Innovative Airport Responses to Threatened and Endangered Species

DETAILS

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AIRPORT COOPERATIVE RESEARCH PROGRAM

ACRP REPORT 122

Innovative Airport Responses to Threatened and Endangered Species

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AIRPORT COOPERATIVE RESEARCH PROGRAM

Airports are vital national resources. They serve a key role in transportation of people and goods and in regional, national, and international commerce. They are where the nation's aviation system connects with other modes of transportation and where federal responsibility for managing and regulating air traffic operations intersects with the role of state and local governments that own and operate most airports. Research is necessary to solve common operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the airport industry. The Airport Cooperative Research Program (ACRP) serves as one of the principal means by which the airport industry can develop innovative near-term solutions to meet demands placed on it.

The need for ACRP was identified in *TRB Special Report 272: Airport Research Needs: Cooperative Solutions* in 2003, based on a study sponsored by the Federal Aviation Administration (FAA). The ACRP carries out applied research on problems that are shared by airport operating agencies and are not being adequately addressed by existing federal research programs. It is modeled after the successful National Cooperative Highway Research Program and Transit Cooperative Research Program. The ACRP undertakes research and other technical activities in a variety of airport subject areas, including design, construction, maintenance, operations, safety, security, policy, planning, human resources, and administration. The ACRP provides a forum where airport operators can cooperatively address common operational problems.

The ACRP was authorized in December 2003 as part of the Vision 100-Century of Aviation Reauthorization Act. The primary participants in the ACRP are (1) an independent governing board, the ACRP Oversight Committee (AOC), appointed by the Secretary of the U.S. Department of Transportation with representation from airport operating agencies, other stakeholders, and relevant industry organizations such as the Airports Council International-North America (ACI-NA), the American Association of Airport Executives (AAAE), the National Association of State Aviation Officials (NASAO), Airlines for America (A4A), and the Airport Consultants Council (ACC) as vital links to the airport community; (2) the TRB as program manager and secretariat for the governing board; and (3) the FAA as program sponsor. In October 2005, the FAA executed a contract with the National Academies formally initiating the program.

The ACRP benefits from the cooperation and participation of airport professionals, air carriers, shippers, state and local government officials, equipment and service suppliers, other airport users, and research organizations. Each of these participants has different interests and responsibilities, and each is an integral part of this cooperative research effort.

Research problem statements for the ACRP are solicited periodically but may be submitted to the TRB by anyone at any time. It is the responsibility of the AOC to formulate the research program by identifying the highest priority projects and defining funding levels and expected products.

Once selected, each ACRP project is assigned to an expert panel, appointed by the TRB. Panels include experienced practitioners and research specialists; heavy emphasis is placed on including airport professionals, the intended users of the research products. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, ACRP project panels serve voluntarily without compensation.

Primary emphasis is placed on disseminating ACRP results to the intended end-users of the research: airport operating agencies, service providers, and suppliers. The ACRP produces a series of research reports for use by airport operators, local agencies, the FAA, and other interested parties, and industry associations may arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by airport-industry practitioners.

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FOREWORD

By Joseph D. Navarrete
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ACRP Report 122: Innovative Airport Responses to Threatened and Endangered Species is a primer to help airport industry practitioners creatively address the presence of federally listed species at or near airports. It provides a thorough yet concise source of information that not only enables a better understanding of the issues, but more importantly, helps airports, regulatory agencies, and other stakeholders work together to reach practical solutions that both maintain airport operational safety and protect threatened and endangered species. Accompanying the primer is *CRP-CD-ROM 160: Airport Toolbox for ACRP Report 122,* which is designed to help facilitate understanding among airports and agencies.

Airports often occupy large tracts of land with varying degrees of development. Land that is less developed is often reserved for long-range facility expansion, yet undeveloped land may also be an attractive wildlife habitat, which raises potential safety issues from bird and other animal interference with aircraft operations. While there are many measures to discourage common wildlife species, the management of threatened and endangered species is more challenging because airports must work with environmental regulatory agencies to balance the need to protect these species with the needs for maintaining operational safety and meeting long-range requirements. Many airports, however, are unfamiliar with the issues brought about by the presence of threatened and endangered species, and regulators charged with protecting these species may not have a thorough understanding of an airport's unique operational requirements. Research was needed to identify best practices for addressing threatened and endangered species at airports, including balancing species protection with safety, implementing practical mitigation measures where required, and coordinating with key stakeholders.

