fires like these have burned most of Holly Shelter in the past. The location also predisposes the area to hurricane damage.

The area has no special protection other than that given to any North Carolina game lands.

<b>86</b>	<b>Braddock Bay</b> <i>Monroe County, New York</i>	
USNY05G	43°32' N, 76°32' W	73–90 m / 20.38 km <sup>2</sup>

► **Habitats:**

Primarily non-tidal wetlands, ponds, lakeshore, deciduous woods, and suburban development, with some shrublands and grasslands.

► **Land-use:**

Large areas managed for wildlife, mixed with residential development and outdoor recreation (including boating and fishing).

► **Threats:**

*Critical* – residential and commercial development; recreational over-use.  
*Major* – pollution, non-native flora/fauna. *Potential* – succession.

► **Ownership:**

New York Department of Environmental Conservation and private owners.

### Site description

The Braddock Bay IBA is an area of ponds, creeks, wetlands, woods, and fields along the shore of Lake Ontario, near the city of Rochester. Wetland portions are dominated by cattail marsh. Upland portions are mainly wet deciduous forest, abandoned farmland, and private residential properties. The site includes the state-owned Braddock Bay Wildlife Management Area and Braddock Bay State Park, and privately-owned lands. The Braddock Bay Raptor Research Center has an ongoing hawk and owl banding program and annually staffs a spring hawk watch from February through June. Braddock Bay Bird Observatory carries out a large-scale passerine mist-netting and banding operation each spring and fall.

### Birds

The area has a great abundance and diversity of birds. One of the largest spring hawk flights in the world passes through this area, with over 100,000 birds counted annually (144,000 in 1996). Banding efforts have shown the area to be an important owl migration point, with an average of 100 Northern Saw-whet Owls and 35 Long-eared Owls banded each spring from 1985 to 1995. Woodlands in the area host large numbers and a great variety of song-birds. A passerine banding station at the site has operated annually for the last 12 years and annually bands thousands of individuals (5,122 in 1996). The area also supports breeding populations of state-listed wetland species, including Pied-billed Grebe, American Bittern (at least four pairs), Least Bittern, Northern Harrier, Black Tern (27 to 38 pairs; 10–15% of the state breeding population), and Sedge Wren. Finally, the site regularly hosts waterfowl concentrations in the thousands.

	Season	Number
Raptor spp.	SM	144,000
Northern Saw-whet Owl	SM	100
Long-eared Owl	SM	35
Black Tern	B	27–33 pairs
landbird concentrations	SM/FM	5,000+

### Conservation issues

Although much of the wetland marsh habitat is currently protected and under management by the New York State Department of Environmental Conservation, most of the upland portions have become residential or commercial developments. The remaining forest, shrubland, and grassland fragments are vitally important as foraging locations for migrating hawks, owls, and passerines, and are being rapidly lost to development. The area's most well-known passerine concentration site, Island Cottage Woods, is under threat of development despite 20 years of ongoing negotiations with the landowners. The site of the Braddock Bay Bird Observatory's long-term banding operation is similarly under threat of being sold for development. The massive numbers of hawks and owls that migrate through the area rely on undeveloped areas for foraging. There have been localized problems with unsupervised all-terrain-vehicle use, illegal woodcutting, illegal dumping, and suburban lawn runoff. For example, there was a waterfowl die-off in 1995 and 1996 traced to diazanon, a lawn insecticide.

87	<b>Northern Montezuma Wetlands Complex</b> <i>Seneca, Wayne, and Cayuga Counties, New York</i>	
	USNY06G	43°02'N, 76°48'W
		114–120 m / 144 km <sup>2</sup>

#### ► Habitats:

Primarily non-tidal wetland, riparian, deciduous woods, and agricultural land.

#### ► Land-use:

Agriculture, wildlife conservation, and recreation and tourism, including hunting and fishing.

#### ► Threats:

*Critical* – Introduction of non-indigenous flora. *Major* – Pollution from land-fill leachate, agricultural conversion. *Local* – Development.

#### ► Ownership:

US Fish and Wildlife Service, State, and private.

### Site description

The Northern Montezuma Wetlands Complex lies within the heart of the drumlins region of New York's Great Lakes Plain. This area includes the Montezuma National Wildlife Refuge. It is characterized by broad, flat basins interspersed with classic drumlin formations. These glacial formations are generally oriented in a north-south direction, with wetland basins in the valleys between adjacent drumlins. The mix of extensive marshes and swamps, upland forests, productive agricultural soils, topography, and hydrology creates a patchwork of diverse habitats important to many migratory and resident wildlife species. Due to the area's location on the Atlantic Flyway, the complex plays a key role in providing waterfowl feeding and resting habitat and providing a link between the deepwater habitats of Lake Ontario and the Finger Lakes.

### Birds

An exceptional complex of wetland habitats supports a high diversity and abundance of wetland-dependent species at this site. The area hosts one of the largest migratory concentrations of waterfowl in the Northeast. Over 500,000 Canada Geese pass through during each migration period, a significant portion of the global population. During spring migration, 15,000 Snow Geese regularly use the area. In late fall, Mallard numbers peak at 100,000 (1% of the US population) and American Black Duck at 25,000 or more (>8% of the global population). Montezuma National Wildlife Refuge is also one of the most significant stopover and foraging locations for shorebirds in upstate New York, regularly hosting 1,000 or more individuals of 25 species. Many federally and state-listed species breed within the complex, including Pied-billed Grebe, American and Least Bitterns, Osprey (4 pairs), Bald Eagle (3 pairs), Northern Harrier, Cooper's Hawk, Red-shouldered Hawk, Black Tern (5–10 pairs), Sedge Wren (2–5 pairs), and Cerulean Warbler (250 pairs). The site supports breeding colonies of Great Blue Heron and Black-crowned Night Heron, and hosts one of the largest fall swallow concentrations in the state, estimated at between 50,000 and 100,000 individuals.

	Season	Number
Canada Goose	SM/FM	500,000
Snow Goose	SM	15,000
American Black Duck	FM	25,000
Mallard	FM	100,000
shorebird spp.	FM	1,000
Bald Eagle	B	3 pairs
Osprey	B	4 pairs
swallow spp.	FM	50,000–100,000
Sedge Wren	B	2–5 pairs
Cerulean Warbler	B	250 pairs

### Conservation issues

Land acquisition within the complex by the US Fish and Wildlife Service and the New York State Department of Environmental Conservation (DEC) has continued (300 ha acquired by the latter in 1997), but there are insufficient funds to acquire land at the same rate as willing sellers are identified. Agricultural use of drained wetlands continues, though such lands are specifically targeted for acquisition whenever possible. There are problems with runoff from croplands into wetlands. The invasion of purple loosestrife has been a major problem, but active control programs have been implemented by the refuge and DEC staff, including an experimental release of insect control agents. The various measures have had some success in decreasing the spread of loosestrife and in reestablishing cattail marsh in certain areas, but invasive non-indigenous flora is an ongoing problem. A large landfill is located on the western boundary of the area. The direction of groundwater flow at this site is towards the refuge. The landfill administration has requested a permit to expand operations, and the site may become the largest landfill in the state. There are concerns that over the long term, contaminants could leach out and impact the wetlands and wetland-associated species.

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### Jug Bay, Patuxent River

*Anne Arundel, Calvert and Prince George's, Maryland*

USMD02N

39°30' N, 76°42' W

0–6 m / 12 km<sup>2</sup>

#### ► Habitats:

Primarily riparian tidal wetlands, with non-tidal wetlands, mixed woods and shrubland.

#### ► Land-use:

Primarily wildlife conservation with some agriculture, fishing and other recreational uses.

#### ► Threats:

*Critical* – Residential development. *Major* – Introduction of non-indigenous species, succession, soil erosion and eutrophication. *Local* – Predation. *Potential* – Natural pests/diseases, land claim, recreational overuse and flooding.

#### ► Ownership:

Mixed, including Anne Arundel County and State of Maryland.

### Site description

Jug Bay Wetland Sanctuary is primarily (75%) made up of three tracts of public land (Jug Bay Natural Area, Jug Bay Wetlands Sanctuary and Merkle Wildlife Sanctuary), interspersed with some private land. Jug Bay consists of a meandering main channel, a shallow embayment with exposed mud flats (at low tide) and extensive freshwater tidal marshes. Several major creeks enter the river and tidal channels run throughout the marshes. The marshes are among the most extensive in the state and contain wild rice (one of the largest stands on the East Coast), spatterdock, pickerelweed, arrow arum, arrowhead, smartweeds, cattails, phragmites, jewelweed, sedges, bulrushes and nearly 40 other species. The marshes are surrounded by uplands vegetated in Virginia pine, sweetgum, tulip tree, American beech and oaks as well as some agricultural land. This is one of the few sites in Maryland where red turtlehead (*Chelone obliqua*, a state endangered species) is found.

### Birds

This site is a good example of an eastern freshwater marsh ecosystem. It provides breeding habitat for more than 65 Osprey, migration habitat in fall for both Sora and Virginia Rails (more than 4,000 counted), migration habitat for shorebirds (3,000 counted) and wintering habitat for gulls (10,000) and waterfowl (8,000).

More than 205 species of birds are seen annually in the area. Of these, 90 species breed, 41 (46%) of which winter, at least in part, in the neotropics. An additional 52 nearctic migrants are seen on the refuge annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
Osprey	B	65
Sora and Virginia Rail	FM	4,000 +

### Conservation issues

The primary threat to this area comes from encroaching commercial and residential development in the watershed. Construction, additional impervious surfaces, resultant sedimentation and runoff, increased traffic, habitat loss and fragmentation all have an impact. A serious decline in the wild rice crop may have a negative impact on the rail population.

Tree and shrub plantings have begun, in order to increase the size of buffers around the area. Ongoing shrub and meadow management is undertaken to improve wildlife habitat. Efforts are underway to acquire additional habitat for the parks.

89

### Wyoming State Forest and World's End State Park

*Sullivan and Lycoming Counties, Pennsylvania*

USPA10S

41°26'N 76°37'W

308–310 m / 168 km<sup>2</sup>

► **Habitats:**

Mature forest, with some riparian areas and shrub/scrub swamp.

► **Land-use:**

Forestry; wildlife management, conservation and recreation.

► **Threats:**

*Potential* – Natural pests and disease, recreational overuse, inappropriate forestry practices.

► **Ownership:**

Pennsylvania Bureau of Forestry.

### Site description

Wyoming State Forest and World's End State Park consist of a large area of relatively mature and unbroken forest. This includes an extensive northern hardwood-hemlock forest on the eastern side of the mountainous High Plateau section of the Allegheny Plateau. Much of the forest is on highland plateau, with relatively flat terrain bisected by narrow stream valleys. The Kettle Creek Gorge area contains large specimens of tulip poplar, black cherry, and American beech. Most of the rest of the forest is covered by second-growth beech, red maple, black cherry, yellow birch, white ash, and eastern hemlock. At the headwaters of the streams there are conifer swamps and peatlands (mostly hemlock), and shrub/scrub swamps, with high densities of songbirds.

### Birds

Data from the Breeding Bird Survey and the state Special Areas Project (SAP) show high densities of forest interior, area-sensitive birds relative to the surrounding area. Key breeding species include Blackburnian and Black-throated Green warblers. Other notable species include Barred Owl, Common Merganser, Ruffed Grouse, Brown Creeper, Least Flycatcher, and Scarlet Tanager. It contains one of the few confirmed nesting sites in Pennsylvania for the Yellow-bellied Flycatcher (state endangered).

	Season	Number
Yellow-bellied Flycatcher	B	4+ pairs

### Conservation issues

Potential threats include natural pests and disease, recreational development and overuse, and excessive or inappropriate forestry practices. The forest managers have kept hemlock swamps protected by providing buffer zones around them.

90	<b>Conejohela Flats</b> <i>Lancaster County, Pennsylvania</i>	
	USPA03G	39°59'N, 76°29'W

68–70 m / 0.4 km<sup>2</sup>

► **Habitats:**

Mudflats, river islands, with shrub, grasses, herbs, and woody vegetation.

► **Land-use:**

Water control (hydroelectric generation), recreation.

► **Threats:**

*Major* – Recreational overuse and disturbance to birds. *Potential* – Water-level changes.

► **Ownership:**

Corporate; unprotected.

### Site description

Conejohela Flats is a combination of small brush islands and adjacent mudflats on the Susquehanna River. The IBA also encompasses this reach of the river, including Lake Clarke. The mudflats are produced when Safe Harbor Dam lowers the Lake Clarke area of the river for hydroelectric generation. A mixture of shrubs, some deciduous trees, grasses and sedges covers the islands. The flats are exposed and flooded daily by the operation of the dam. When exposed in spring and fall, they provide habitat for migratory shorebirds. There are some larger islands with deciduous growth, but they are not particularly important for birds at present. Historically, they held a large breeding colony of Cattle Egrets and Black-crowned Night-Herons.

### Birds

This site is a globally significant wintering area and spring migration staging area for Tundra Swan. It also hosts major winter and spring concentrations of Snow Goose. It is one of the two or three largest staging areas in Pennsylvania for migratory shorebirds in spring and fall, with up to 17,000 birds of 30 species regularly occurring. Conejohela Flats is a noteworthy wintering area for Bald Eagle. Breeding species include Prothonotary Warbler (Pennsylvania Species of Concern).

	Season	Number
Tundra Swan	W/SM	15,000
Snow Goose	W/SM	15,000
shorebird spp.	SM/FM	17,000

## Conservation issues

The dam operator has applied to raise water levels above the dam, which could inundate the mudflats and eliminate the shorebird habitat. Conservation groups have met with the power company to discuss alternatives, and in March 1997 the company issued a revised plan for comment. The Lancaster County Bird Club has been coordinating studies at the site on the potential impacts of water level changes. Disturbance from recreational boaters and jet skiers could have negative effects on migratory birds. Encroachment by purple loosestrife is also a major threat.

91

## Derby Hill Bird Observatory

*Oswego County, New York*

USNY04G

43°32' N, 76°32' W

73–94 m / 0.23 km<sup>2</sup>

► **Habitats:**

Grasslands and fields, lakeshore, and some shrubland and deciduous woodlands.

► **Land-use:**

Wildlife conservation and research.

► **Threats:**

*Local* – Non-indigenous fauna and flora, erosion. *Potential* – Residential development.

► **Ownership:**

Onandaga Audubon Society.

## Site description

Strategically located on a bluff overlooking the southeast corner of Lake Ontario, the observatory is one of the highest points in the area. Birds migrating along the southern shore of Lake Ontario in spring turn and follow the shoreline instead of flying out over the lake. This funnels birds over Derby Hill. A broad, open field atop the hill provides a wide expanse for viewing migrating hawks, and looking out over the lake one may see thousands of migrating waterfowl, gulls, and, in fall, jaegers. Mixed deciduous woods on part of the main parcel harbor large numbers of passerine migrants. The marsh habitats host migrant and breeding waterfowl, waders, and other wetland-dependent species.

## Birds

Derby Hill is well-known as a spring hawk concentration site and has been monitored annually since 1963. The average total number of hawks counted each spring from 1979 to 1996 was 43,293, with a maximum of 66,139, making the site one of global significance. At least 20 diurnal raptor species have been recorded here, including an annual spring average of 2,997 (max. 7,537) Turkey Vultures, 406 (692) Osprey, 37 (101) Bald Eagles, 780 (1,554) Northern Harriers, 5,936 (11,582) Sharp-shinned Hawks, 543 (1,176) Cooper's Hawks, 70 (174) Northern Goshawks, 950 (1,805) Red-shouldered Hawks, 22,449 (40,108) Broad-winged Hawks, 7,979 (19,531) Red-tailed Hawks, 396 (656) Rough-legged Hawks, 24 (55) Golden Eagles, 497 (931) American Kestrels, 19 (53) Merlins, and 4 (12) Peregrine Falcons. The site meets national-level significance for Broad-winged Hawk and Northern Harrier. The site is also an important spring stopover site and concentration point for migrating passerines. Offshore, waterfowl (especially sea ducks and diving ducks) and gull concentrations regularly number into the thousands, and the site is known as one of the few viewing locations for fall jaeger flights, with more than 200 (mostly Parasitic) counted on one day in October 1979.

	Season	Number
Raptor spp.	SM	66,139
Bald Eagle	SM	37
Northern Harrier	SM	780
Osprey	SM	406
Broad-winged Hawk	SM	22,449
Red-shouldered Hawk	SM	950
Sharp-shinned Hawk	SM	5,936
Rough-legged Hawk	SM	396
Jaeger spp.	FM	200+

### Conservation issues

The Sage Creek Marsh portion of the site is threatened by invasion of purple loosestrife. Erosion of the bluff, particularly during winter storms and spring thaw, is causing loss of overlook property.

92

## Dutch Mountain Wetlands Complex

Wyoming County, Pennsylvania

USPA04S

41°28'N, 76°13'W

670–686 m / 1 km<sup>2</sup>

#### ► Habitats:

Boreal conifer swamps and shrub/scrub wetlands.

#### ► Land-use:

Conservation and wildlife management.

#### ► Threats:

*Potential* – Wetland draining and filling, overgrazing by deer, recreation, and pests.

#### ► Ownership:

Corporate.