The research, led by Environmental Science Associates, began with reviewing the Endangered Species Act and other regulatory guidance, identifying airport activity and plans that could conflict with or be impacted by listed species, and reviewing the FAA National Wildlife Strike Database for listed species involved in strike reports. The research team then conducted a series of case studies that not only featured a diverse set of regulatory settings and challenges but also highlighted innovative approaches, including safe harbor agreements, species recovery plans, conservation banking, and off-site mitigation.

The primer reviews endangered species regulation and the mission, roles, and responsibilities of the airport sponsor and regulatory agencies. It then identifies typical airport actions that could create a conflict (for example, wildlife hazard management, stormwater management, and airport expansion/construction) and common process challenges (such as inexperience, lack of early coordination with regulatory agencies, and inconsistent guidance). The primer then describes innovative solutions to overcoming these challenges,

including safe harbor agreements, candidate conservation agreements, habitat conservation plans, conservation banking, adaptive management plans, programmatic consultations and biological opinions, and recovery credits. Through the use of nine case studies, the primer provides real world examples of these practices, focusing on the importance of developing and maintaining stakeholder relationships. Finally, the *Airport Toolbox,* bound into this report as *CRP-CD-160,* includes an informational overview titled "Understanding the Airport Environment," a sample memorandum of agreement, factsheets, checklists, a brochure, templates, and sources for additional information.

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SECTION 1

Purpose and Structure of the Primer

ACRP Project 11-02, Task 21, "Innovative Airport Responses to Threatened and Endangered Species," was conceived to assist airport sponsors/operators in addressing federally listed species issues on or near their facilities. Airports often occupy large tracts of land with development limitations that include zoning, safety, operational efficiency, environmental, noise reduction, and a variety of other issues. While most airport operators are aware of the potential safety issues associated with wildlife and aircraft operations, many are unfamiliar with the additional considerations brought about when threatened or endangered species, or their habitat, occur on or near airport property. Additionally, regulators charged with the protection of those species may not be thoroughly aware of the myriad of safety and operational constraints specific to airports. Where airport and wildlife regulatory missions conflict, there is a potential for compromised safety, increased costs, or adverse effects on long-term aviation or species protection goals.

ACRP Report 122: Innovative Airport Responses to Threatened and Endangered Species was developed to provide airport owners and operators with practical information specific to addressing federally listed species issues on or near airports. It is also intended to provide regulators, stakeholders, environmental groups, and the public with information on the unique challenges airports may face in their efforts to comply with potentially conflicting environmental and safety regulations. This primer is intended to provide a concise, meaningful compilation of resources for users to access information on potential conflicts, challenges, and processes as well as resolutions for listed species issues at airports.

ACRP Report 122 first introduces relevant regulations and then provides a discussion of potential areas of conflict between airports and those regulations as well as information on how to address those challenges. Additionally, the primer includes a series of case studies to provide users with a variety of approaches, actions, and measures that have been successfully implemented in diverse geographic, facility, and regulatory settings. Finally, *CRP-CD-160: Airport Toolbox for ACRP Report 122* (bound into this primer and available on the *ACRP Report 122* web page), provides further resources for airports addressing listed species issues—U.S. Fish and Wildlife Service (USFWS) factsheets; a customizable informational overview on the airport operational environment for regulators, stakeholders, and the public; informational overviews for airport operators on elements of the Endangered Species Act that are especially relevant to airports; and forms, a checklist, and samples to help airports assess and manage listed species and habitat at the airport.

SECTION 2

Glossary of Terms and Definitions

Act—the Endangered Species Act.

Action—all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon the high seas (50 CFR §402.02).

Action area—all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR §402.02).

Advisory Circular—Advisory Circulars are informational documents produced by the FAA to inform and guide institutions, operations, and individuals within the aviation industry, as well as the general public. Advisory Circulars are intended to be informative in nature and not regulatory; however, many times they describe actions or advice that the FAA expects to be implemented or followed.

Airport sponsor—(1) a public agency that submits an application to the Secretary of Transportation for financial assistance under 49 U.S.C. Subpart B, Chapter 471, Subchapter I, Airport Development or (2) a private owner of a public-use airport who submits an application for financial aid for the airport to the Secretary of Transportation under 49 U.S.C. Subpart B, Chapter 471, Subchapter I (49 U.S.C. 47102 [19]).

Applicant—see "permit or license applicant."

Biological assessment—information prepared by, or under the direction of, a federal agency to determine whether a proposed action is likely to: (1) adversely affect listed species or designated critical habitat; (2) jeopardize the continued existence of species that are proposed for listing; or (3) adversely modify proposed critical habitat. Biological assessments must be prepared for "major construction activities" (50 CFR §402.02, 50 CFR §402.12).

Biological opinion—a document that includes (1) the opinion of the USFWS or the National Marine Fisheries Service (NMFS) (see below) as to whether or not a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat; (2) a summary of the information on which the opinion is based; and (3) a detailed discussion of the effects of the action on listed species or designated critical habitat (50 CFR §402.02, 50 CFR §402.14[h]).

Candidate species—plant and animal taxa considered for possible addition to the List of Endangered and Threatened Species (61 FR 7596-7613 [February 28, 1996]). USFWS further defines candidate species as plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other, higher priority listing activities.

Categorical exclusion (CatEx)—categorical exclusions are federal actions that meet the criteria contained in 40 CFR 1508.4. They represent actions that the FAA has found, based on past experience with similar actions, do not normally require an environmental assessment (EA) or environmental impact statement (EIS) because they do not individually or cumulatively have a significant effect on the human environment, with the exception of extraordinary circumstances.

Conference—a process of early interagency cooperation involving informal or formal discussions between a federal agency and USFWS and/or NMFS pursuant to section 7(a)(4) of the Act regarding the likely impact of an action on proposed species or proposed critical habitat (50 CFR §402.02, 50 CFR §402.10).

Conservation—the terms "conserve," "conserving," and "conservation" mean to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the] Act are no longer necessary (ESA §3[3]).

Conservation measures—actions to benefit or promote the recovery of listed species that are included by the fed-

eral agency as an integral part of the proposed action. These actions will be taken by the federal agency or applicant and serve to minimize, or compensate for, project effects on the species under review.

Conservation recommendations—non-binding suggestions from the USFWS and/or NMFS resulting from formal or informal consultation that (1) identify discretionary measures a federal agency can take to minimize or avoid the adverse effects of a proposed action on listed or proposed species, or designated or proposed critical habitat; (2) identify studies, monitoring, or research to develop new information on listed or proposed species, or designated or proposed critical habitat; and (3) include suggestions on how an action agency can assist species conservation as part of their action and in furtherance of their authorities under section 7(a)(1) of the Act (50 CFR §402.02).

Critical habitat—for listed species consists of (1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Act, on which are found those physical or biological features (constituent elements) (a) essential to the conservation of the species and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Act, upon a determination by the Secretary that such areas are essential for the conservation of the species (ESA §3 [5][A]).

Cumulative effects—are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR §402.02). (This definition applies only to section 7 analyses.)

Designated non-federal representative—the person, agency, or organization designated by the federal agency as its representative to conduct informal consultation or prepare a biological assessment (50 CFR §402.02, 50 CFR §402.08).

Distinct population segment—a population of any vertebrate species of fish or wildlife that interbreeds when mature and that meets the criteria for distinctness and significance described in USFWS's and NMFS's joint policy (61 FR 4722-4725).

Early consultation—a preliminary consultation requested by a federal agency on behalf of a prospective permit or license applicant prior to the filing of an application for a federal permit (50 CFR §402.11).

Effects of the action—the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action. Considered with the environmental baseline and predicted cumulative effects to determine overall effects to the species for purposes of preparing a biological opinion on the proposed action (50 CFR §402.02).

Endangered species—any species which is in danger of extinction throughout all or a significant portion of its range (ESA §3[6]).

Environmental assessment (EA)—an EA is a "concise document" that takes a "hard look" at expected environmental effects of a proposed action.