### Site description

Dutch Mountain Wetlands is the collective name for an archipelago of boreal conifer swamps and shrub/scrub wetland on the eastern extension of the Allegheny Plateau. Coal Bed Swamp, Tamarack Swamp, and Crane Swamp are all included in the site. Some of the largest and oldest red spruce in the state dominate the area and form dense stands. Eastern hemlock, black spruce, eastern larch, red maple, black gum, and yellow birch are also prominent. The wetlands have a well-developed peat layer and are covered with sphagnum moss. Ferns, sedges, and a variety of herbs and forbs provide dense ground cover. Shrubs and conifer samplings provide a dense mid-story layer.

At this site, the hoary bat has been recorded but is extremely rare. It is also a reintroduction area for fisher.

### Birds

More than sixty breeding species are present, including at least six pairs of Yellow-bellied Flycatcher (a state endangered species), Northern Saw-whet Owl, numerous interior-forest, area-sensitive species such as Blackpoll (first confirmed breeding site in the state), Canada, Black-throated Blue, and Black-and-white Warbler, and species associated with the unique habitat, such as Purple Finch, Northern Waterthrush, White-throated Sparrow, and Nashville Warbler.

	Season	Number
Yellow-bellied Flycatcher	B	6+ pairs

### Conservation issues

The area is one of the largest roadless areas in Pennsylvania, and the swamp has not been significantly altered in 75 years. It should be given special protected status as one of the rarest and most pristine habitats in the state. Drainage ways from the swamps must not be

blocked and the integrity of the headwaters should be maintained. Potential threats include inappropriate wetland draining and/or filling, excessive use of all-terrain vehicles, over-browsing by deer, road development, and damage from elm spanworm. The Pennsylvania Game Commission has purchased the tract from private landowners to make it available for public use. Large sections have been gated and the commission patrols for ATV use.

93

## Mattamuskeet National Wildlife Refuge

*Hyde, North Carolina*

USNC02G

35°30' N, 76°10' W

0–1.5 m / 203 km<sup>2</sup>

► **Habitats:**

Natural freshwater lake (80%), freshwater marsh (8%), mixed woodlands (6%), moist-soil units (5%) and some cropland (1%).

► **Land-use:**

Primarily wildlife conservation and habitat management, with some forestry, agriculture, hunting fishing and other recreation.

► **Threats:**

*Major* – Agricultural conversion, drought and hurricane. *Local* – Natural pests, introduction of non-indigenous fauna/flora, drainage, fire, increase in agriculture, soil erosion/degradation. *Potential* – Deforestation and pesticide pollution.

► **Ownership:**

US Fish and Wildlife Service.

### Site description

Lake Mattamuskeet, the largest natural lake in North Carolina, is a shallow body of water averaging only 0.6 m in depth. Vegetation in the lake includes *Vallisneria americana*, *Potamogeton crispus* and *Chara* species. Surrounding the lake are freshwater marshes containing flat sedges, spikerush, wild millet, cattails and phragmites. The forested swampland on the refuge consists of sweetgum, bald cypress, red maple and loblolly pine. This site also supports habitat for the American Alligator and Red Wolf.

Recreation-related economic benefits of the refuge to the local economy are estimated to be approximately \$700,000 annually.

### Birds

The refuge supplies habitat for more than 120,000 waterfowl during the winter. This includes 21,650 Tundra Swans (25% of the eastern population), 13,278 Ruddy Ducks (2% of the population) and approximately 1% of the populations of Canvasback, Northern Pintail, American Black Duck, Ring-necked Duck, Green-winged Teal, Snow Goose and Canada Goose.

More than 240 species of birds have been found here or at nearby Swan Quarter NWR. Of these, 78 species breed, 28 (12%) of which winter, at least in part, in the neotropics. An additional 74 nearctic migrants are seen on the refuge annually, either coming from or returning to their wintering grounds in the neotropics.

	Season	Number
Tundra Swan	W	21,650
Canvasback	W	9,953
Northern Pintail	W	25,051
American Black Duck	W	2,522
Ring-necked Duck	W	8,322
Green-winged Teal	W	25,327
Ruddy Duck	W	13,278
Snow Goose	W	9,250
Canada Goose	W	5,307
Osprey	B	79 pairs

### Conservation issues

There has been a decline in the wintering Canada Goose population, owing to poor production, over-harvest and land use changes in the flyway and on local agricultural lands. Pocosins and forested swamps/wetlands on the Albemarle-Pamlico peninsula have been converted to agricultural land, leading to increased fragmentation of the habitat. Housing development along portions of Lake Mattamuskeet has the potential to disturb traditional waterfowl areas and affect lake water quality. The local community tends to take the natural resources for granted and local government is non-supportive of conservation of the resource.

The refuge works to overcome these obstacles by providing education for the local community and through enforcement of existing wildlife laws.

94

### Tionesta Natural Scenic/Research Area *McKean, Pennsylvania*

USPA01S

35°30'N, 76°10'W

458–604 m / 16.4 km<sup>2</sup>

► **Habitats:**

Old growth deciduous and mixed forest, with no oak or pine.

► **Land-use:**

Recreation, conservation/natural area and mining.

► **Threats:**

Over-browsing by deer.

► **Ownership:**

US Forest Service.

### Site description

Part of the Allegheny National Forest, the Tionesta Natural Scenic and Research Area contains the largest tract of old-growth forest in Pennsylvania, consisting of never-logged beech and hemlock with some maple and cherry.

### Birds

The scenic and research area contains exceptionally high densities of breeding neotropical migrants and characteristic old-growth species, including densities of nesting Blackburnian Warblers up to 40 times greater than in the surrounding forest. It is one of the few confirmed breeding locations in Pennsylvania for Yellow-bellied Flycatcher, a state threatened species, and is an important breeding site for Northern Goshawk and Swainson's Thrush.

	Season	Number
Yellow-bellied Flycatcher	B	Unknown
Swainson's Thrush	B	Unknown
Northern Goshawk	B	Unknown

### Conservation issues

The chief threat to this area is over-browsing by deer, which degrades the understory of the forest. The site is protected and used for research. Mineral rights belong to the federal government. Part of the area sustained tornado damage in 1985.

95	<b>Blue Marsh Lake</b> <i>Berks County, Pennsylvania</i>	
	USPA02G	40°23'N, 76°03'W
		88–177 m / 27.2 km <sup>2</sup>

► **Habitats:**

A 460 ha man-made lake surrounded primarily by deciduous forest, with shrub swamp and cultivated fields.

► **Land-use:**

Recreation, water supply, wildlife management.

► **Threats:**

Recreational overuse, residential and commercial development.

► **Ownership:**

US Army Corps of Engineers.

### Site description

Blue Marsh Lake is a water-storage lake used for water supply, flood control, and recreation. It is surrounded by deciduous woods, shrub swamp, and cultivated fields, and adjoins another 2.8 km<sup>2</sup> of State Game Lands. The lake is fed by Tulpehocken Creek, which drains a 453 km<sup>2</sup> area west of the site. Outcrops indicate that relatively impervious shells primarily underlie the main stream valley and surrounding area.

### Birds

The lake is an important staging area for Common Merganser in spring migration, averaging from 2,000–5,000 birds (up to 2% of the flyway population). Good numbers of Killdeer also stop over in spring. The surrounding woodlands host a diversity of breeding species, including several state species of concern such as Barn Owl, Wood Thrush, and Ovenbird.

	Season	Number
Common Merganser	SM	2,000–5,000

### Conservation issues

Increasingly heavy use and disturbance by recreational boaters threaten the lake. Residential and commercial development is rapidly pushing in around the edges. The Army Corps of Engineers, in cooperation with the Pennsylvania Game Commission, manages most of the surrounding land for wildlife and environmental education. The Corps has installed and maintained food plots and nest boxes, hosted volunteer events, and adopted progressive mowing practices in cultivated fields to allow for nesting grassland species.

96	<b>Hawk Mountain/Kittatinny Ridge</b> <i>Schuykill, Berks, and Lehigh Counties, Pennsylvania</i>	
	USPA05NA	40°38'N, 75°59'W
		670–686 m / 9.6+ km <sup>2</sup>

► **Habitats:**

Deciduous forest, rocky outcrops.

► **Land-use:**

Conservation and research.

► **Threats:**

None known.

► **Ownership:**

Hawk Mountain Sanctuary Association.

### Site description

Hawk Mountain is a world-famous observatory for witnessing the southbound migration of raptors in eastern North America. The sanctuary includes a portion of the Kittatinny Ridge adjacent to and west of the Appalachian Trail, along with the surrounding lowlands. Rocky outcrops along the ridge afford excellent views of oncoming migrants in autumn, for which the entire Kittatinny Ridge is a globally important migratory corridor. The ridge is covered with second-growth deciduous forest, and the valleys on either side are characterized by mixed farmland and small, rural communities.

The ridge is a major flyway for migrating monarch butterflies. A number of American chestnut trees are documented on the site, populations of which have mostly been decimated by chestnut blight.

### Birds

Annual counts of migrating raptors have helped assess long-term trends in raptor populations throughout eastern North America. An average of 17,000 individuals of 10 raptor species pass through each fall. The annual counts now constitute a 58-year, 39,000-hour, million-bird database, the longest and most complete record of raptor migration in the world. This database has helped document rebounds in several raptor populations following decreases in the use of environmental contaminants such as DDT.

	Season	Number
raptor spp.	FM	17,000
Osprey	FM	648
Bald Eagle	FM	77
Peregrine Falcon	FM	36

## Conservation issues

Hawk Mountain Sanctuary became a registered US Natural Landmark in 1965. It is the world's first refuge for birds of prey and is a site where long-term monitoring, applied research, local land-use planning, and public education are conducted. Up to 3,000 people per day visit the sanctuary during peak season. Visitor access is largely restricted to 6.5 km of trails. Limited camping is allowed and campfires are prohibited during high-risk periods. Although no immediate threats have been identified, the surrounding lands are probably crucial feeding and resting areas for migratory birds; keeping them intact is a priority.

97

## John Heinz National Wildlife Refuge at Tinicum *Philadelphia County, Pennsylvania*

USPA06NA

39°52'N, 75°17'W

0–10 m / 4.8 km<sup>2</sup>

► **Habitats:**

Tidal marsh, mudflats, impoundments.

► **Land-use:**

Conservation and wildlife management; recreation.

► **Threats:**

Introduced plants, pressure from encroachment of surrounding areas.

► **Ownership:**

US Fish and Wildlife Service.

## Site description

A series of impoundments and tidal wetlands adjoining Darby Creek make up the core of this wildlife oasis in the urbanized southernmost corridor of Philadelphia. Approximately 120 ha of wetlands comprise the largest freshwater tidal habitat in the state, but are only a fraction of what once lined the Delaware River. Tidal mudflats and occasional draw-downs of the ponds provide excellent habitat for migratory shorebirds.

## Birds

Over 288 species have been recorded at Tinicum, with more than 85 species breeding at the site. The refuge is a globally important stopover for shorebirds in fall migration along the Atlantic Flyway, since the surrounding area is heavily urbanized. Up to 1% of the populations of Pectoral Sandpiper, Least Sandpiper, and Greater Yellowlegs use the site in migration. Major concentrations of waterfowl occur from late fall to early spring, including close to 1% of the flyway population of American Black Duck. An average of 5 pairs of Least Bittern breed in the refuge, but their numbers, along with those of breeding Black-crowned Night-Heron and migratory shorebirds, have been on the decline since the 1980s.

	Season	Number
American Black Duck	FM, W, SM	1,000
Northern Pintail	FM, W, SM	2,500
Green-winged Teal	FM, W, SM	3,000
Blue-winged Teal	FM, W, SM	1,000
Semipalmated Sandpiper	FM	10,000
Pectoral Sandpiper	FM	500
Least Sandpiper	FM	800
Greater Yellowlegs	FM	300
Lesser Yellowlegs	FM	1,250
Least Bittern	B	5 pairs

### Conservation issues

Degradation of the habitat by exotic plants, mainly purple loosestrife and phragmites, has affected the abundance and variety of wetland bird species and excluded more productive vegetation. Explosive carp populations have reduced the value of impoundments to waterfowl. Encroachment of the surrounding area by urbanization and industrialization has reduced the overall open space, placing more pressure on refuge land. Refuge objectives are to maintain the habitat, provide environmental education, and to encourage wildlife-oriented recreation within the inner city. There are future plans to acquire more land for Tinicum Marsh.

98

### Ferd's Bog

*Hamilton County, New York*

USNY01S

43°48'N, 74°45'W

530–550 m / 0.4 km<sup>2</sup>

► **Habitats:**

Primarily non-tidal wetland (bog) surrounded by coniferous woods.

► **Land-use:**

Wildlife conservation, outdoor recreation; some hunting.

► **Threats:**

*Major* – Recreational overuse.

► **Ownership:**

New York State Department of Environmental Conservation.

### Site description

Ferd's Bog is a boreal spruce-tamarack bog with a sphagnum mat, surrounded by a ring of dense spruce, pine, fir, and tamarack. The area is an excellent example of combined boreal bog and forest system.

### Birds

Ferd's Bog is an exceptional representative of a boreal bog bird community, with species such as Boreal Chickadee, Gray Jay, Black-backed Woodpecker, Three-toed Woodpecker, Olive-sided Flycatcher, Yellow-bellied Flycatcher, and Lincoln's Sparrow. There is one active Osprey nest in the bog.

	Season	Number
Boreal Chickadee	W	Unknown
Gray Jay	W	Unknown
Black-backed Woodpecker	W	Unknown
Three-toed Woodpecker	W	Unknown
Olive-sided Flycatcher	B	Unknown
Yellow-bellied Flycatcher	B	Unknown
Lincoln's Sparrow	B	Unknown

### Conservation issues

The site is very popular among birders but there are currently no boardwalks to protect the fragile bog habitat. Frequent visits by birders have destroyed vegetation along some trails, forming muddy furrows where people have broken through upper layers of the sphagnum

mat. The NY Department of Environmental Conservation has constructed a boardwalk that it proposes to airlift into the site. As wetland permits have not yet been procured, the project has been temporarily halted.

99

## Doodletown Road & Iona Island

*Rockland County, New York*

USNY02S

43°48'N, 74°45'W

0–183 m / 6.6 km<sup>2</sup>

► **Habitats:**

Primarily deciduous and mixed woods, with some tidal wetlands, shrub, and grasslands.

► **Land-use:**

Wildlife conservation, outdoor recreation.

► **Threats:**

*Potential* – Recreational development and overuse; succession.

► **Ownership:**

New York Office of Parks, Recreation, and Preservation.

### Site description

Situated along the western shore of the Hudson River just south of West Point, the Doodletown Road and Iona Island portions of Bear Mountain State Park encompass deciduous forest habitats, freshwater and brackish tidal wetlands, and riverine habitats. From the cattail marshes along the river, the land slopes up steeply with hemlocks and occasional small bubbling streams. Oaks and cottonwoods predominate in the forest, with an understory of barberry. The Doodletown portion is an abandoned settlement with openings growing into shrubby second-growth.

The site contains populations of a number of rare and unusual animals, including timber rattlesnake (*Crotalus horridus*), Needham's skimmer (*Libellula needhami*), arrowhead spiketail (*Cardulegaster obliqua*), comet darter (*Anax longipes*), and gray petaltail (*Tachopteryx thoreyi*). Unusual plants include *Carex buschii*, *C. emonsii*, and *C. seorsa*, *Corydalis falvula*, *Cuscuta pentagona*, *Cyperus odoratus*, and *Vitis vulpina*.

### Birds

The Doodletown Road area supports an unusual diversity and abundance of breeding warblers and other songbirds. This includes state-listed Cerulean Warbler (15–20+ pairs) and Golden-winged Warbler (2–3 pairs), as well as Hooded (25–30 pairs) and Kentucky (1–3 pairs) warblers, Louisiana Waterthrush (2–4 pairs), Acadian Flycatcher (2–4 pairs), and many more common species. Iona Island, with its wetlands along the Hudson, hosts many wetland-dependent species including migratory Pied-billed Grebe, breeding Least Bittern, and migratory American Bittern; also, migratory Osprey, Northern Harrier, and wintering Bald Eagle. More than 165 species have been documented at the site.

	Season	Number
Cerulean Warbler	B	15–20 pairs
Golden-winged Warbler	B	2–3 pairs
Hooded Warbler	B	25–30 pairs
Kentucky Warbler	B	1–3 pairs
Louisiana Waterthrush	B	2–4 pairs
Acadian Flycatcher	B	2–4 pairs

### Conservation issues

No major issues exist at present. Doodletown Road is easily accessible by foot, which creates a potential for overuse. Access by mountain bikers is also a potential issue. Iona Island has been considered for a visitor's center and group campsites, although currently the site is closed to the public from 1 December through 31 March because of use by wintering Bald Eagles. Potential expansion of park maintenance facilities at Iona Island could discourage eagle use of the site.

100	<b>Jamaica Bay</b> <i>Queens and Kings Counties, New York</i>	
	USNY03G	40°36'N, 73°47'W
		0–15 m / 100 km <sup>2</sup>

► **Habitats:**

Primarily marine and tidal wetland.

► **Land-use:**

Primarily wildlife conservation and outdoor recreation.

► **Threats:**

*Major* – Commercial and residential development, pollution.

► **Ownership:**

US National Park Service, State, City, and Private.