Environmental impact statement (EIS)—regulations at 40 CFR 1502.1 state that an EIS's primary purpose is to be an "action-forcing tool" to ensure that federal government programs and actions meet the National Environmental Policy Act's (NEPA's) goals and policies.

ESA—the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

Federal agency—any department, agency, or instrumentality of the United States.

Fish or wildlife—any member of the animal kingdom, including without limitation any mammal, fish, bird (including any migratory, nonmigratory, or endangered bird for which protection is also afforded by treaty or other international agreement), amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate, and includes any part, product, egg, or offspring thereof, or the dead body or parts thereof.

Formal consultation—a process occurring between USFWS and/or NMFS and a federal agency or applicant that (1) determines whether a proposed federal action is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat; (2) begins with a federal agency's written request and submittal of a complete initiation package; and (3) concludes with the issuance of a biological opinion and incidental take statement by either USFWS or NMFS (50 CFR §402.02, §402.14).

Habitat conservation plan (HCP)—under section 10(a)(2)(A) of the Act, a planning document that is a mandatory component of an incidental take permit application, also known as a "conservation plan."

Incidental take—take of listed fish or wildlife species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by a federal agency or applicant (50 CFR §402.02). Also see 50 CFR 17.4.

Indirect effects—those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur (50 CFR §402.02).

Informal consultation—an optional process that includes all discussions and correspondence between the USFWS and

NMFS and a federal agency or designated non-federal representative, prior to formal consultation, to determine whether a proposed federal action may affect listed species or critical habitat (50 CFR §402.02, §402.13).

Interdependent actions—actions having no independent utility apart from the proposed action (50 CFR §402.02).

Interrelated actions—actions that are part of a larger action and depend on the larger action for their justification (50 CFR §402.02).

Is likely to adversely affect—the appropriate finding in a biological assessment (or conclusion) if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions and is not discountable, insignificant, or beneficial.

Is not likely to adversely affect—the appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. **Beneficial effects** are contemporaneous positive effects without any adverse effects to the species. **Insignificant effects** relate to the size of the impact and should not reach the scale where take occurs.

Jeopardize the continued existence of—to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of the species (50 CFR §402.02).

Lead agency—for most airport actions, the FAA will be the lead agency (FAA Order 1050.1E).

Listed species—any species of fish, wildlife, or plant which has been determined to be endangered or threatened under section 4 of the Act (50 CFR §402.02).

Major construction activity—a construction project (or other undertaking having similar physical effects), which is a major federal action significantly affecting the quality of the human environment as referred to in NEPA (NEPA, 42 U.S.C. 4332[2][C], 50 CFR §402.02).

May affect—the appropriate conclusion when a proposed action may impose any effects on listed species or designated critical habitat. When the federal agency proposing the action determines that a "may affect" situation exists, then they must either initiate formal consultation or seek written concurrence from USFWS and/or NMFS that the action "is not likely to adversely affect" listed species.

National Environmental Policy Act (NEPA)—signed into law on January 1, 1970. Establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals within the federal agencies.

National Marine Fisheries Service (NMFS)—an office in the National Oceanic and Atmospheric Administration (NOAA) within the U.S. Department of Commerce. USFWS and the NMFS-NOAA fisheries share responsibility for implementing the ESA. NMFS is responsible for 94 marine species, from whales to sea turtles and salmon to Johnson's seagrass.

NOAA Fisheries—NOAA NMFS and USFWS share responsibility for implementing the ESA. The NMFS is usually referred to as NOAA Fisheries.

No effect—the appropriate conclusion when the action agency determines its proposed action will not affect a listed species or designated critical habitat. [Clarification of usage]

"Permit or license applicant"—when used with respect to an action of a federal agency for which exemption is sought under section 7, any person whose application to such agency for a permit or license has been denied primarily because of the application of section 7(a) to such agency action.

Person—an individual, corporation, partnership, trust, association, or any other private entity; or any officer, employee, agent, department, or instrumentality of the federal government, of any state, municipality, or political subdivision of a state, or of any foreign government; any state, municipality, or political subdivision of a state; or any other entity subject to the jurisdiction of the United States.

Plant—any member of the plant kingdom, including seeds, roots, and other parts thereof (SEC. 3. [16 U.S.C. 1532]).

Population—a group of fish or wildlife in the same taxon below the subspecific level, in common spatial arrangement that interbreed when mature [50 CFR 17.3]. The term has additional application as part of the ESA's definition of species at 16 U.S.C. 1532 (16).

Proposed critical habitat—habitat proposed in the *Federal Register* to be designated as critical habitat, or habitat proposed to be added to an existing critical habitat designation, under section 4 of the Endangered Species Act for any listed or proposed species (50 CFR §402.02).

Proposed species—any species of fish, wildlife, or plant that is proposed in the *Federal Register* to be listed under section 4 of the Endangered Species Act (50 CFR §402.02).

Reasonable and prudent alternatives—recommended alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Director believes would avoid the likelihood of jeopardizing the continued existence of listed species or the destruction or adverse modification of designated critical habitat (50 CFR §402.02).

Reasonable and prudent measures—actions the Director believes necessary or appropriate to minimize the impacts, i.e., amount or extent, of incidental take (50 CFR §402.02).

Recovery—improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in section 4(a)(1) of the Act (50 CFR §402.02).

Section 4—the section of the Endangered Species Act of 1973, as amended, outlining procedures and criteria for: (1) identifying and listing threatened and endangered species; (2) identifying, designating, and revising critical habitat; (3) developing and revising recovery plans; and (4) monitoring species removed from the list of threatened or endangered species as well as other provisions (ESA §4).

Section 7—the section of the Endangered Species Act of 1973, as amended, outlining the responsibilities and procedures for interagency cooperation to conserve federally listed species and designated critical habitats (SEC. 7. [16 U.S.C. 1536]).

Section 7 consultation—the various section 7 processes, including both consultation and conference if proposed species are involved (50 CFR §402).

Section 9—the section of the Endangered Species Act of 1973, as amended, that prohibits the taking of endangered species of fish and wildlife. Additional prohibitions include: (1) import or export of endangered species or products made from endangered species; (2) interstate or foreign commerce in listed species or their products; and (3) possession of unlawfully taken endangered species [ESA §9]. By regulation, USFWS generally extends the take prohibitions to threatened wildlife per 50 CFR 17.31.

Section 10—the section of the Endangered Species Act that allows non-federal parties planning activities that have no federal nexus, but which could result in the incidental taking of listed species, to apply for an incidental take permit.

Service(s)—the U.S. Fish and Wildlife Service or the National Marine Fisheries Service (or both).

Species—includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.

Take—to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. [ESA §3(19)] **Harm** is further defined by USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Further, NOAA defines the term **harm** as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering." **Harass** is defined by USFWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR §17.3).

Threatened species—any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

USACE—acronym for the Army Corps of Engineers.

USFWS—U.S. Fish and Wildlife Service.

SECTION 3

An Introduction to Endangered Species Regulation

This section provides a user-friendly introduction to the Endangered Species Act of 1973 (ESA) and other federal regulations and policies relevant to listed species. This includes a brief history of federal wildlife protection in the United States, a discussion of the ESA and other relevant regulations, and a summary of typical processes and the regulatory agency roles and responsibilities. Additional information on each of the topics in this section can be found at the referenced website locations and on *CRP-CD-160: Airport Toolbox for ACRP Report 122*, which is bound into this report and available on the *ACRP Report 122* web page.

Federal Protection for Wildlife: A Brief History

In the early 1900s, the concept of extinction was brought to public attention through the near extinction of several species. The Lacey Act of 1900 (16 U.S.C. §§ 3371–3378) was the first federal law that regulated commercial animal markets, prohibiting interstate commerce of animals killed in violation of state game laws. Other legislation followed, and, by 1963, public awareness and support for wildlife conservation drove political action and a shift from "take" regulation to habitat and species preservation. The U.S. Department of the Interior appointed the Committee on Rare and Endangered Wildlife Species, which published "Rare and Endangered Fish and Wildlife of the United States," (1966) and led to Congress passing the first piece of comprehensive endangered species legislation, The Endangered Species Preservation Act of 1966. The first national list of threatened and endangered species was also published. In 1969, the 1966 Act was renamed the Endangered Species Conservation Act and amended, extending protection to species "threatened with worldwide extinction."