### Site description

The Jamaica Bay IBA includes the marine and tidal wetland portions of the bay itself, as well as the barrier beach/dune system surrounding it and some adjoining upland shrubland and grassland. The largest habitat unit, the Jamaica Bay Wildlife Refuge, is part of the Gateway National Recreation Area managed by the National Park Service. Jamaica Bay proper is a saline-to-brackish, eutrophic estuary with a mean depth of 4 meters. It is situated in the midst of the New York City metropolitan area. The uplands around the bay, as well as much of the Rockaway Peninsula (barrier beach), are developed. About 4,850 of the original 6,470 ha of wetlands in the bay have been filled in. Extensive areas have been dredged for navigation channels and to provide fill for airports and other construction projects.

The area supports breeding diamondback terrapin. Notable plants include seabeach amaranth, seabeach knotweed, Schweinitz's flatsedge, needlepod rush, and slender flatsedge.

### Birds

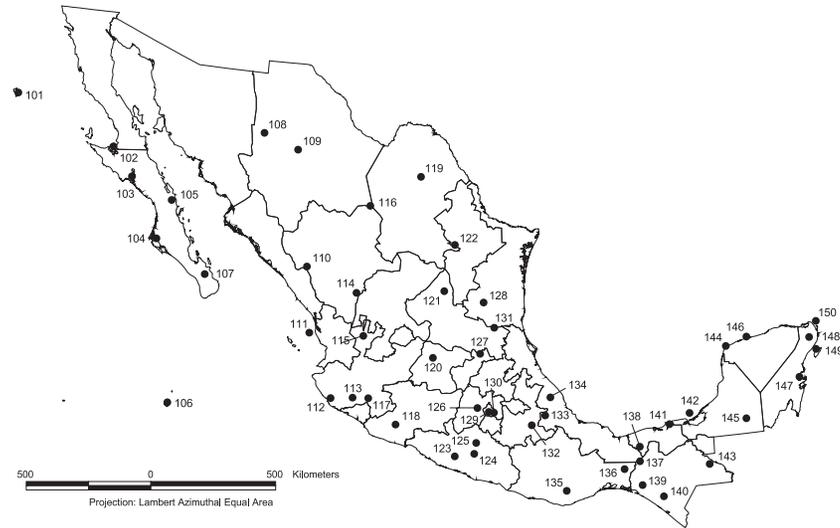
The saltwater and brackish wetland habitats support an abundance and diversity of shorebirds, waterfowls, gulls, terns, and other species. During migration the site hosts 600 to 1,200 Black-bellied Plover (>1% of the North American population), 200–1,600 Red Knots (1% or more of the Atlantic Flyway population), and 35 or more other shorebird species. The beaches are breeding sites for 20 to 30 pairs of Piping Plovers (federally threatened; 1% or more of the global population), 2,500–3,000 pairs of Common Terns (1% or more of North American population), 180–200 pairs of Least Terns, 2–4 pairs of Roseate Terns, 190–230 pairs of Black Skimmers, and 4,500–5,000 pairs of Laughing Gulls. The area is also an important waterfowl wintering site, with healthy numbers of scaup spp. and Brant. A hawk watch at Breezy Point tallies 5,000–6,000 or more hawks each fall, including good numbers of Peregrine Falcons.

	Season	Number
Raptor spp.	FM	5,000–6,000
Piping Plover	B	20–30 pairs
Black-bellied Plover	FM	600–1,200
Red Knot	FM	200–1,600
Common Tern	B	2,500–3,000 pairs
Least Tern	B	180–200 pairs
Black Skimmer	B	190–230 pairs

### Conservation issues

Development of the remaining open space within the area is the most critical issue. Vandavia Dunes, a 92-ha site on the shore of the bay, has been slated for a 2,385-unit housing project with an adjoining shopping center, retail and office space, schools, etc. A 121-ha site along the Atlantic Ocean beaches of the Rockaway Peninsula, where Piping Plovers breed, is also being considered for development. Pollution is an ongoing problem, though great strides have been made in recent decades. Sewage, storm drain outflow, and contaminated sediments are ongoing issues. Swimming and shell fishing are prohibited, and health advisories warn against fish consumption. The portions of the area managed by the National Park Service are under competing pressures for various public recreational uses, including biking, surf-fishing, sunbathing and swimming, musical concerts, and educational programs.

# Mexico



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## Introduction to the Mexican Sites

*María del Coro Arizmendi Arriaga*  
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As with other groups of vertebrates, birds in Mexico and around the world are subjected to many pressures that place their survival in danger. The most vulnerable species are those with limited distribution areas, since the primary threat today to biological diversity is the loss of habitat. The official standard in Mexico for the protection of wild plant and animal life (NOM-059-ECOL-1994) includes 34 percent of the country's bird population in one of the categories of threatened species: 56 species in danger of extinction, 121 threatened species, 144 rare species and 17 under special protection. The list of extinct, endangered, and threatened species throughout the world includes 76 species found in Mexico; of those one is extinct, four have critical status, 15 are endangered, 14 threatened, 40 borderline-threatened, and for the remaining two, there is insufficient information to determine their current status (Collar et al. 1994).

Conserving populations of wild plant and animal life that make up biodiversity is dependent on the survival of the habitats where species have evolved and where they can continue to live under natural conditions. In light of the accelerated destruction of natural environments, one of the most important actions for conserving biodiversity is to protect the areas that guarantee the survival of species sharing the same habitat.

In Mexico, the program known as Important Bird Areas (IBAs) emerged as a joint effort of the Mexican sections of the International Council for Bird Preservation (*Consejo Internacional para la Preservación de las Aves*—Cipamex) and of BirdLife International. This program is carried out with funds from the Commission for Environmental Cooperation (CEC), and it was founded to promote the creation of a regional network of important areas for preserving birds.

Specialists and others interested in the conservation of birds were invited to an initial workshop held in Huatulco, Oaxaca, on 5–9 June 1996 for the purpose of identifying Important Bird Areas (IBAs) in Mexican territory. Approximately 40 specialists representing universities and nongovernmental organizations from different regions of the country attended the meeting and proposed 170 areas in Mexico as important for the conservation of birds.

This original list of IBAs was circulated and other individuals were invited to participate in the process of identifying important areas. In the end, a total of 193 areas were nominated during the 1996–1997 period. These areas were reviewed by the IBA program coordinators, and a corresponding database was developed whose structure and design were adapted according to the program's needs. Graphic information collected at the initial meeting, including maps of all the nominated areas that had been prepared by experts, was digitalized at the National Commission for Knowledge and Use of Biodiversity (*Comisión Nacional para el Conocimiento y Uso de la Biodiversidad*—Conabio) and incorporated into a geographical information system (ArcInfo). This information was complemented with maps received from the authors. In May 1997, during a meeting of the advisory committee and the coordinators and technicians from Conabio, the 193 proposed areas were reviewed, together with their coordinates and boundaries, with the help of vegetation, topographic and hydrographic maps. As a result, a digital-sensitive map was prepared in which information from the IBA database can be consulted by constructing polygons to delineate the different areas.

During 1998, the program entered its second phase—organizing IBAs by regions—with financial support from the Mexican Fund for the Conservation of Nature (*Fondo Mexicano para la Conservación de la Naturaleza, A.C.*). Four regional areas were defined (Northeast, Northwest, South and Center) and a workshop was held in each to review the IBAs. Areas were added or eliminated according to the experiences of the groups of experts,

and the process was concluded with a total of 230 “new” IBAs. New maps were drawn using the scale of 1:250,000.

A technical indexed listing was developed for each IBA, which includes a biotic and abiotic description as well as a list of bird species registered in the area, their abundance (by category) and their seasonal residence in the area. The complete listing includes a total of 17,886 entries of 1,038 bird species, comprising 96 percent of all the species in Mexico, according to the American Ornithologists’ Union. At least one of the areas is home to 90 percent of the species listed as endangered according to Mexican law (306 of 339 species) and to 94 percent of the species included in the book *Birds to Watch 2: The World List of Threatened Birds* (Collar et al., 1994). Of the 95 endemic species in Mexico, 92 are registered in at least one of the areas (97 percent).

All of this information is contained in a database (Microsoft Access 4) which also lists information regarding the protection status of the species according to different authors; the Check-List of North American Birds (American Ornithologists’ Union) and subsequent modifications (Howell and Webb, 1995; Navarro and Benítez, 1995); as well as the common names in both English and Spanish of North American species. This information was compiled by 98 Mexican specialists whose names and addresses are listed in the database according to their areas of specialty.

IBAs in all states of Mexico are included, although some states are only minimally represented. This indicates the varying levels of knowledge in different states, as well as the intrinsic differences among them. Thus, while Baja California Sur is a state with limited diversity in climate and vegetation, in comparison with Oaxaca or Chiapas, for example, it is the state with the most areas described. This clearly reflects the amount of knowledge accumulated in Baja California Sur, as well as the specific importance of birds found in the IBAs there. The database also represents, in similar proportions, all the types of vegetation found in Mexico, according to Rzedowski (1978).

The nominated areas cover 95 percent of the country’s biosphere reserves, 100 percent of the special reserves, 77 percent of those classified as special biosphere reserves, 100 percent of the biological research stations, and 50 percent of the areas declared as zones for protection of wild plant and animal life in the National System of Protected Areas (*Sistema Nacional de Áreas Protegidas*). Also included are 121 (63 percent) of the priority regions for conservation in Mexico.

### Issues in the conservation of birds in Mexico

As a consequence of the information generated by this program in Mexico, threats to the preservation of birds in different areas can be identified. Important “firsthand” information is acquired by compiling the experiences of ornithologists who live in different regions around the country and have direct contact in specific areas. The main threat for the conservation of birds in Mexico is the loss of habitat due to livestock ranching, agricultural production and forestry, tourism and industrial activities. The second most significant threat is the legal and illegal trade of wild bird life. As well, there are other critical threats such as the introduction of non-native species, the draining of marshlands and natural habitat deterioration.

#### Loss of habitat

The destruction of habitats or their modification for use in different economic activities is clearly the primary threat to the conservation of biodiversity in Mexico. It is estimated that between 300,000 and one million hectares are deforested annually in Mexico. And in the case of the tropical forests in southern Mexico, for example, the annual rate of deforestation is between 7 and 10 percent. If this continues, practically all of this type of vegetation will have been eradicated by the end of this century. The reductions in area covered by dry

forests—a very important ecosystem because of the large number of endemic species it sustains—are just as dramatic. For example, dry forests in central Mexico were reduced by 93 percent between 1975 and 1980.

There is a correlation between the loss of habitat and an increase in land used for agricultural, ranching and forestry activities as well as tourism. Birds are affected both directly and indirectly by the loss of habitat. Changes in land use not only cause bird mortality, but also reduce the area where bird populations feed, reproduce and rest. The effect of this can be seen in areas like the Lerma wetlands, where since the land has dried up, one species (*Quiscalus palustris*) has disappeared and several others are in danger of extinction.

The economic activities defined as causing a loss of habitat in tropical regions are related to an increase in human populations—which, in turn, results in increased demand for production of basic goods. But there is also an increase in demand on the international market for the products derived from these activities. A clear example of this phenomenon can be seen in meat production: thousands of hectares of tropical ecosystems have been converted into grazing land for livestock—and the products derived from this livestock production are primarily consumed in other countries.

#### Legal and illegal trade

The birds sold inside the country and internationally are mostly parakeets, macaws, hawks, eagles and some species of songbirds and ornamental birds. Especially vulnerable are baby birds, which suffer high rates of mortality and are exploited in large numbers. Both legal and illegal trade of birds is common in practically all the areas analyzed in this volume, including areas declared as protected zones by Mexican law.

Because of the growing international market for these birds, there is increasing pressure on these species. More and more, the preferred pets in developed countries are exotic species, instead of dogs and cats. This has led to increased prices and a growing demand for these species from tropical countries.

#### Introduction of non-native species

In areas such as ocean islands, where we find reproductive colonies and resting areas for many seabird species, there are pressures generated by the introduction of non-native species—often rats, mice and cats—that become ferocious predators of eggs, baby birds and sometimes adult birds that nest on the ground and even those that nest among vegetation. For example, on Guadalupe Island cats have provoked the extinction of the Guadalupe caracara (*Polyborus lutosus*) and the Guadalupe storm-petrel (*Oceanodroma macrodactyla*). This type of threat is also cited as a significant problem in areas other than islands, such as the Sierra de la Giganta in Baja California, where the introduction of goats is negatively affecting various species of wildlife.

This problem is a serious one around the world. It is estimated that nearly 70 percent of extinctions of endemic species on islands is due to the introduction of non-native species. And once such populations have been introduced, it is difficult to eradicate them. However, in certain areas, such as Rasa Island in Mexico, successful eradication programs have been carried out.

#### Natural phenomena

In some coastal areas, particularly on the Yucatán peninsula, the frequent incidence of hurricanes and cyclones produces serious deterioration in vegetation structure.

Fires provoked by natural causes or by agricultural, ranching and even sociopolitical activities are cited as dangers in certain areas. For example, grazing land in the southern part of Mexico City (La Cima and Southern Valle de México) is affected by this kind of phenomena

every year. These areas are home to important species that are threatened by the destruction of their habitats. One of them is *Xenospiza baileyi*, a species endemic to grazing land in coniferous forests. The case of the Chimalapas is a recent and important example. The fires in 1998 destroyed a considerable amount of tropical and cloud forests there and the consequences for bird life have not yet been evaluated.

It is important to emphasize that the conservation of wildlife is threatened in the 50 Mexican IBAs presented in this volume, based on a combination of the factors described here. There is only one area, the Chamela-Cuitzmala Biosphere Reserve, located in the state of Jalisco along the Pacific coast, where levels of danger are low or nonexistent, and this is because of the specific characteristics of land ownership there (private individuals and the *Universidad Nacional Autónoma de México*—UNAM).

### Opportunities for preserving birds in Mexico

The IBAs program in Mexico has represented a unique opportunity for cooperation among individuals interested in the study and conservation of Mexican birds. In addition to creating the database described above, this program has encouraged the consolidation of organizations of ornithologists and bird lovers, resulting in unprecedented cooperation. One example is Cipamex, which is the Mexican association bringing together the most persons interested in birds.

This program has not only constituted an instrument to be used by the conservationist community and the Mexican government, but has also established the groundwork for formulating the Mexican Bird Conservation Initiative. The latter is a project that began in January 1998, and satisfactory results are expected in the near future. The Mexican initiative is part of the North American Bird Conservation Initiative (NABCI), a project under the auspices of the CEC that has opened up innumerable paths for trilateral cooperation and the results of which will be important for the conservation of the region's birds.

An example of CEC participation in this regional effort is the development of the North American Biodiversity Information Network (NABIN), a computerized tool that makes it easy to consult the taxonomic and geo-referenced databases for North American birds.

The successes achieved through the IBAs program in Mexico are part of a pattern of important changes in the government as well as in nongovernmental organizations and the country's private and social sectors—all of which acted together in facilitating this program.

### Strengthening of governmental institutions

Mexican governmental institutions have experienced a significant transformation during recent years. The creation of Conabio has been an important step for Mexico, since the country now has an institution responsible for promoting knowledge of biodiversity so it can be conserved. In addition, the review and consolidation of the national system of protected natural areas should produce highly important impacts, although we have yet to see their full extent. Participating in this process were the government, through the National Institute of Ecology (*Instituto Nacional de Ecología*—INE); the private sector, through the Mexican Fund for the Conservation of Nature; and experts in this area, through different forums for providing consultation and exchanging opinions.

### Consolidation of nongovernmental organizations

In addition to strengthening government institutions, there is also an important process underway to consolidate the many nongovernmental organizations and academic institutions that have great potential for working in the area of conservation. On the one hand, academic institutions (universities, research institutes and nongovernmental organizations) represent a source of knowledge regarding biodiversity, and on the other hand, institutions dedicated to conservation represent the link—lost until recently—between research that

expands our knowledge, and society. Growth in both sectors and the increasing possibilities for joint efforts between them may represent a major opportunity for conserving the country's natural resources.

### New institutions dedicated to conservation

Undoubtedly, a big step forward has been the creation of private institutions, such as the Mexican Fund for the Conservation of Nature, which are undertaking the task of promoting different methods of conserving the country's natural resources. This has consolidated the interest of different sectors (academic, conservationist, among others) in a coordinated conservation of resources. The IBA program is a good example of the way in which an idea originally developed by an NGO and involving the cooperation (economic and academic) of public and private entities from around the country has made possible the compilation and systematization of vital information for conserving Mexico's birds by protecting their habitats.

### Regionalization of solutions

In order for conservation to have real effects, programs must have solid bases in the country's various regions and must involve local residents. Thus, increasingly, projects must have a local scope as well as a national one. For this reason, the IBA program in Mexico was regionalized in 1998. Instead of one central coordinating body, four regional coordinating bodies were created. This makes it possible to have more precise information—because of the benefit of a broader base—and conservation alternatives have more direct local impact, since the working groups that put proposals into practice are local. In order to achieve this regionalization, efforts have been made to concentrate the cooperation of a number of participants, including the institutions supporting the project (CEC, the Mexican Fund for the Conservation of Nature, Conabio and UNAM) and the many regional institutions (Ecosur, the Chiapas Institute of Natural History (*Instituto de Historia Natural de Chiapas*), the Museum of Mexican Birds (*Museo de las Aves de México*), *Pronatura Noreste*, Wetlands International Mexico, and *Pronatura Sonora*, among others), with Cipamex as the central coordinator.

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Conabio: Institution responsible for the database (Hesiquio Benítez) and maps (Enrique Muñoz).