The Endangered Species Act of 1973

The ESA (87 Stat 884), which was signed by President Nixon on December 28, 1973, recognized that U.S. wildlife and wildlife habitat is of "aesthetic, ecological, educational, recreational, and scientific value to our Nation and its people." The ESA provided a program for the protection and recovery of threatened and endangered plants and animals and the habitats in which they occur. The ESA

- Defined the terms "endangered" and "threatened" (section 3);
- Made plants and invertebrates eligible for listing (section 3);
- Made matching funds available to states with cooperative agreements (section 6);
- Required federal agencies to use their authorities to conserve listed species and consult on "may affect" actions (section 7);
- Prohibited federal agencies from authorizing, funding, or carrying out any action that would jeopardize the continued existence of any listed species or destroy or modify its "critical habitat" (section 7);
- Provided funding authority for land acquisition for foreign species (section 8);
- Implemented CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) protection (import, export, interstate, and foreign commerce of listed species) in the United States (section 8);
- Applied broad "take" prohibitions to endangered animal species, which could be extended to threatened animal species by special regulation (section 9);
- Provided exceptions to the prohibited acts (section 10); and
- Provided for civil and criminal penalties for violations and allowed for citizen suits to enforce certain provisions of the statute.

Since its enactment, there have been numerous amendments, legal challenges, and clarifications, but the overall framework of the 1973 Act has remained essentially unchanged. The combined results of the amendments to the ESA have led to a flexible, permitting statute, vastly different from the ESA of 1973.

Regulatory Roles and Responsibilities: Endangered Species Act

The lead federal agencies for implementing the ESA are the USFWS and the NOAA NMFS (commonly known as NOAA Fisheries), collectively termed the "Services." The USFWS has primary responsibility for terrestrial and freshwater species, while NOAA Fisheries manages marine wildlife and anadromous fish, such as salmon. Where there is overlap, the species may be jointly managed. The USFWS maintains a database of information on listed species under their purview. The database can be easily searched online by classification (e.g., vertebrates), species, state, USFWS region, listing status, or a variety of other search options (see http://ecos.fws.gov/tess_public/). The NOAA Fisheries list is also maintained and easily accessible online at http://www.fws.gov/endangered/esa-library/pdf/esa_table.pdf.

The ESA requires federal agencies to ensure that actions they authorize, fund, or perform are not likely to jeopardize the continued existence of any listed species (section 7(a)(2)) or result in the destruction or adverse modification of designated critical habitat of such species. This is accomplished through consultation with the Services. When there is federal funding (e.g., an FAA grant) or control over a proposed action (e.g., U.S. Army Corps of Engineers [USACE] permit sought), consultation proceeds under section 7. Where there is no federal nexus, the ESA has provisions for permitting incidental take of listed wildlife species under section 10(a)(1)(B).

The National Environmental Policy Act and the Endangered Species Act

On January 1, 1970, President Nixon signed the National Environmental Policy Act (NEPA) into law, which required federal agencies to assess the environmental impacts of their actions in the decision-making process. NEPA establishes a national framework with goals and processes for federal agencies to protect the environment (83 Stat 852, 1969). The regulations of NEPA are binding on all federal agencies, including the FAA. FAA Order 1050.1E: Environmental Impacts: Policies and Procedures establishes guidance for the FAA for complying with NEPA and includes compliance with the ESA. In accordance with this guidance, the FAA is responsible for the environmental review for all proposed actions (at and related to airports) under NEPA. Depending on the anticipated level of environmental impact, the NEPA analysis can be performed at one of three levels: Categorical Exclusion (CatEx), Environmental Assessment (EA), or Environmental Impact Statement (EIS). Coordination with agencies outside of the FAA is required when an action involves resources protected by special purpose laws or administrative directives, which includes the ESA.

At airports, the NEPA process is typically triggered during planning, design, and development of proposed improvements, expansions, or demolitions, and design or implementation of operations and management plans. The applicability of NEPA procedures to FAA actions depends upon the type of proposed action.