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101	<b>Isla Guadalupe</b> <i>Baja California</i>	
	MXNO60G-1	29° 00' N, 118° 20' W 0–1,400 m / 250 km <sup>2</sup>

► **Habitats:**

Dry scrubland and forests of cypress (*Cupressus guadalupensis*) associated with pine and oak.

► **Land-use:**

Human settlements and hunting of introduced goats.

► **Threats:**

Organic and inorganic waste, urban development, deforestation and introduction of goats, dogs, cats, rats and mice.

► **Ownership:**

Federal 100%.

### Site description

The island is part of a volcanic archipelago. The climate is arid to semi-hot with a cool winter and mean average temperature of 28° C which drops below 18° C in the coldest month. Rains fall in the winter, northwesterly winds and cyclones have a great influence over the island. There is a predominance of steep slopes linked with the mountainous topography, with heights of up to 1,400 m. The highest peaks are the Volcán Rojo and the Gran Cráter. Soils are andosols and vertisols. There are over 146 vascular plant species, of which 56.6% are endemic.

### Birds

The island is an international priority, due to the high number of endemic plants and animals. It provides a haven and nesting sites for some seabirds in danger of extinction found in the area, like Laysan Albatross. Of the over 53 bird species and sub species on the island, nine are endemic and the majority are in the Cypress (*Cupressus guadalupensis*) woodland, which is rapidly becoming deforested by introduced goats, threatening the aforementioned taxa. Cats, rats and dogs also cause major harm to endemic fauna. All of this calls for an urgent conservation and ecological restoration program. A total of 102 bird species have been reported on the island, with 46% winter residents, 22.5% year-round residents, 5.9% summer residents and 23.6% accidentals. The area was classified as G-1 due to the presence of Guadalupe Junco.

### Conservation issues

INE conducted a study of biodiversity, conservation and sustainable development and environmental education in 1993. However, there is no real protection on the island, since the goats continue to proliferate because fishers on the island raise them for meat for local consumption. Also, waste from both organic and inorganic sources is uncontrolled and the habitat loss situation is serious. It is suggested that environmental education projects be intensified to inform settlers of the gravity of the problem and help eliminate goats, cats and dogs.

102	<b>Laguna Ojo de Liebre</b> <i>Baja California</i>	
	MXNW12NA-4c	27° 52' N, 114° 10' W
		0 m / 360 km <sup>2</sup>

► **Habitats:**

Halophytic scrub, dunes and salt marshes.

► **Land-use:**

Conservation, urban areas and industries.

► **Threats:**

Industrial development, urban development, fishing, tourism and introduction of exotic species.

► **Ownership:**

Federal, *ejido*.

### Site description

This coastal lagoon of approximately 360 km<sup>2</sup> is included in the El Vizcaino biosphere reserve. Most of the water is shallow (6–12 m), with channels as deep as 16 m. There are 5 small islets in the lagoon. Close by is a settlement with some 10,000 inhabitants (Guerrero Negro). Most of the coast of the lagoon is covered with halophilous scrub 30 to 50 cm high, including Palmer's seaheath, shadscale, cliff spurge, alkali seaheath and Barclay's seaheath. Part of the coastline is covered with dunes: sand verbena, Barclay's seaheath, rush milkweed and soft prairieclover. There are two kinds of salt marshes within the lagoon: coralgrass in areas continuously covered with water and red swampfire in the higher areas. There are layers of seawrack in the bottom of the intertidal areas.

### Birds

The lagoon is one of the four wetlands on the west coast of Baja California of prime importance for the concentration of resident and migratory waterbirds. Around 16 species of waterbirds nest in the islets and areas around the lagoon. Some of the resident species nest in relatively high numbers on the west coast. It is classified as NA-4c because of the concentration of numbers of: Double-crested Cormorant, Brandt's Cormorant, Brant, Caspian Tern, Royal Tern and Western Gull. A total of 98 bird species have been reported, of which 15.3% are year-round residents, 62.2% winter residents, 10.2% summer residents and 12.2% accidentals or transitory.

	Numbers
Double-crested Cormorant	10,000
Brandt's Cormorant	800
Great Blue Heron	60
Reddish Egret	1,500
Brant	35,000
Osprey	250
Peregrine Falcon	6
American Oystercatcher	60
Laughing Gull	10
Western Gull	1,200
Caspian Tern	2,500
Royal Tern	6,000

### Conservation issues

Research is being done in the area by the *Universidad Autónoma de Baja California Sur*, the *Centro de Investigaciones Biológicas del Noroeste* and the *Centro Regional de Investigaciones Pesqueras*. The studies are on the gray whale, migratory waterbirds (ducks, geese and Brant), resident waterbirds (Osprey, Laughing Gull); and on marine species of commercial importance.

103	<b>Laguna de San Ignacio</b> <i>Baja California</i>	
	MXNW06G-4c	26° 43' N, 113° 24' W
		0 m / 175 km <sup>2</sup>

► **Habitats:**

Halophilous scrub and mangrove swamps.

► **Land-use:**

Mainly conservation, tourism and fishing.

► **Threats:**

Inappropriate resource use, tourism, introduction of exotic species and fishing.

► **Ownership:**

*Ejido*, federal and private.

### Site description

This area is part of the El Vizcaino Biosphere Reserve. It is a coastal lagoon 24 km long by 3 to 6 km wide. Its base is about 1.5 km wide and it opens to a bay in the south. The lagoon is shallow, 6 to 12 m deep, with canals as deep as 16 m. There are two islets in the lagoon, which has not inconsiderable currents of 2 to 4 knots. The area is sparsely populated and isolated, since there are no paved access roads. The shores of the lagoon are mostly covered with halophilous scrub, with a predominance of Palmer's seaheath, shadscale, cliff spurge, alkali seaheath and Barclay's saltbush. In the interior of the lagoon there are salt marshes dominated by American mangrove and white mangrove. Layers of seawrack cover intertidal zones and shallow areas along with widgeon grass.

### Birds

The lagoon is probably the second largest wetland for waterbirds on the west coast of the Baja California Peninsula. Also, it is home to some species threatened worldwide (Least Tern). About 91 species have been sighted in the area, of which 20 nest in on the islets, with some species nesting in large colonies. The numbers in which Brown Pelican, Double-crested Cormorant, Brant and Royal Tern, are concentrated put the area in category G-4c.

	Numbers
Brown Pelican	2,500
Double-crested Cormorant	1,000
Great Blue Heron	>20
Great Egret	>10
Snowy Egret	150
Little Blue Heron	300
Tricolored Heron	120
Reddish Egret	200
Green Heron	40
Brant	25,000
Osprey	300
Peregrine Falcon	4
Royal Tern	800

Of the 91 recorded species, 17% are year-round residents, 68% are winter residents, 4% are summer residents and 11% are accidentals or transients.

### Conservation issues

Research is being conducted in the area by the *Universidad Autónoma de Baja California Sur* and the *Centro de Investigaciones Biológicas del Noroeste*. These are studies of the gray whale, migratory and resident waterbirds, commercial marine resources, and ecotourism.

104	<b>Bahía Magdalena</b> <i>Baja California Sur</i>	
	MXNW02NA-4c	24° 30' N, 112° 00' W
		0–200 m / 3,668.23 km <sup>2</sup>

► **Habitats:**

Xerophilic succulent scrub, mangrove swamps.

► **Land-use:**

Tourism, urban areas and industries.

► **Threats:**

Deforestation, urban development, industrial development, tourism and inappropriate resource use.

► **Ownership:**

Federal.

### Site description

This is an area with high levels of endemism in cacti and other plants, mammals and reptiles. It has a high degree of ecological integrity although there are illegal activities like fishing for sea turtles and shrimp. The area is covered with succulent scrub. The waters of the bay are relatively deep.

### Birds

This is one of the four major wetlands on the west coast of the Baja California Peninsula because of the number of species and the size of the populations of resident and migratory waterbirds. It is a major winter habitat for Brant. The area contains species threatened in Mexico and worldwide and is a concentration site, especially for waterbirds. The area was classified as NA-4c because of the concentration of numbers of: Brown Pelican, Magnificent Frigatebird, Double-crested Cormorant, Brandt's Cormorant, Brant and Western Gull. Of the 112 recorded species, 25.5% are year-round residents, 51.8% winter residents, 4.5% transients, 7.3% summer residents and 10.9% accidentals.

	Numbers
Brown Pelican	6,000
Magnificent Frigatebird	40,000
Double-crested Cormorant	500
Brandt's Cormorant	600
Great Blue Heron	>10
Brant	30,000
Western Gull	800
Least Tern	60

### Conservation issues

Research is being conducted by the *Universidad Autónoma de Baja California Sur* and the *Centro de Investigaciones Biológicas del Noroeste*. Among the research projects being conducted in the area are research on the gray whale, on ecotourism; and on reproductive biology of the resident species of waterbirds.

105	<b>Sierra La Giganta</b> <i>Baja California</i>	
	MXNW05NA-2	25° 30' N, 111° 15' W
		1,400 m / 4,929.45 km <sup>2</sup>

► **Habitats:**

Succulent scrub.

► **Land-use:**

Goat herding.

► **Threats:**

Introduction of exotic species (goats), ranching.

► **Ownership:**

*Ejido*.

### Site description

A rugged mountain range with mountains up to 1,400 m high, this site has high levels of endemism and greatly typifies the dry mountain regions of Baja California. It has steep slopes with deep canyons. The area has been affected by poaching and extensive grazing of exotic species (goats).

### Birds

This site is important because its inaccessibility makes it able to support considerable populations of raptors. There are a total of 180 bird species in the area, with 37.2% year-round residents, 47.8% summer residents, 12.8% transients, 0.6% summer residents and 1.6% accidentals. It is classified as NA-2 due to the presence of Xantus' Hummingbird and Gray Thrasher.

### Conservation issues

The *Centro de Investigaciones Biológicas del Noroeste* is conducting research in the area. Its inaccessibility enables it to maintain a high degree of conservation. There have been studies of large fauna, and occasional surveying of mammals, reptiles and vascular plants.

106	<b>Revillagigedo Islands</b>	
	<i>Colima</i>	
MXC36G-1	18° 45' N, 110° 58' W	0–1,100 m / 6,366.85 km <sup>2</sup>

► **Habitats:**

*Croton* scrub, banyan (*Ficus cotinifolia*) and montane forest, scrub and chaparral.

► **Land-use:**

There is only a military outpost, on Socorro Island, since these islands are reserve areas.

► **Threats:**

Deforestation due to sheep, rabbits and pigs, and predation by feral cats.

► **Ownership:**

100% federal.

### Site description

The Revillagigedo Archipelago lies off the Pacific coast of Mexico; the above figure giving size includes marine areas around the islands. The archipelago is composed of four volcanic islands: Socorro, Clarión, San Benedicto and Roca Partida. Socorro is the largest island, with an area of 110 km<sup>2</sup> and with a maximum altitude of 1,040 m. Clarión and Socorro stand out for their wealth of flora and fauna and for a high degree of endemism. The vegetation on Socorro is: *Croton* scrub, *Ficus cotinifolia* and montane forest with elements of cloud forest; and on Clarión scrub and scrub forest. Roca Partida is a bare rock. A major eruption took place on San Benedicto in August 1952, wiping out some species endemic to the island, which is covered with volcanic ash and some colonizing creeping plants.

### Birds

A total of some 100 bird species are reported on the archipelago, with a high percentage of year-round residents (51%), 20% summer or winter residents, and 29% transient or accidental. There are high levels of endemism, with around 33% of plants and 100% of land birds at the subspecies, species or generic level, mainly on Socorro and Clarión. The following endemic species are found on Socorro island: Socorro Mockingbird, Socorro Parakeet, Socorro Dove, Socorro Wren and Socorro Towhee. The Clarión Wren is endemic to Clarión. Townsend's Shearwater is endemic to both. This led to the area's classification in category G-1.

### Conservation issues

The elimination or control of cats, pigs and sheep which disturb the island habitat and prey on the birds has been proposed but not yet implemented. Dr. Baptista and Dr. Martínez of the University of California are working on island birds with bioacoustics of the Socorro Mockingbird and the reintroduction of the Socorro Dove in the medium term.

107	Sierra de La Laguna <i>Baja California</i>	
	MXNW01G-2	22° 50' N, 110° 15' W 450–2,090 m / 1,705 km <sup>2</sup>

► **Habitats:**

Xerophilic succulent scrub, tropical deciduous forest, coniferous forest.

► **Land-use:**

Conservation, ranching, forestry and tourism.

► **Threats:**

Deforestation, ranching and tourism.

► **Ownership:**

Private, *ejido*, federal.

### Site description

This mountain range extends in a north-south direction, with a maximum length of 70 km and a width between 20 and 30 km. It reaches an altitude of 2,090 m at its highest point and is a watershed dividing the Gulf of California from the Pacific Ocean. It contains a range of vegetation from xerophilic succulent scrub between 10 and 300 m, tropical deciduous forest from 450 to 1,000 m, oak forests between 800 and 1,200 m, and oak-pine forest on the heights.

### Birds

This area is a vegetational island on the Baja California Peninsula. Species and subendemic species include Xantus' Hummingbird, Baird's Junco, Gray Thrasher and San Lucas Robin, because of which it was classified as G-2, as well as some threatened species in the Mexican Ecological Code: Northern Pygmy-Owl, Cooper's Hawk and Golden Eagle. Total recorded species in the zone number 91, with 69.2% year-round residents, 29.7% winter residents and 1.1% accidentals.

### Conservation issues

The La Paz Center for Biological Research in Baja California Sur is conducting research in the area of botanical issues, vegetation and vertebrate ecology, agronomy and environmental impact.

108	<b>Babícora</b> <i>Chihuahua</i>	
	MXNW47G-4c	29° 05' N, 108° 11' W
		2,066 m / 2,000 km <sup>2</sup>

► **Habitats:**

Pine forests, grasslands, agricultural systems.

► **Land-use:**

Mainly forestry and an area of lakes; also agriculture and, to a lesser degree, ranching.

► **Threats:**

Ranching, deforestation and agriculture.

► **Ownership:**

*Ejido*, private.

### Site description

This area is a closed basin, with numerous shallow seasonal bodies of water. The area has 70.6% natural vegetation, 64.82% of which is pine-oak forest and 5.77% semiarid grassland. 22.75% is cultivated with corn and beans.

### Birds

This area contains a large number of migratory waterbirds, chiefly ducks, geese and cranes. It is also an important breeding site for Mexican Duck. The area also contains a migratory population of Bald Eagle, Golden Eagle and Aplomado Falcon. There are reports of Whooping Crane. The area has been classified as Category G-4c, due to the presence of Sandhill Crane, Snow Goose and Mexican Duck. A total of 126 bird species have been recorded, of which 52.4% are year-round residents, 34% are winter residents, 4.8% are transients, 2.4% are summer residents and 6.3% accidentals.

### Conservation issues

The *Universidad Autónoma de Chihuahua* is currently implementing a conservation and management program, in which various nongovernmental organizations like DUMAC are participating.

109	<b>Laguna de Bustillos</b> <i>Chihuahua</i>	
	MXNE03NA-4c	28° 40' N, 106° 45' W
		1,740 m / 50 km <sup>2</sup>

► **Habitats:**

Halophytic grassland, agricultural lands and woodland.

► **Land-use:**

Agriculture, ranching and industries.

► **Threats:**

Agriculture, industrial development, ranching and deforestation.

► **Ownership:**

Private and *ejido*.

### Site description

This permanent lagoon is surrounded by pine-oak forests and grassland. A cellulose factory, which discharges “treated” water into the lake, is in the area. There are also inflows of polluted water from the settlements of Anáhuac and Cuauhtémoc.

### Birds

This area has major concentrations of migratory and native waterbirds, such as Sandhill Crane, Snow Goose, Ross' Goose and Mexican Duck, because of which it was classified as category NA-4c. A total of 25 bird species have been reported, with 16% year-round residents and 84% winter residents.

### Conservation issues

The NGO DUMAC has visited the area and is keeping records of the migratory birds coming to the lagoon.

110	<b>Las Bufas</b>	
	<i>Durango</i>	
MXNE17G-1	24° 26' N, 106° 10' W	450–2,960 m / 206.45 km <sup>2</sup>

► **Habitats:**

Coniferous forest, tropical deciduous forest.

► **Land-use:**

Forestry and taking of nestlings for sale.

► **Threats:**

Deforestation and inappropriate resource use.

► **Ownership:**

*Ejido.*

### Site description

A highland area in the Sierra Madre Occidental. It has logged plateau pine-oak forests (4,097 ha), pine-oak canyon forest (9,331 ha), dry pine-oak woodland (1,140 ha), and high-altitude humid oak forest (140 ha). The adjacent Pacific slope has lowland tropical deciduous forest or lowland deciduous forest and transition forests to pine-oak (5,937 ha).

### Birds

The area contains a large number of threatened birds, of which three are endemic: Thick-billed Parrot, Eared Trogon and Tufted Jay. Other non-endemic threatened species are Lilac-crowned Parrot, Military Macaw and Spotted Owl. Since it is believed that there are still Imperial Woodpeckers, it was classified as category G-1. Within the plateau forest there are 140 ha of virgin forest, with large oaks as the backbone. This is the only forest of this type in the entire Sierra Madre Occidental.

### Conservation issues

Cipamex staff have conducted some studies which show the importance of this area to many species endemic to Mexico. They have been able to prevent excessive logging in the forests and the area is being proposed for classification as a biosphere reserve.

<b>111</b>	<b>Isla Isabel</b> <i>Nayarit</i>	
MXC59G-4a	21° 52' N, 105° 54' W	0–60 m / 1.78 km <sup>2</sup>

► **Habitats:**

Tropical deciduous forest, grassland, exotic and ruderal vegetation.

► **Land-use:**

Conservation 90%, tourism 5% and a fishing camp and administration 5%.

► **Threats:**

Mainly the introduction of exotics, followed by urban and industrial development and deforestation.

► **Ownership:**

Federal.

### Site description

This site is a small volcanic island in the Mexican Pacific on the continental platform, 28 km off the coast of Nayarit. Its shore is made up of cliffs, four sand and two rocky beaches, as well as several islets. The island's interior relief is very diverse, with hills and depressions and a crater enclosing a hypersaline lagoon. The island has no fresh water, except for a small pool of brackish water. The vegetation is 70% tropical deciduous forest (*Crataeva tapia* and *Euphorbia schlichtendalli*); 20% grassland (*Gramineae* and *Cyperaceae*); and exotic and ruderal vegetation (sugarcane, bananas, lemons, pineapple).

### Birds

The island is a nesting haven for some 20,000 seabirds of 9 species; research has been conducted at the site for over 12 years. There are no permanent inhabitants, but a community of fishers, tourists and researchers. Some of the birds are classified as threatened. The area is in Category G-4a, as it has over 1% of the world's population of Magnificent Frigatebird. For other birds, the local population represents a substantial percentage of individuals of that species worldwide. Sooty Tern is classified as threatened locally.

	Numbers
Blue-footed Booby	600–800
Brown Booby	600–800
Red-footed Booby	6–10
Brown Pelican	50–100
Magnificent Frigatebird	2,000–2,500
Heermann's Gull	>100
Sooty Tern	700

## Conservation issues

The island is a national park, with most of the area set aside for conservation. Due to the lack of drinking water and services and above all because of ecosystem fragility and the nesting habits of the birds, access to the island is limited to scientific researchers and small groups with permission from INE. Studies have been conducted on booby and frigatebird reproduction and shell exchanges in the hermit crab; there has also been a study involving cat eradication. It is important to conserve the island, as deterioration would lead to the disappearance of a vast number of birds.

112	<b>Chamela-Cuitzmala</b>	
	<i>Jalisco</i>	
MXC38NA-2	19° 13' N, 104° 39' W	500 m / 131.42 km <sup>2</sup>

► **Habitats:**

Tropical deciduous and semi-deciduous forest, mangrove swamp, coastal scrub and riparian vegetation.

► **Land-use:**

99% of the area for conservation, 1% for ranching.

► **Threats:**

Very minor from grazing and poaching, since the area is fenced and watched over by UNAM, and there is no access to the Cuitzmala area since it is private property.

► **Ownership:**

Private and federal.

## Site description

This area is a typical site of the Mexican Pacific slope. The predominant vegetation is tropical deciduous forest, with patches of tropical semi-deciduous forest in ravines. There are also thorn scrub, mangrove swamps and riparian vegetation along riverbanks and canals.

## Birds

In this site there are many species endemic to the dry tropical forests of western Mexico. A total of 264 bird species have been reported, with 59.6% year-round residents, 31.5% winter residents, 3.7% high-altitude migrants, 0.8% summer residents and 4.4% transients. It is also an important area for migrating species and for some classified in danger of extinction, such as Military Macaw, Yellow-headed Parrot and Peregrine Falcon. It is classified as NA-2 because of Banded Quail, Heermann's Gull, Balsas Screech-Owl, Mexican Parrotlet, Buff-collared Nightjar and Violet-crowned Hummingbird, among others.

## Conservation issues

Chamela-Cuitzmala is a biosphere reserve. The area around the Chamela biological station of UNAM is monitored, as is the Cuitzmala area, to which there is no free access without permission from the researchers on site, since it is private property. Research is being conducted on birds and other animal taxa at the biological station, mainly on Cuitzmala mammals.

113	<b>Sierra de Manantlán</b>	
	<i>Jalisco</i>	
MXC64G-1	19° 26' N, 104° 27' W	400–2,860 m / 1,395.77 km <sup>2</sup>

► **Habitats:**

Tropical deciduous and semi-deciduous forest, coniferous forest and cloud forest.

► **Land-use:**

Conservation, agriculture, ranching, urban areas.

► **Threats:**

Ranching, agriculture, deforestation and illicit drugs.

► **Ownership:**

Federal, *ejido*, private.

### Site description

This area consists of a gradient from lowland and mid-level tropical to coniferous forests, including pines, fir, oak and pine-oak, with patches of temperate montane rainforest in ravines. The University of Guadalajara has a biological station in the core area of the reserve, with 1,600 ha of fenced lands.

### Birds

This is an important area with populations of species threatened worldwide and species endemic to Mexico. It is classified as G-1 due to the presence of Eared Trogon, Black-capped Vireo and Mexican Woodnymph. A total of 179 bird species have been reported in the zone, with 56.4% year-round residents, 30.2% winter residents, 12.8% altitudinal migrants and 0.6% accidentals.

### Conservation issues

Manantlán is a biosphere reserve. There is a management plan for the reserve, as well as a scientific station managed by the *Instituto Manantlán* and belonging to the University of Guadalajara, where several projects are developing. The core area is fenced, which preserves part of the richness of the area.

<b>114</b>	<b>La Michilia</b> <i>Durango</i>	
MXNE20G-1	23° 25' N, 104° 10' W	2,000–2,800 m / 420 km <sup>2</sup>

► **Habitats:**

Coniferous forest, grassland, dry scrub and riparian vegetation.

► **Land-use:**

Mainly conservation, and, to a lesser degree, agriculture, ranching, forestry, urban areas.

► **Threats:**

Deforestation, urban development, ranching, agriculture and introduction of exotic species.

► **Ownership:**

Federal, *ejido*, private, state.

### Site description

This area is located on the eastern slopes of the Sierra Madre Occidental, in the south of the state of Durango. The altitudinal gradient is from 2,000 to 2,800 m. The various vegetation types are xerophytic scrub, manzanita, coniferous forests, including oak-pine, oak, and pine, and also grassland. The climate ranges from semi-dry in the lower parts to semi-cold on the heights.

### Birds

Since 1983, the bird community in the mixed oak-pine forest of Piedra Herrada has been monitored. A total 153 bird species have been reported here, with 59.4% year-round residents, 30% winter residents, 5.9% summer residents and 4.7% transient or accidental. Among threatened species living in the area are the Military Macaw and Eared Trogon, because of which it was classified as category G-1.

### Conservation issues

La Michilia is a biosphere reserve. Access to this reserve is only possible with permission from the *Instituto de Ecología*, A.C., to keep most of the area intact. Studies of important hunting species, wild turkey and communities of insect-eating birds have been conducted in the area, chiefly by Dr. Necedal of the *Instituto*, located in Durango.

115	<b>Carricito del Huichol</b>	
	<i>Jalisco</i>	
MXC55G-1	21° 35' N, 103° 58' W	2,500 m / 200 km <sup>2</sup>

- ▶ **Habitats:**  
Coniferous forest.
- ▶ **Land-use:**  
Forestry.
- ▶ **Threats:**  
Rapidly increasing deforestation.
- ▶ **Ownership:**  
Huichol 10% and private 90%.

### Site description

The coniferous forest consists of meseta pine-oak forest (2,370 ha), dry pine-oak forest (12,400 ha) and oak-pine forest (100 ha). There are four fragments of primary plateau forest (mature pine-oak), which are found close together on the highest crest of the mountain range. There are Mexican pines with trunks 1.2 m in diameter at chest-height in the patches of mature forest. Plateau forests with the dry pine-oak woodland in the surroundings make this area the largest roadless highland forest remaining in the Sierra Madre Occidental. It conserves the only considerable tract of primary plateau forest in this part of the Sierra Madre Occidental.

### Birds

This area contains the largest viable population of eared trogon, as well as Military Macaw and Thick-billed Parrot, because of which it was classified as category G-1. It is also rich in hunting species like Wild Turkey and white-tailed deer. A total of 68 bird species have been reported, of which 87% are year-round residents and 13% are winter residents.

### Conservation issues

Dr. Patricia Escalante and Jorge Rojas of Cipamex are looking into creating a Monitoring and Research Center in the area to suggest economic alternatives for the Huichol Indians, and then to have the area declared a reserve. They have also been trying to prevent continued indiscriminate logging. They are currently developing a project for the biological and cultural preservation of the area.

<b>116</b>	<b>Mapimí</b> <i>Durango</i>	
MXNW48NA-2	26° 30' N, 103° 50' W	1,100–1,450 m / 1,030 km <sup>2</sup>

► **Habitats:**

Scrub and grassland.

► **Land-use:**

Mostly conservation, tourism and ranching.

► **Threats:**

Tourism, inappropriate resource use and ranching.

► **Ownership:**

Federal, *ejido*, private.

### Site description

This area is situated in the central part of the Chihuahuan Desert. It features small ranges of hills surrounded with extensive plains. There are different vegetative associations within the dry scrubland and grassland range. Vegetation consists of agave scrub (magueyal), prickly pear scrub (nopalera), creosote scrub, mesquite scrub, savanna grassland and muhly grassland. There is a major presence of artificial bodies of water. The climate is dry and has more or less regular drought cycles.

### Birds

Studies on variations of bird populations have been conducted since 1978. A total of 161 species have been reported, with 37.8% year-round residents, 25% winter residents, 3.2% summer residents, 13% high-altitude migrants and 21% accidentals or transients. Among threatened species presents in the area are the Golden Eagle and Prairie Falcon, because of which it is classified as NA-2.

### Conservation issues

Mapimí is a biosphere reserve. In the area, studies of desert turtle, bird and mammal biology and conservation are being conducted. Studies are also being done of vegetation and population dynamics, soil and hydrology.

117	<b>Nevado de Colima</b> <i>Jalisco and Colima</i>	
	MXC37G-1	19° 31' N, 103° 38' W
		2,200–4,330 m / 222 km <sup>2</sup>

► **Habitats:**

Coniferous forest, including fir (*Abies amabilis*) forest and tropical deciduous forest.

► **Land-use:**

Conservation, agriculture, ranching, forestry and urban areas.

► **Threats:**

Ranching, agriculture, deforestation and urban development.

► **Ownership:**

*Ejido.*

### Site description

The Volcán de Colima and its folds are a gradient where daily and seasonal local movements of birds have been documented. It covers an area going from deciduous tropical forests on the lower slopes up to amabilis fir forests.

### Birds

This area rises from the coast at the Chamela-Cuitzmala Biosphere Reserve, passing through the Manantlán Biosphere Reserve up to the highest and innermost part of the gradient. A total of 117 birds have been reported on the volcano (Schaldach, 1963. The avifauna of Colima and adjacent Jalisco, Mexico. Proc. West. Found. Vert. Zool. 1 (1): 100 pp), of which 82.2% are year-round residents, 11.2% are winter residents, 4.7% are transients and 0.9% are summer residents. This site is classified as category G-1 due to the presence of the Stygian Owl, threatened worldwide.

### Conservation issues

The *Instituto Manantlán* is studying birds and other vertebrates in the area, in collaboration with Dr. Calder of the University of Arizona, but there is no concrete action plan for conservation of the area. Although it is a national park, there is no protection to prevent its deterioration.

118	<b>Tumbiscatio</b>	
	<i>Michoacán</i>	
MXC04NA-2	18° 33' N, 102° 22' W	0–1,000 m

► **Habitats:**

Pine-oak forest, oak forest, cloud forest.

► **Land-use:**

Agriculture, ranching and extraction of timber.

► **Threats:**

Deforestation, agriculture, ranching and inappropriate resource use.

► **Ownership:**

Undetermined.

### Site description

This area is an isolated mountain massif in the Sierra Madre del Sur, in the southeast of the state of Michoacán. It has major tracts of coniferous forests and rivers flowing towards the coast that act as corridors for many plant and animal species.

### Birds

A total of 60 bird species have been found in the zone, the majority of which are year-round residents (88%). The area has been classified as NA-2 because of the following species: Blue Mockingbird, Banded Quail, White-striped Woodcreeper, Wagler's Chachalaca, Happy Wren, Russet Nightingale-Thrush and Golden Vireo. There are also many species endemic to Mexico in the area and, in addition, some which are listed as rare under Mexican law, such as Louisiana Waterthrush and Slate-throated Redstart, or under special protection, such as Brown-backed Solitaire.

### Conservation issues

Extensive studies over a broad geographic area are recommended to obtain information on populations of species in order to determine areas of greatest abundance of critical species. The *Universidad Michoacana*, located in Morelia, Michoacán, is conducting studies of the area.

119	<b>SE Sierra de Santa Rosa, Nacimiento Río Sabinas</b> <i>Coahuila</i>	
	MXNE06G-1	27° 55' N, 101° 30' W
		250–2,050 m / 5,594.43 km <sup>2</sup>

► **Habitats:**

Scrub and grassland.

► **Land-use:**

Ranching, forestry.

► **Threats:**

Ranching and inadequate resource use.

► **Ownership:**

Private and federal.

### Site description

Pine-oak forests with grassland and very varied fauna, including large carnivores and ungulates. The Sabinas River runs through several municipalities of the state of Coahuila, among them San Juan de Sabinas, Sabinas, and Muzquíz, before emptying into the Don Martín Dam. It is the only major river in the region. Several streams empty into this basin, which is essential for the survival of flora and fauna.

### Birds

A total of 151 bird species have been recorded in the area, of which 43% are year-round residents, 31.8% winter residents, 14.6% are transients, 9.3% are summer residents and 1.3% accidentals. This area is important as part of the migratory corridor between the south of Texas and the north of Coahuila, where birds like Black-capped Vireo and Golden-cheeked Warbler occur; hence, it is classified as category G-1.

### Conservation issues

Some studies of birds have been done by the Museum of Mexican Birds located in Saltillo, Coahuila.

120	<b>Sierra de Santa Rosa</b>	
	<i>Guanajuato</i>	
MXC32G-1	20°58' N, 101°22' W	2,100–2,800 m / 800 km <sup>2</sup>

- ▶ **Habitats:**  
Oak forest.
- ▶ **Land-use:**  
Agriculture, ranching, use of forests, industry and tourism.
- ▶ **Threats:**  
Deforestation, inappropriate resource use, agriculture, ranching and tourism.
- ▶ **Ownership:**  
*Ejido*, private and federal.

### Site description

The Sierra de Santa Rosa is located in the center of the state of Guanajuato, covering the municipalities of Dolores Hidalgo, San Felipe and Guanajuato. The dominant vegetation is oak forests (with around 14 species) in association with madrone (*Arbutus* sp.) and pingüica (*Arctostaphylos pungens*). In the shrub stratum we find an abundance of *Dodonaea viscosa* and *Baccharis glutinosa* as well as several medicinal plants which are still being studied. Little is known about the diversity of fauna and flora in the zone. Productive activities in the area are forestry, mining, clay extraction, fruit cultivation, free-range ranching and tourism, but the effect these activities have on natural resources is not known. The Sierra de Santa Rosa is ecologically important from various viewpoints: i) the hydrodynamic role it plays in the zone as a producer of humidity and water supplier to different watersheds providing water to the city of Guanajuato and adjoining towns; ii) the Sierra can be seen as an island surrounded by a dominant landscape of dry scrubland or eroded areas; iii) recreation is another important activity which can be thought of as a potential resource because of the number of people coming to the area; and iv) there is a lack of protected areas in the state which would ensure preservation of the representative biodiversity of this area of Mexico.

### Birds

At present there is a preliminary bird study which records 122 species, 24% being winter residents, 16% migratory, 4% summer residents and 56% year-round residents. There are 6 new records for the state, 7 Mexican endemic species and two critically threatened. Basic and applied research is required in order to implement management and conservation plans in the zone. It was placed in category G-1 because of the presence of the Golden Eagle and Golden-cheeked Warbler.

### Conservation issues

*La Fundación Ecológica de Guanajuato*, A.C. administers the “Las Palomas” recreational center, in coordination with the state government. The center regulates tourist activities in the La Esperanza River basin and is trying to implement a management plan for the area.

121	<b>Sierra de Catorce</b> <i>San Luis Potosí</i>	
	MXNE22G-1	100° 45' N, 23° 15' W 2,000–3,180 m / 1,300 km <sup>2</sup>

► **Habitats:**

Coniferous forest, grassland, prickly pear scrub, desert agave scrub.

► **Land-use:**

Ranching 25%, agriculture 20%, tourism 10%, urban areas 5% and mining 5%.

► **Threats:**

Deforestation, illegal taking and trafficking in species, urban development, tourism, ranching, agriculture, industrial development and inappropriate resource use.

► **Ownership:**

*Ejido* 60% and private 40%.

### Site description

This area is in the north of San Luis Potosí, covering part of the municipalities of Vanegas, Catorce, La Paz and Venado. The mountain range runs north-south, with an axis of approximately 80 km. Real de Catorce is the best-known town; the area is also known for the ritual visits of the Huichol Indians. A mining boom continued until the past century. The area is the southeastern part of the Chihuahuan Desert, and contains its greatest cactus diversity and endemism. The coniferous forest vegetation is made up of pine forest, juniper woodland, oak forest and oak scrub.