FAA actions subject to NEPA review (CatEx, EA, EIS) encompass most of the actions typically conducted at airports. FAA actions that trigger the NEPA/ESA review process include FAA approval of an Airport Layout Plan (ALP), a change to an ALP, or approval of financing for airport development. Examples include facility improvement and construction, airport development, and Passenger Facility Charge (PFC) approval. Also included are Airport Improvement Program (AIP) grant funding; navigational aid installation; and operational/management actions such as air traffic procedures, airspace redesign, and wildlife hazard management (a wildlife hazard management plan in itself does not trigger NEPA, but the individual actions within the plan may trigger NEPA once initiated).

Advisory actions, **emergency actions**, **and FAA actions not subject to NEPA review** are specialized and have different levels of exemption from NEPA review. Additionally, actions that lie outside the Office of Airports (ARP) may also be subject to NEPA coordination, so it is important to consult the FAA if there are questions about an activity's NEPA requirements. Additional information on airport NEPA can be found on *CRP-CD-160: Airport Toolbox for ACRP Report 122* (bound into this report and available on the *ACRP Report 122* web page) and on these websites:

- http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.current/documentNumber/1050.1
- http://www.faa.gov/airports/resources/publications/orders/environmental_5050_4/

Section 7 Consultations

Section 7 of the ESA imposes a series of responsibilities on federal agencies. Section 7(a)(1) directs federal agencies to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Section 7(a)(2) requires that federal agencies consult with the Services when any action the agency undertakes, funds, or authorizes (through issuance of a permit) may affect a listed endangered or threatened species. This process is called section 7 consultation. This is a cooperative process, and there is latitude within section 7 for the Services to work with applicants and other agencies during the process. Prior to filing an application for a federal permit or license, if an airport sponsor believes its proposed action may affect a federally listed species or critical habitat, the airport sponsor may request that FAA start early consultation with the Services. The FAA (on

behalf of the applicant) then coordinates with the Services to determine whether a proposed action "may affect" listed species or designated critical habitat. If the FAA accepts an alternative proposed by the Services or proposes another acceptable alternative, the FAA also concludes that impacts are not significant.

In 1986, the USFWS issued regulations detailing the consultation process, which includes both "informal" and "formal" consultations (50 CFR §402). When used in the context of consultation, the term "informal" refers to an optional process that is designed to help the federal action agency determine whether formal consultation is needed. Informal consultation is strongly encouraged so that projects can be designed with minimal impact to listed species. Informal consultations identify listed or candidate species or critical habitat occurrence in the action area; determine what effect the action may have on these species or critical habitats; explore avoidance and minimization options; and determine whether there is a need to enter into formal consultation for listed species or designated critical habitats. There is no overall timeframe for informal consultation; however, some individual process elements have statutory time limits. Consultations that are resolved by reaching a "is not likely to adversely affect" determination are said to have been resolved informally. An FAA determination of "no effect" or "is not likely to adversely affect" means that the consultation can be resolved without concurrence from the USFWS.

If an action agency determines that proposed action(s) "may affect," or "is likely to adversely affect" a listed species or adversely modify critical habitat, formal consultation is necessary. Formal consultations identify the nature and the extent of effects on listed species and critical habitat; identify reasonable and prudent alternatives if the action jeopardizes a listed species or adversely modifies critical habitat; provide reasonable and prudent measures to minimize incidental take impacts; identify conservation measures; and provide an administrative record of effects to help establish the species' environmental baseline in future biological opinions. Regulations require that formal consultation be concluded within 90 calendar days of initiation, and a biological opinion be delivered within 45 days of that conclusion; however, it is important to note that formal consultation is not "initiated" until the file is deemed "complete." This means that all the relevant data required by 50 CFR §402.14(c) has been received by USFWS.

The FAA maintains a variety of information specific to airport section 7 consultations in their *Environmental Desk Reference for Airport Actions* (FAA Office of Airports, Office of Airport Planning and Programming, Airports Planning and Environmental Division October 2007). This guidance, which can be accessed through the FAA's website, compiles information on special purpose laws in one location for convenience and quick reference. Its purpose is to help FAA integrate compliance with NEPA and applicable special purpose laws into the NEPA process to the fullest extent possible. (See http://www.faa.gov/airports/environmental/environmental_desk_ref/.)