### Birds

The area is part of the region known as Wirikuta by the Huichol Indians. For over 1,000 years it has been a place of vital cultural significance. There are 157 bird species in the region, which includes a large percentage of the Chihuahuan Desert. Of these, 51.6% of the birds are residents, 34.2% winter residents, 9% transients and 4.6% summer residents. Sierra de Catorce is an important nesting area for the Golden Eagle, which is in danger of extinction. Worthen's Sparrow is endemic to the area, because of which it was assigned to Category G-1.

### Conservation issues

The Federal Attorney General for Environmental Protection (*Procuraduría Federal de Protección al Ambiente*—Profepa) has an ongoing monitoring program, and an ecological management program is being started for this area. *Conservación Humana*, a nongovernmental organization, is conducting information campaigns about the importance of conserving the region and is studying a proposed incentive program for productive activities.

<h1>122</h1>	<b>Sierra de Arteaga</b> <i>Coahuila</i>	
MXNE10G-1	25° 18' N, 100° 27' W	1,500–3,500 m / 3,000 km <sup>2</sup>

► **Habitats:**

Coniferous forest and desert scrub.

► **Land-use:**

Conservation mainly, to a lesser degree ranching, agriculture, tourism, urban areas and forestry.

► **Threats:**

Deforestation, inappropriate resource use, ranching, tourism, agriculture, urban development, industrial development and fires.

► **Ownership:**

Private 60% and *ejido* 40%.

### Site description

These mountains are known as the “Curva de Monterrey” because of the change of direction of the mountainous folds. The area contains the Cumbres de Monterrey National Park, which is currently undergoing a delimitation and reclassification process. To the northeast of the mountain range is the El Taray region, which is being considered as a possible reserve. At the top of El Taray there is a cliff where Maroon-fronted Parrots nest. The coniferous forest is made up of the following species: white pine, Mexican pine, teocote pine and *Pseudotsuga flahaulti*. The desert scrub includes sotol, agave, maguey, Eve’s needle, matgrass, madrone, lechuguilla, marigold and sumac.

### Birds

The area contains 100% of the Maroon-fronted Parrot’s nesting sites. There are distribution areas of Worthen’s Sparrow, which are under serious threat of disturbance because of building of country houses and fires. Due to the presence of the two aforementioned species, the site was classified as category G-1. A total of 63 bird species have been reported, of which 31.8% are winter residents, 20.6% year-round residents, 1.6% summer residents, 6.3% transients and 39.7% accidentals.

### Conservation issues

Cumbres de Monterrey National Park is currently undergoing a delimitation and reclassification process. The intent is to create a reserve in the area of El Taray, which harbors the most important nesting site of the Maroon-fronted Parrot, endemic to the Sierra Madre Oriental.

123	<b>Sierra de Atoyac</b> <i>Guerrero</i>	
	MXC25G-1	17° 25' N, 100° 13' W
		600–3,705 m

► **Habitats:**

Tropical semi-deciduous forest, cloud forest, Lauraceae forest, coniferous forest.

► **Land-use:**

Agriculture, forestry.

► **Threats:**

Mainly deforestation, agriculture, inappropriate resource use and illicit drugs.

► **Ownership:**

*Ejido* and private.

### Site description

This mountain range originates in the Sierra Madre del Sur and is located between Cerro Teotepec and the Atoyac settlement of Alvarez. Cerro Teotepec is the highest peak in the state, at 3,705 m.

### Birds

A total of 123 bird species have been reported in this mountain range, of which the majority are year-round residents. It is classified as a high-endemism zone, containing viable populations of several species in some of the threatened categories. Some of the endemic species are Russet Nightingale-Thrush, Sinaloa Thrush, Happy Wren, Long-tailed Wood-Partridge and Unicolored Jay. Among threatened species worldwide there are Short-crested Coquette, White-throated Jay and White-tailed Hummingbird. It was classified as category G-1.

### Conservation issues

There are no concrete actions taken to preserve the area at present. Adolfo Navarro, of the Faculty of Science of UNAM, is currently studying birds in the area.

<h1>124</h1>	<b>Omiltemi</b> <i>Guerrero</i>	
MXC26G-1	17° 30' N, 99° 40' W	1,800–2,800 m / 30 km <sup>2</sup>

► **Habitats:**

Coniferous forest, cloud forest, tropical deciduous and semi-deciduous forest.

► **Land-use:**

Primarily conservation and secondarily forestry.

► **Threats:**

Mainly deforestation and to a lesser degree ranching.

► **Ownership:**

*Ejido.*

### Site description

The Omiltemi State Ecological Park is located in the center of the state of Guerrero, about 15 km west of the city of Chilpancingo. It is a watershed sector of the Sierra Madre del Sur. The area is composed of a series of humid canyons of considerable importance to many of the bird species present in the zone. Vegetation types in the area are coniferous forest (pine-oak, pine and oak), cloud forest, tropical deciduous forest and tropical semi-deciduous forest.

### Birds

This very isolated area has high endemism and a great species richness in all groups. Several restricted distribution and/or endangered species are present. A total of 167 bird species are reported, with 78.4% year-round residents, 21% winter residents and 0.6% summer residents. Some endangered species present in the area are the White-throated Jay and White-tailed Hummingbird, because of which it is classified as G-1. Species endemic to Mexico are the White-striped Woodcreeper, Long-tailed Wood-Partridge and Emerald Toucanet (group *wagleri*).

### Conservation issues

Since the area is classified as a state reserve, it has a management plan. A comprehensive study was done in the area on all kinds of vegetation and fauna. The results were published as the "Natural History of Omiltemi Park" by Conabio and UNAM.

125	<b>Cañón del Zopilote</b> <i>Guerrero</i>	
	MXC23G-2	17° 45' N, 99° 30' W
		0–2,750 m / 847.11 km <sup>2</sup>

► **Habitats:**

Dry scrubland and cloud forest.

► **Land-use:**

Urban development and cropland (corn, beans, etc.)

► **Threats:**

Urban development, agriculture and highway construction.

► **Ownership:**

*Ejido* and private.

### Site description

El Cañón del Zopilote is located in the Balsas Depression, in the northeast of the state of Guerrero. Among the tributaries of the Balsas or Mezcala River as it is known locally, are the Grande, Cocula, Teloloapan and Tepecoacuilco Rivers. The tributaries feeding into the Balsas from the north slope of the Sierra Madre del Sur are the Tlapaneco and Zopilote Rivers. The latter has created an eponymous canyon. The southern part of this reserve reaches 2,750 m in the Sierra Madre del Sur, from which it drops steeply down cliffs to 500 m in the Balsas River. The canyon is a center of floristic diversity center with a high concentration of species of cacti.

### Birds

The area is classified as G-2 because of the presence of the following species endemic to the Balsas: Pileated Flycatcher, Gray-breasted Woodpecker, Banded Quail, Balsas Screech-Owl and Black-chested Sparrow. A total of 61 bird species have been recorded, of which 85.2% are year-round residents, 10% are winter residents, 4.8% transients or undetermined. It is a high-endemism area, representative of the arid inland regions.

### Conservation issues

The Herbarium of the Faculty of Science of UNAM is conducting research in the area, mainly on plants. Studies of mammals (Rodentia and Chiroptera) and other land vertebrates have been conducted. The zone has been proposed as a protected area.

126	<b>Ciénegas del Lerma</b> <i>Estado de México</i>	
	MXC11G-1	19° 05' N, 99° 35' W
		0–2,000 m / 121.25 km <sup>2</sup>

► **Habitats:**

Agriculture, bulrushes and other aquatic plants.

► **Land-use:**

Principally for agriculture, and to a lesser degree ranching, hunting, industry and fishing.

► **Threats:**

Drying up of the lagoon, pollution from industrial wastes, agriculture, urban development, deforestation, ranching and hunting.

► **Ownership:**

*Ejido* 100%.

### Site description

This wetland is located in the central highland plateau in the state of Mexico. It is located in the eastern strip of the Toluca Valley, which forms the basin of the upper Lerma. Three major wetlands form these marshes. From south to north along the course of the river, they are the lagoons of Almoloya del Río, Tultepec and San Bartolo, also known as the northern extension of the Ciénegas del Lerma. These are bulrush marshes and flood areas, including land used for the cultivation of corn (75%) and ranching. The marshes occupy 25% of the area, of which 70% are bulrushes and 30% clearings and other aquatic plants.

### Birds

The area is one of the remnants of Mexico's central wetlands, an important wintering area for migratory waterbirds, especially ducks and geese, and habitat for the following species: Mexican Duck, Yellow Rail, Black-polled Yellowthroat, Least Bittern, King Rail and Virginia Rail. The area was classified as G-1 because of Black-polled Yellowthroat. A total of 23 bird species are reported for the region, with 65% winter residents, 30.4% year-round residents and 4.4% transients.

### Conservation issues

The NGO *Unidos para la Conservación*, established in 1992, conducts a project for the recovery of the Ciénegas del Lerma, with rural production programs offering better yields than traditional agriculture, as well as encouraging controlled hunting in order to adopt programs for the conservation and management of the game waterbirds. This association monitors migratory birds. Another institution working in the area, mainly with vegetation, is the *Universidad Autónoma del Estado de México*.

127	<b>Sierra Gorda</b> <i>Querétaro</i>	
	MXC06G-1	20° 59' N, 99° 46' W

300–3,100 m / 3,290.2 km<sup>2</sup>

► **Habitats:**

Tropical semi-deciduous and deciduous forest, semi-montane scrub, coniferous forest and cloud forest.

► **Land-use:**

Agriculture, ranching, forestry and urban areas.

► **Threats:**

Deforestation, ranching, agriculture, inappropriate resource use, forest fires, tourism and urban development.

► **Ownership:**

*Ejido* and private.

### Site description

The Sierra Gorda is part of the great mountain ranges of the Sierra Madre Oriental, adjoining the Mesa Central in the west and the neovolcanic axis in the south. It covers 44.38% of the area of the state. Climate ranges from subhumid semi-hot in the lower areas of the mountain range (800 to 1,500 m) to temperate subhumid in parts over 2,000 m. Rains vary from 500 mm to 1,500 mm in the extreme northeast of the state. The river system of the Sierra Gorda is an integral part of the Pánuco watershed, the largest rivers being the Santa María and Moctezuma, which both connect with many tributaries in the area. Vegetation is composed of tropical semi-deciduous forest, tropical deciduous forest (4.5%), semi-montane scrub (27%), oak scrub, oak forest (10%), coniferous forest (3.5%) and cloud forest (5.4%).

### Birds

A total of 291 species have been reported in this mountain range, of which 28 (14%) are endemic or quasiendemic to Mexico. Of the avifauna, 30% are winter residents and 70% year-round residents. The mountain range includes the Sótano del Barro region, which is home to the last colony of Military Macaw in the state of Querétaro. It also includes the Santa María river canyon, a major biotic haven, with species like Great Currawong, Crested Guan, Red-crowned Parrot, among others, as well as a variety of vegetation types. It is classified as G-1 due to the presence of Military Macaw and Red-crowned Parrot.

### Conservation issues

There are plans to declare the Sótano del Barro area a reserve. The *Grupo Ecológico Sierra Gorda, A.C.* is concerned about the situation of the mountain range and has started outreach work about its importance for birds and other living organisms, and is trying to have it included in state or federal conservation plans.

<h1>128</h1>	<b>El Cielo</b> <i>Tamaulipas</i>	
MXNE26G-1	23° 03' N, 99° 09' W	200–2,200 m / 1,440 km <sup>2</sup>

► **Habitats:**

Tropical semi-deciduous forest, cloud forest, oak forest, coniferous forest, dry scrubland.

► **Land-use:**

Mostly for conservation, followed by forestry, ranching, tourism and agriculture to a smaller degree.

► **Threats:**

Deforestation, agriculture, ranching, poaching and poorly planned ecotourism.

► **Ownership:**

*Ejido*, federal, state, private.

### Site description

The area is located in the province of the Sierra Madre Oriental on its eastern slope. Major mountain ranges are Sierra Los Nogales in the northern part of the reserve, Sierra de Santa Fe in the northeastern part and Sierra de Tamalave in the south. Its relief, height and proximity to the Gulf of Mexico make this area a natural barrier to the humid winds from the east and southeast, which dump their load of humidity here as rain or mist. The special features of high relative humidity and varied vegetation create ideal living conditions in this area for many organisms. Vegetation is distributed as follows: tropical semi-deciduous forest (between 200 and 800 meters above sea level), cloud forest (between 700 and 1,400 meters above sea level), oak forest (between 700 and 1,000 meters above sea level), coniferous forest (over 1,400 meters above sea level), dry scrubland (1,600 meters above sea level on the western and northwestern slopes).

### Birds

As a result of the diverse vegetation covering the region, the fauna also reflects a broad variety, due to the mix of nearctic and neotropical species. The area contains 400 bird species, with 56% year-round residents and 44% winter residents; 13 species are endemic. It is classified as G-1 due to the presence of Military Macaw, Maroon-fronted Parrot and Red-crowned Parrot.

### Conservation issues

The protection the area receives as a biosphere reserve is deficient and the ecotourism in the area is poorly planned. Research is being conducted in the area by the *Universidad de Tamaulipas*, the *Universidad Autónoma de Nuevo León*, UNAM and some US institutions.

129	<b>La Cima</b> <i>Federal District and Morelos</i>	
	MXC18G-1	19° 20' N, 99° 22' W

0–3,100 m

▶ **Habitats:**

Muhly grassland and pine woodland; patches of pine-oak forest.

▶ **Land-use:**

Agriculture.

▶ **Threats:**

Agriculture and forest fires.

▶ **Ownership:**

*Ejido* and federal.

**Site description**

Located close to the highest point of the Mexico City–Cuernavaca federal highway, between the Federal District and the state of Morelos, this site is mainly covered with grassland but includes areas of pine and pine-oak woodland.

**Birds**

A total of 133 bird species have been reported in the zone, with 76% year-round residents, 16% winter residents, 1% summer residents and 7% accidentals or transients. Its key importance is as the residence of 100% of the known population of the Sierra Madre Sparrow, a species endemic to Mexico and classified as endangered worldwide; it is classified as category G-1.

**Conservation issues**

In the area, several studies have been made of the volcano rabbit. Wilson and Ceballos Lascurain have studied birds in the region.

130	<b>Southern Valle de México</b> <i>Federal District and Morelos</i>	
	MXC19NA-2	19° 20' N, 98° 55' W
		2,900–3,950 m / 900 km <sup>2</sup>

► **Habitats:**

Mixed oak-pine, alder-pine and highland pine-muhly grass forests.

► **Land-use:**

50% for conservation, 30% for agriculture, grazing and tourism 10%.

► **Threats:**

Agriculture, grazing, urban sprawl, deforestation, introduction of exotic species and tourism.

► **Ownership:**

*Ejido* and private.

### Site description

This zone covers part of the Federal District and the State of Morelos. The southern part of the Valle de México was studied by Velázquez (1993. Landscape Ecology of the Tláloc and Pelado volcanoes. Doctoral Dissertation, Amsterdam, Holland) in terms of plant communities and their association with major geomorphological units; the landscape-vegetation map generated by this study shows predominant highland pine forests and grasslands, mixed pine-oak forests, Mexican pine forests, highland muhly grasslands and prairies associated with geological formations such as craters, plains, slopes, screes, foothills and ravines.

### Birds

Due to the presence of the Long-tailed Wood-Partridge, White-naped Swift, Strickland Woodpecker, Gray-barred Wren and Aztec Thrush, the area has been classified as a NA-2 site. It contains a great wealth of flora and fauna, with many endemic species which fall into threatened and/or protected categories. A total of 199 bird species have been recorded, 59% of which are year-round residents, 28% winter residents, 0.7% summer residents, 4.4% high-altitude migratory and 7.9% transient or accidental. The area is a highly diversified ecosystem and is of considerable importance to Mexico City. It was recently nominated by Semarnap as a national priority area for conservation.

### Conservation issues

Within the Valle de México there are eight protected areas: Desierto de los Leones National Park, Cumbres del Ajusco National Park, El Tepozteco National Park, Lagunas de Zempoala National Park, La Marquesa National Park, Volcán Pelado Forestry Reserve, Volcán Tláloc Forestry Reserve and the Ajusco-Chichinautzin biological corridor. Various environmental education and research programs are being conducted, along with reforestation and fire control programs, but there is no integrated management plan for the entire area. Studies have been made of the volcano rabbit and the birds native to the southern part of the Valle de México and their relationship with landscape-vegetation communities. A zoning plan is being drawn up for the entire Valle de México region.

131	<b>Sierra del Abra-Tanchipa</b>	
	<i>San Luis Potosí</i>	
MXC54G-1	22° 25' N, 99° 00' W	200–800 m / 218.53 km <sup>2</sup>

► **Habitats:**

Tropical deciduous and semi-deciduous forest, tropical oak woodland and palm groves.

► **Land-use:**

In the area of influence 56% is used for ranching, 32% forestry, 9% agriculture and 3% other types of activity.

► **Threats:**

Deforestation, ranching, agriculture, eucalyptus plantations and explosions for petroleum exploration.

► **Ownership:**

*Ejido* 81%, private 19%.

### Site description

This mountain range is located in the northeast of the state of San Luis Potosí, contiguous with the municipalities of Valles and Tamuín, and the state of Tamaulipas. It represents the northernmost limit of the tropical deciduous and semi-deciduous forests, tropical oak woodland and palm groves. The area contains 231 plant species and 161 vertebrates, as well as various taxa which are threatened, rare and in danger of extinction.

### Birds

A total of 81 bird species have been reported in this mountain range, of which 75.6% are year-round residents, 12.8% winter residents, 6.4% are transients, 3.8% are summer residents and 1.4% are accidentals. The following threatened species are present in the area: Military Macaw, Red-crowned Parrot and Red-lored Parrot, because of which it was classified as category G-1. Also, there are still jaguar, puma and ocelot.

### Conservation issues

This site is classified as a biosphere reserve. Vegetation and wildlife studies have been conducted by the *Instituto de Ecología y Alimentos* de la *Universidad Autónoma de Tamaulipas*.

132	<b>Valle de Tehuacán</b> <i>Puebla</i>	
	MXC31NA-2	17° 48' N, 97° 43' W
		400 m / 100 km <sup>2</sup>

► **Habitats:**

Columnar cactus forest, dry scrubland, tropical deciduous forest.

► **Land-use:**

Extensive ranching and new settlements.

► **Threats:**

Ranching to a greater and trade to a lesser degree.

► **Ownership:**

*Ejido* and private.

### Site description

This area contains a cactus forest with a high diversity of cacti and vascular plants—almost 3,000 vascular plant species are found there (Dávila *et al.* 1993). Of the 70 species of columnar cacti, 45 occur in the valley. It is classified as center for columnar cacti endemism and diversification.

### Birds

A unique biome due to the features of its biology and birds, it shares many species with the more humid neighboring areas and a few with the northerly desert. A total of 90 bird species have been recorded, with 53.9% year-round residents, 29.2% winter residents, 14.6% high-altitude migrants and 2.3% transients. The species considered endangered in Mexico are Elf Owl and Beautiful Hummingbird. It is classified as NA-2 due to the presence of Boucard's Wren, Dwarf Vireo, Slaty Vireo and Oaxaca Sparrow.

### Conservation issues

Valle de Tehuacán is a biosphere reserve. Dr. Arizmendi of ENEP Iztacala is studying birds in the area while Dr. Valiente of the *Instituto de Ecología*, UNAM, is studying vegetation ecology.

133	<b>Río Metlac</b> <i>Veracruz</i>	
	MXSE01G-1	19° 02' N, 97° 10' W
		850–5,700 m / 211 km <sup>2</sup>

► **Habitats:**

Coniferous forest and cloud forest.

► **Land-use:**

Industries, urban areas, forestry and agriculture.

► **Threats:**

Deforestation, industrial development, urban development, agriculture and inappropriate resource use.

► **Ownership:**

*Ejido*, private and federal.

### Site description

The Metlac River sub-basin is located on the eastern slope of the Pico de Orizaba with the summit as its western border and the confluence of the Metlac with the Blanco River on the east. It has 12 vegetation types and a great variation of strata.

### Birds

This site contains the largest variation of strata/biomes in Mexico in the smallest area, from 850 to 5,700 meters above sea level over a linear distance of 17 kilometers. It is the northernmost limit for several species and the easternmost for others. A total of 259 bird species have been reported, of which 78.6% are year-round residents, 16.4% are winter residents and 5% are transients. Due to the presence of Bearded Wood-Partridge and Slender-billed Wren it is classified as G-1.

### Conservation issues

Although the area is within two national parks, the Cañón del Río Blanco and the Pico de Orizaba, there are no management plans for this area. Pronatura Veracruz is working in the area.

134	Central Veracruz <i>Veracruz</i>	
	MXSE03G-1	19° 46' N, 19° 14' W 0–4,400 m / 6,000 km <sup>2</sup>

► **Habitats:**

Dry scrubland, coniferous and oak forest, cloud forest.

► **Land-use:**

Agriculture, forestry, ranching, urban areas and tourism.

► **Threats:**

Deforestation, agriculture, pesticide use, ranching, urban development, inappropriate resource use and tourism.

► **Ownership:**

*Ejido*, federal and private.

### Site description

The region of central Veracruz is made up of an extension of the neo-volcanic axis east of the Cofre de Perote volcano which splits the Gulf coastal plain in half. With the only patch of lowland tropical forest in the Gulf slope (except for the northern part of the Yucatán Peninsula), this region also has 18 vegetation types and a variation of strata in elevation from 0 to 4,400 m over a linear distance of some 85 km. The area is partially included in the Cofre de Perote National Park and El Morro de la Mancha scientific reserve.

### Birds

Central Veracruz is a critical region for approximately 236 neotropical migratory species with worldwide relevance. The world's largest migration of raptors (hawks, vultures, falcons, kites and other species) flies across Mexico's Caribbean Coastal plain near the city of Veracruz. It also has populations of some 12 endemic or limited distribution bird species, and 4 of the 19 bird species listed for Mexico in the IUCN Red Book. Some of the species presents are: Bearded Wood-Partridge, Piping Plover, Dwarf Jay and Golden-cheeked Warbler.

	Numbers
American White Pelican	54,477
Wood Stork	24,915
Turkey Vulture	1,475,387
Mississippi Kite	47,996
Broad-winged Hawk	1,719,770
Swainson's Hawk	845,465
American Kestrel	2,935
Peregrine Falcon	205
White-winged Dove	10,266

There are 432 total recorded species for the area, with 71.8% year-round residents, 19% winter residents, 8% transients and 1.2% accidentals.

### Conservation issues

Pronatura Veracruz conducts raptor monitoring programs and Mexican and foreign researchers conduct general ornithological studies.

135	<b>Sierra de Miahuatlán</b>	
	<i>Oaxaca</i>	
MXC17G-1	16° 12' N, 97° 07' W	1,000–4,000 m / 7,270.48 km <sup>2</sup>

► **Habitats:**

Tropical semi-deciduous forest, cloud forest, pine-oak forest.

► **Land-use:**

Agriculture and ranching.

► **Threats:**

Deforestation, agriculture, ranching and illicit drugs.

► **Ownership:**

*Ejido* 100%.

### Site description

This mountain range is part of the Sierra Madre del Sur and is located in the southernmost part of the state of Oaxaca. There are several towns in the area, including San Pedro Mixtepec, San Mateo Río Hondo, San Juan Lachao, San Miguel Coatlán and Santa María Ozolotepec. Few highways cross it and some areas are relatively unexplored.

### Birds

The area contains species threatened worldwide: White-throated Jay, Blue-capped Hummingbird and Black-capped Vireo; hence it is classified as G-1. Also there are species endemic to Mexico—White-naped Swift, Long-tailed Wood-Partridge, Wagler's Chachalaca and Cinnamon Hummingbird—and Blue-capped Hummingbird, endemic to the Sierra de Miahuatlán. A total of 193 bird species have been reported for the mountain range, of which 72.5% are year-round residents, 16.7% are winter residents, 3.6% are transients, 1% are summer residents and 1.6% are accidentals.

### Conservation issues

Binford in 1989 published a book listing all the bird species present in the state of Oaxaca. Dr. Francisco Ornelas of the *Instituto de Ecología de Xalapa* and Dr. Townsend Peterson of the University of Kansas have worked in this mountain range.

136	<b>Los Chimalapas</b> <i>Oaxaca</i>	
	MXSE11G-1	17° 10' N, 94° 20' W 200–1,800 m / 7,000 km <sup>2</sup>

► **Habitats:**

Tropical rainforest and cloud forest.

► **Land-use:**

Conservation, forestry and agriculture.

► **Threats:**

Inappropriate resource use and deforestation.

► **Ownership:**

*Ejido.*

### Site description

This is the largest tract of virgin tropical rainforest located in the easternmost part of Oaxaca. It also contains substantial areas of cloud forest. The conserved area covers 700,000 ha.

### Birds

The area contains a wealth of species, as well as several in danger of extinction and viable populations of many taxa under special protection. Some of the species are King Vulture, Keel-billed Motmot, Bat Falcon, Highland Guan, Red-lored Parrot and White-throated Magpie-Jay. Due to the presence of Keel-billed Motmot, it was classified as category G-1. A total of 281 species have been reported for the area, of which 75.8 are year-round residents, 19.2% are winter residents and 5% are accidentals or transients.

### Conservation issues

The area is proposed for classification as a biosphere reserve.

137	<b>Selva El Ocote</b> <i>Chiapas</i>	
	MXSE21G-1	17° 09' N, 93° 39' W
		180–1,450 m / 481.4 km <sup>2</sup>

► **Habitats:**

Tropical evergreen and deciduous forest, thorn forest, coniferous forest, grassland, secondary vegetation, relict forests and agricultural areas.

► **Land-use:**

Conservation 56%, agriculture 25% , ranching. 15% and urban areas 4%.

► **Threats:**

Agriculture, ranching, inappropriate resource use, deforestation and hunting.

► **Ownership:**

Federal 58%, *ejido* 36% and private 6%.

### Site description

The Selva El Ocote is an Area for the Protection of Natural Resources. The following types of vegetation are found in the region: tropical evergreen forest 1.4%, subdeciduous tropical forest 45%, tropical deciduous forest 5.2%, thorn forest 1.5%, coniferous forest 0.7%, oak forest 2.6%, grassland 7.2%, secondary vegetation, relict forests 3.7% and agricultural areas 32.1%. The evergreen and semideciduous tropical forests are on limestone substrates with unusual formations because of the karst phenomenon.

### Birds

The site contains one of the highest and most complex biodiversities in the state of Chiapas, with characteristic endemisms like Nava's Wren; this is why it was classified as category G-1. It also contains numerous mammal and bird species included in official lists as threatened or in danger of extinction. The site may harbor the most viable populations over the long term for many species that require an extensive area to survive. In addition, it is a site of prime importance, situated as it is in a transition zone between biogeographic provinces. It supports a total of 334 bird species, with 76% year-round residents, 18.2% winter residents, 4.8% transients, 0.4% summer residents and 0.6% accidentals.

### Conservation issues

The Selva El Ocote is officially managed by the *Instituto de Historia Natural de Chiapas*, located in Tuxtla Gutiérrez. There is a management plan for the reserve, and protection, environmental education, ecodevelopment, monitoring and research projects are under way.

138	<b>Sierra de Tabasco</b>	
	<i>Tabasco</i>	
MXSE09G-1	17° 35' N, 93° 40' W	50–1,000 m / 272.5 km <sup>2</sup>

► **Habitats:**

Tropical rainforest and semi-deciduous forest, secondary vegetation.

► **Land-use:**

Agriculture and ranching.

► **Threats:**

Deforestation, ranching, agriculture and inappropriate resource use.

► **Ownership:**

*Ejido*, private and federal.

### Site description

This mountain range in the south of Chiapas covers the municipalities of Huimanguillo, Teapa, Tacotalpa and Tenosique and is part of the northern Chiapas mountain range. The relief is very rugged, with steep slopes of up to 80%. There are outcrops of sedimentary rock of marine origin, with limestone formations. Surface limestone soils predominate, while there are also red clay soils on the hillsides and alluvial soil on riverbanks. The climate is warm and humid and annual rainfall is between 2,900 and 3,600 mm. Part of the sierra is classified as a state park. The vegetation is tropical evergreen and semi-deciduous forest, high-altitude and mid-level semi-evergreen *Terminalia amazona* forest, mid-level semi-evergreen breadnut forest, secondary vegetation or old tallgrass pastureland more than ten years old and secondary vegetation or young tallgrass pastureland less than ten years old.

### Birds

In this IBA, 73% of known birds for the state were reported. Of the recorded species, 28% are listed in the NOM-059-ECOL-1994. In this zone there are vestiges of what used to be a vast jungle corridor extending as far as Veracruz. This is of interest for the conduct of studies on habitat fragmentation, colonization, extinction, etc. A total of 324 bird species were recorded, of which 78.4% are year-round residents, 15.4% are winter residents, 5.5% transients and 0.7% accidentals. It is classified as G-1 due to the presence of the Slender-billed Wren.

### Conservation issues

Part of the mountain range is a state park, while another is being proposed. In another region of the mountain range the inhabitants have expressed interest in establishing a municipal protected area. Studies being conducted in the area include one on birds of the Tapijulapa mountain range and a population study of the Red-lored Parrot, by students of the *Universidad Juárez Autónoma de Tabasco*.

<h1>139</h1>	<b>La Sepultura</b> <i>Chiapas</i>	
MXSE20NA-2	16° 29' N, 94° 07' W	25–2,550 m / 1,674.2 km <sup>2</sup>

► **Habitats:**

Tropical semi-deciduous forest, cloud forest, grassland, oak forest and pine, tropical deciduous forest and thorn forest.

► **Land-use:**

Conservation, agriculture, ranching, forestry.

► **Threats:**

Deforestation, agriculture, ranching, inappropriate resource use and urban development.

► **Ownership:**

*Ejido*, private and federal.

### Site description

The area is in the northwest Sierra Madre de Chiapas and has a rugged and broken terrain. There are nine types of vegetation recorded in the area, with endemic or rare species like *Didon merolae*, *Ceratozamia matudae*, *Calea megacephala* and others. Deciduous forest is well represented in this area while it is hardly present at all in others.

### Birds

This area is rich in wildlife. It has 93 species of mammals, 177 species of birds, 55 species of reptiles and 25 species of amphibians, besides being a transition zone between the nearctic and neotropical regions and probably a Pleistocene haven. It contains the Resplendent Quetzal and species endemic to Mexico, such as the Rose-bellied Bunting and Giant Wren, the latter also endemic to Chiapas. Due to the presence of these three species, it is classified as NA-2. There are 16 threatened species, 35 rare, 6 under special protection and 5 in danger of extinction. Of the 177 bird species, 67% are year-round residents and 33% are winter residents.

### Conservation issues

In the effort to find productive activities that could offer local benefits and at the same time contribute to conserving habitat indispensable for birds, greenhouses have been established in this area for the propagation, conservation, and sale of cycads of the *Zamiaceae* family (an ancient group of seed plants which date from the Jurassic Era and earlier).

140	<b>El Triunfo</b> <i>Chiapas</i>	
	MXSE23G-1	15° 57' N, 93° 12' W 450–2,550 m / 1,191.77 km <sup>2</sup>

► **Habitats:**

Tropical evergreen, deciduous and semi-deciduous forest, cloud forest, coniferous forest and agrosystems.

► **Land-use:**

Conservation, agriculture, ranching, forestry, tourism and urban areas.

► **Threats:**

Agriculture, deforestation, urban development, ranching, inappropriate resource use and illicit drugs.

► **Ownership:**

*Ejido* 79%, federal 20.9% and private 0.1%.

### Site description

The area was declared a biosphere reserve in 1993 and recognized by UNESCO in 1994. It is situated in the Sierra Madre de Chiapas and contains at least 10 of the 19 vegetation types reported by Breedlove (1981), among them cloud forest and tropical deciduous forest, coniferous forest, including oak forest located on small crests, and coffee, corn, beans and grasslands. There are 542 land vertebrate species, 95 species of mammals, 362 of birds, 63 of reptiles and 22 of amphibians. It is classified as a Pleistocene haven.

### Birds

The area contains several threatened species, according to the ICBP and IUCN, such as Azure-rumped Tanager and Horned Guan, or only according to the ICBP, like Resplendent Quetzal; because of these species it is classified as G-1. According to the threatened species list of the *Norma Oficial Mexicana*, there are a total of 30: 6 endangered, 56 rare and 7 under special protection, as well as species endemic to Mexico (Wagler's Chachalaca, Black-capped Gnatcatcher, Green-fronted Hummingbird) and to Chiapas (Giant Wren). Total recorded species in the area number 371, with 74.9% year-round residents, 16.9% winter residents, 0.3% summer residents and 7.8% transients.

### Conservation issues

The area is managed by the *Instituto de Historia Natural de Chiapas*, which conducts ecodvelopment, monitoring and environmental education projects. The Institute prepares an annual operating plan. A bird monitoring station was set up in 1995.

<h1>141</h1>	<b>Pantanos de Centla</b> <i>Tabasco</i>	
MXSE10NA-4d	18° 39' N, 92° 47' W	0–15 m / 3,027.06 km <sup>2</sup>

► **Habitats:**

Tropical rainforest of *Bucida buceras*, tropical bloodwood rainforest, mangrove swamp, *tasistal*, palmetto groves of *Sabal mexicana*.

► **Land-use:**

Agriculture, petroleum extraction and fishing.

► **Threats:**

Deforestation, ranching, agriculture, introduction of exotic species and petroleum extraction.

► **Ownership:**

*Ejido* 70% and private 30%.

### Site description

The Pantanos de Centla Biosphere Reserve is situated in the delta of the Usumacinta-Grijalva rivers. It has four geomorphic systems: a flood plain, a lake plain, a coastal lagoon plain, and coastal sand terraces. This forms a complex hydrological system of rivers, lagoons, swamps, and salt marshes. The climate is subhumid with summer rains and two dry periods (in winter and summer). Annual mean temperature is 25° C and annual precipitation is 1,600 mm. Soils are gleysols and fluvisols. Vegetation is composed of tropical rainforest of *Bucida buceras*; bloodwood tree (*Haematoxylum campechianum*) woodland; mangrove swamp; rosewood scrub, *tasistal* and palmetto groves of *Sabal mexicana*.

### Birds

This IBA is classified as a priority area by the Mexico-Canada-United States Tripartite Committee, the Ramsar Convention and the North American Wetlands Conservation Council. Large numbers of various migratory species (a total of 66) reach this area, among them many Wood Stork, and ducks and geese; it is therefore classified as NA4-D. There are large colonies of herons. Also, *Jabirus* have their northernmost limit in this region. Total recorded species for the region number 213, with 69% of them year-round residents and 31% winter residents.

### Conservation issues

The management plan for the area is being reviewed by the INE. Studies monitoring climate change, an environmental education program and a peccary farm are in the area, under institutions such as the *Universidad Juárez Autónoma de Tabasco* and the Solidarity Committee for the State of Tabasco.

142	<b>Laguna de Términos</b> <i>Campeche</i>	
	MXSE25NA-4c	19° 10' N, 92° 28' W
		0 m / 7,050.16 km <sup>2</sup>

► **Habitats:**

Mangrove swamps, bulrushes, savannas, patches of tropical rainforest and secondary vegetation.

► **Land-use:**

Ranching 40%, agriculture, forestry, urban areas, petroleum extraction and fisheries.

► **Threats:**

Industrial development, inappropriate resource use (sandbanks), deforestation of the mangrove swamp, ranching, agriculture and urban development.

► **Ownership:**

Private 65%, *ejido* 30% and federal 5%.

### Site description

This is the largest estuarine lagoon system in Mexico, a coastal complex attached to the adjacent continental platform. It is part of the main delta of the most important ecological basin, made up of the Mexcalapa, Grijalva and Usumacinta rivers, with the largest discharge volume in Mexico. The tributaries are the Palizada, Candelaria, Las Cruces, Las Piñas and Chumpán Rivers. Vegetation in the core zone features major tracts of mangrove swamps, bulrushes and flooded grasses. In the buffer zones there are savannas and patches of tropical rainforest, between considerable areas of secondary vegetation in different stages of succession.

### Birds

A total of 262 bird species are reported, of which 84 fall within one of the threatened categories, representing 53.5% of total Peninsula species within one of the risk categories. The site is of considerable importance for the reproduction, feeding and shelter of waterbirds, among them Wood Stork, Black-bellied Whistling-Duck, White Ibis and Muscovy Duck, because of which it was classified as category NA-4c. Of the 262 bird species, 67.6% are year-round residents, 21.4% are winter residents, 9.1% transients and 1.9% are summer residents.

### Conservation issues

Paul Wood and Mauro Berlanga of *Pronatura Peninsula de Yucatán* have conducted ornithological studies in the Laguna de Términos. It is proposed as a flora and fauna protection area.

143	<b>Montes Azules</b> <i>Chiapas</i>	
	MXSE17G-1	17° 00' N, 91° 30' W
		300–1,500 m / 3,312 km <sup>2</sup>

► **Habitats:**

Tropical rainforest and semi-deciduous forest, coniferous forest, cloud forest, riparian forest, savannas and tallgrass pasturelands.

► **Land-use:**

Agriculture, ranching, forestry, tourism, urban areas, conservation and industries.

► **Threats:**

Deforestation, agriculture, ranching, inappropriate resource use, hunting, industrial development, urban development, tourism and introduction of exotic species.

► **Ownership:**

Federal 57%, *ejido* 17%, undetermined 26%

### Site description

The Selva Lacandona region is one of the world's most threatened ecosystems, due to intense natural resource use and colonization. Approximately 24% of this forest was declared a biosphere reserve ("Montes Azules") in 1978. This region is one of the last areas of tropical rainforest in Mexico and features a great diversity of plant and animal species. The reserve is in the municipalities of Ocosingo and Palenque. It borders on the ruins of Bonampak in the north, with Lacantún River on the south and east and with the Sierra de San Felipe and Laguna Miramar on the west.

### Birds

This is a critical habitat for the Harpy Eagle and other species threatened worldwide, such as the Agami Heron, Solitary Eagle and Orange-breasted Falcon; due to the presence of these species, it was classified as G-1. It is probably the habitat for the only viable population of the Scarlet Macaw in Mexico, and the last bastion of extensive riparian tropical forests in Mexico. The area contains a great ornithological wealth, due to its topographical complexity, the presence of bodies of water, climate conditions and anthropogenic factors. A total of 354 bird species have been reported in the area, with 78% year-round residents, 16% winter residents, 4.8% transients, 0.6% summer residents and 0.6% accidentals.

### Conservation issues

There are two research stations on the reserve: Chajul and Ocotul, where there is a degree of vigilance over the region, but because of its size there is no total control over access to the reserve.

144	<b>Ría Celestún</b>	
	<i>Yucatán</i>	
MXSE38G-2	20° 50' N, 90° 20' W	0–20 m / 591.3 km <sup>2</sup>

► **Habitats:**

Mangrove swamp, bulrushes, *petenes*, coastal dune vegetation and tropical semi-deciduous forest.

► **Land-use:**

Conservation.

► **Threats:**

Deforestation, inappropriate resource use, contamination, hunting and highway construction.

► **Ownership:**

Federal 70%, *ejido* 24%, private 6%.

### Site description

Ría Celestún is a special biosphere reserve. Of the 59,130 ha of the reserve, 23,777 are in the municipality of Calkiní, Campeche. These neotropical wetlands are at sea level and generally are flat, with hypersaline water. Some areas have sediment-bearing currents which build sand bars. There are coastal lagoons, known locally as *rías*. Another feature is the surface silt and water called *blanquizales*, used for salt production since pre-Hispanic times. There is a vegetative association of mangrove swamp (American mangrove, white mangrove and black mangrove) bulrushes, *petenes*, coastal dune vegetation and tropical semi-deciduous forest.

### Birds

This is one of the largest areas of mangrove swamp in a good state of conservation on the Gulf of Mexico. A total of 304 bird species were reported by Correa and García-Barrón (1993). In: *Biodiversidad marina and costera de México*. Conabio), corresponding to 59.7% of the total reported birds for the Yucatán Peninsula. The reserve is extremely valuable since the largest population of Greater Flamingo is found in the area, because of which it was classified as category G-2. Of the 304 recorded species 56% are year-round residents, 43.2% winter residents, 0.4% high-altitude migratory and 0.4% accidentals. It is a priority wetland.

### Conservation issues

*El Colegio de la Frontera Sur* conducts frequent monitoring of waterbirds populations through aerial censuses while *Pronatura Península de Yucatán* monitors waterbirds and landbirds.

145	Calakmul <i>Campeche</i>	
	MXSE26NA-1	19° 15' N, 90° 08' W 50–380 m / 7,231.85 km <sup>2</sup>

► **Habitats:**

Tropical semi-deciduous and deciduous forest, tropical rainforest, hydrophilic vegetation 35%.

► **Land-use:**

Conservation and tourism.

► **Threats:**

Deforestation, agriculture, ranching and inappropriate resource use.

► **Ownership:**

*Ejido*, federal, private.

### Site description

This area is the highest part of the Campeche plain, sloping from south to north. There is a mountain range known as Sierrita de X'pujil, 100 km long, extending as far as the border with Guatemala. There are no major watercourses in the area. There are only surface pools, known locally as *aguadas*, collecting in natural depressions. The climate is warm subhumid. The region where the reserve is located is the largest archeological reserve in Mexico, the second largest of the Mayan Empire, after Tikal in Guatemala (the Calakmul archeological area). This is the largest Mexican tropical reserve, with no human settlements in the reserve area.

Tropical semi-deciduous and deciduous forests dominate, with a smaller proportion of tropical rainforest in the southeastern part of the reserve; the aforementioned types cover some 65%. Hydrophilic vegetation habitat, represented by marshes and *aguadas*, covers some 35%.

### Birds

This is the largest reserve in the Mexican tropics, sheltering some 355 bird species, including 118 in the various risk categories and 9 endemic to the region (quasiendemic). It was classified as NA-1 due to the presence of the Harpy Eagle. Of the 355 bird species, 60% are year-round residents, 16% are winter residents, 7.5% are transients, 1.4% are summer residents and 15.1% accidentals.

### Conservation issues

The area is a reserve without human settlements, but tourism to the archeological area must be controlled to avoid major impacts on habitat. Paul Wood and Mauro Berlanga of *Pronatura Peninsula de Yucatán* have worked in the area and wrote a report emphasizing the importance of this site for conservation.

146	<b>Ichka' Ansijo</b> <i>Yucatán</i>	
	MXSE39NA-1	21° 25' N, 90° 00' W
		1–11 m / 240 km <sup>2</sup>

► **Habitats:**

Coasal dunes, mangrove swamp, halophilic grassland, bulrushes, tropical deciduous forest and lowland thorn forest.

► **Land-use:**

Forestry 48%, ranching 25%, agriculture 24.7%, and smaller proportions of salt pans, a Pemex storage and pumping plant, tourism and urban areas.

► **Threats:**

Deforestation, hunting, ranching, agriculture, urban development, tourism, industrial development and inappropriate resource use.

► **Ownership:**

*Ejido*, private, mixed and federal.

### Site description

This site is on the northern coast of the state of Yucatán, facing the Gulf of Mexico and bordering to the west with the El Palmar state ecological reserve and on the east with the Dzilám reserve. The area has Tertiary and Quaternary limestone rock. The climate is very warm and dry, with summer rains. The area has been heavily affected since colonial times by salt making, copa production, fishing, sisal production and ranching. In recent years, modernization has increased environmental deterioration with the construction of the coastal highway and building of tourist structures. It should be pointed out that there is much endemism in the vegetation of the coastal dunes, due to the great variety of microenvironments created, giving the area the capacity to host a high diversity of species (Martínez *et al.*, 1993. In: *Biodiversidad marina and costera de México*. Conabio).

### Birds

The presence of different types of vegetation guarantees the wealth of wildlife and provides habitat for 337 bird species, of which 51.6% are year-round residents, 48% are winter residents and 0.4% are transients. It is worthwhile mentioning that there is a continuous coastal lagoon from Celestún to Bahía Conil in Quintana Roo, which, until 1964, was navigable from Chuburná to Dzilám. This lagoon is currently undergoing a process of fragmentation and drying up due to the construction of roads and drains, which hamper free circulation of brackish water, leading to habitat loss for many species like Jabirus and the Yucatán Wren and some species of cacti such as *Mamillaria gaumeri*. It is classified as NA-1 due to the presence of Least Tern.

### Conservation issues

This area may act as a west-east biological corridor between the Ría Celestún special biosphere reserve and Isla Contoy. Some studies have been conducted in the region by the *Universidad Autónoma de Yucatán*.

147	<b>Sian Ka'an</b> <i>Quintana Roo</i>	
	MXSE34G-2	20° 15' N, 88° 00' W
		0–10 m / 5,281.47 km <sup>2</sup>

► **Habitats:**

Tropical rainforests, flooded rainforests, freshwater and brackish swamps, coastal lagoons and *petenes*.

► **Land-use:**

Conservation 99% and tourism 1%.

► **Threats:**

Hurricanes, tourism and deforestation.

► **Ownership:**

Federal 99% and private 1%.

### Site description

The biosphere reserve of Sian Ka'an is situated on a flat area not far above sea level. There are no rivers and the water filters rapidly through the soil. Vegetation in the area is extremely varied and includes tropical rainforests sloping down to the sea and flooded rainforests, freshwater and brackish swamps, coastal lagoons and keys, and also *petenes*. The reserve contains some 23 archeological sites.

### Birds

Sian Ka'an is classified as a World Heritage Site by UNESCO. A total of 329 bird species have been reported, of which 9 are endemic, including threatened species and species in danger of extinction. Of the total species, 63.3% are year-round residents, 22.2% are winter residents, 0.8% are summer residents, 11% are transients and 2.7% are accidentals. The area is of considerable importance for rainforest and waterbirds. It is classified as G-2 due to the presence of Ocellated Turkey, Yucatán Jay, Rose-throated Tanager, Buff-bellied Hummingbird and Yucatán Poorwill.

	Numbers of nests
Wood Stork	1,200

### Conservation issues

Monitoring studies of birds, bats and coral are being conducted by institutions active in the area, such as *El Colegio de la Frontera Sur* and the *Amigos de Sian Ka'an* association.

148	<b>Corredor Central Vallarta-Punta Laguna</b>	
	<i>Quintana Roo</i>	
MXSE32NA-2	20° 50' N, 87° 00' W	8–15 m / 1,000 km <sup>2</sup>

► **Habitats:**

Tropical rainforests and flooded rainforests.

► **Land-use:**

Agriculture, ranching, forestry and tourism.

► **Threats:**

Deforestation, agriculture, ranching, tourism and introduction of exotic species.

► **Ownership:**

*Ejido*, private.

### Site description

The area is a corridor between tropical forests and continuously flooded rainforests. The westernmost zone of this vegetation type is a regionally recognized *ejido* reserve proposed for inclusion in the Mexican System of Protected Natural Areas. There are spider monkey colonies (population restricted to Punta Laguna).

### Birds

The area functions as a linking corridor between Sian Ka'an Reserve in Quintana Roo and the state of Yucatán. This is the northernmost area of incidence of species included in the NOM-059-ECOL-1994, with recent recordings such as Black-and-white Owl. The area was classified as NA-2 due to the presence of Orange Oriole, Ocellated Turkey and Yellow-lored Parrot. A total of 160 bird species were reported for Central Vallarta, with 72.5% year-round residents and 27.5% summer residents.

### Conservation issues

Behavioral studies are currently being conducted in the area, which includes the *Reserva Ejidal Mono Araña* in Punta Laguna, with support from *Pronatura Peninsula de Yucatán*.

149	<b>Isla Cozumel</b> <i>Quintana Roo</i>	
	MXSE33NA-2	20° 30' N, 86° 57' W

► **Habitats:**

Tropical rainforest, tropical deciduous forest, mangrove swamp, bulrushes, halophytic vegetation, *tasista* and secondary vegetation.

► **Land-use:**

Conservation 57%, tourism 15%, urban areas 14%, agriculture 7% and ranching 7%.

► **Threats:**

Tourism, introduction of exotic species, deforestation, agriculture, ranching, hurricanes, urban development, hunting and inappropriate resource use.

► **Ownership:**

Private, state and *ejido*.

### Site description

The island is located 17.5 km off the northeastern coast of the Yucatán Peninsula. Soil origin is limestone and it shares the geomorphological features of the peninsula. The island is subject to hurricanes, with a frequency of one every 6.2 years. The climate is hot and humid, with summer rains. There are 40,000 inhabitants of the island, mostly concentrated in the town of San Miguel, which, like the tourist area, is in the north of the island. Most of the land area is untouched, since most agricultural activities and livestock raising are limited to small areas for domestic consumption and a large part of the island is classified as a reserve (the center and south of the island). The vegetation is tropical rainforest over 28,600 ha (59%), tropical deciduous forest over 6,300 ha (13%), mangrove swamp over 3,100 ha (6%), bulrushes, halophytic or coastal dune vegetation, *tasista*, and secondary vegetation, in areas of human influence or affected by hurricanes.

### Birds

We propose that the north region also be considered important, as it is a well conserved area where there are breeding colonies of Roseate Spoonbills, nesting areas for White-crowned Pigeon and Osprey, and Greater Flamingo colonies are reported in the area. Unlike the majority of the islands of the Greater and Lesser Antilles, the island of Cozumel is practically intact.

A total of 206 bird species have been recorded, with 33.5% year-round residents, 31.6% winter residents, 20.9% transients, 3.9% summer residents and 10.1% accidentals. The area was classified as NA-2 due to the presence of the Cozumel Thrasher, Cozumel Vireo, Cozumel Wren and Great Curassow, as well as 15 subendemic species.

### Conservation issues

Although Cozumel has no protected land areas belonging to the Mexican System of Protected Natural Areas, there are state and municipal decrees protecting most of the

territory. There is a project to restore the Laguna Chancanab directed by the *Instituto de Ciencias del Mar y Limnología* in Puerto Morelos. Also, there are the sea turtle restoration and environmental education programs of the *Instituto de Biología*, UNAM, and the Island Museum aimed at protecting the island birds.

150	<b>Isla Contoy</b> <i>Quintana Roo</i>	
	MXSE31NA-1	21° 32' N, 86° 47' W
		0–12 m / 1.76 km <sup>2</sup>

► **Habitats:**

Sand beaches, coastal dunes, coconut palms.

► **Land-use:**

Conservation 99% and urban areas 1%.

► **Threats:**

Tourism, introduction of exotic species, inappropriate resource use, fishing.

► **Ownership:**

Federal 100%.

### Site description

This area is a long narrow island 8.75 km long and 700 m wide at the widest point. The eastern coast is rocky, with sandy beaches in the north. There are also coastal dunes and a coconut palm grove. It was declared a national park on 2 February 1998.

### Birds

The island is a nesting site for seabirds. The area contains the largest Brown Pelican colonies on the eastern coast of Mexico (70%). Sandwich Tern, Least Tern and Magnificent Frigatebird also nest here. The area is in Category NA-1 due to the presence of Least Tern, classified as in danger of extinction in the ICBP Red Data Book. Total recorded species on the island number 120, of which 35.8% are year-round residents, 41.8% are winter residents, 10.8% transients, 8.3% summer residents and 3.3% accidentals.

	Numbers of nests
Brown Pelican	320
Least Tern	100

### Conservation issues

The island is a special biosphere reserve, which has a management plan and which cannot be visited without a permit from the INE. There are several research facilities on the island. Continuous bird monitoring is currently being conducted by *Amigos de Sian Ka'an*.