Additionally, the Services maintain a handbook titled *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act* (USFWS, NMFS March 1998). While not specific to airports, this handbook provides a thorough and comprehensive discussion of agency internal guidance and national policy for conducting consultation and conferences pursuant to section 7. The purpose of the handbook is to promote efficiency and nationwide consistency within and between the Services. (See http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf.)

Section 10 Permitting

For federal actions, section 7 is triggered when an action "may affect" listed species; for non-federal actions, section 10 provides a mechanism for permitting the "incidental take" of a listed species associated with otherwise lawful activities. In the 1982 amendments to the ESA, Congress established a provision in section 10 that allows for the "incidental take" of endangered and threatened species of wildlife by non-federal entities. Section 10(a)(1)(B) of the ESA allows non-federal parties planning activities that have no federal nexus, but which could result in the incidental taking of listed animals, to apply for an incidental take permit. The application must include a Habitat Conservation Plan (HCP) laying out the proposed actions, determining the effects of those actions on affected fish and wildlife species and their habitats (often including proposed or candidate species), and defining measures to minimize and mitigate adverse effects. HCPs are addressed in more detail in Section 5. Issuance of an incidental take permit, in addition to being a federal action under section 7, is also a federal action subject to NEPA and therefore requires compliance in the form of a CatEx, EA, or EIS. Because of the expanded scope and longer timeframes, parties often strive to find a federal nexus and coordinate under section 7 to avoid the more lengthy section 10 permitting process. An example of section 10 permitting applied to an airport project is included in Case Study #5. Further information is included *CRP-CD-160: Airport Toolbox for ACRP Report 122* (bound into this report and available on the *ACRP Report 122* web page) and also at the following websites:

http://www.fws.gov/endangered/laws-policies/section-10.html
http://www.nmfs.noaa.gov/pr/laws/esa/policies.htm

Other Incidental Take Mechanisms under Section 10

Classified by USFWS as Enhancement of Survival Permits (pursuant to section 10(a)(1)(A), Safe Harbor Agreements and Candidate Conservation Agreements are other potential take mechanisms available to landowners, including airports. These actions are discussed further in the section called "Tools and Innovative Approaches."

Other Relevant Federal Regulations

Under the ESA, a permit may be granted (section 10) or a statement issued (section 7) that allows the incidental take of endangered species. In some cases, however, there are other federal regulations that protect specific fish and wildlife species, which could potentially affect airport development and operation. A summary of these regulations and the circumstances where they could apply is included in this section and consists of the following:

- Migratory Bird Treaty Act (MBTA), (50 CFR 21.11)
- Bald and Golden Eagle Protection Act (BGEPA), (16 U.S.C. 668-668d, 54 Stat. 250)
- Marine Mammal Protection Act of 1972 (MMPA), (50 CFR Part 218)
- Magnuson-Stevens Fishery Conservation and Management Act (MSA) (50 CFR Part 600)

The Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Since birds represent the wildlife group most often at conflict with aviation safety, the MBTA and BGEPA may apply to situations where hazardous wildlife is a concern. Some ESA-listed species (and non-listed species) are protected under the MBTA, the BGEPA, or both. This protection is discussed further in the section called "Post-Listing."

Marine Mammal Protection Act of 1972

The MMPA (50 CFR 216) prohibits the taking of marine mammals, which includes harassment ("any act of pursuit, torment or annoyance which has the potential to either: a.) injure a marine mammal in the wild, or b.) disturb a marine mammal by causing disruption of behavioral patterns"). Authority to manage the MMPA is divided between USFWS (sea otters and marine otters, walruses, polar bears, three species of manatees, and dugongs), NOAA Fisheries (pinnipeds, including seals and sea lions, and cetaceans, such as whales and dolphins), and a third federal agency, the Marine Mammal Commission (MMC), which assists the Services in MMPA implementation. While most airports would not consider impacts to marine mammals as a potential issue, airports with seaplane activities or other actions that might affect in-water habitats may fall under jurisdiction of the MMPA in addition to the ESA. Coordination under both statutes would be required.

While incidental take authorizations would apply to direct impacts to marine mammals or habitats, incidental harassment authorization covers activities such as acoustic harassment due to in-water construction. Case Study #9 is an example of potential acoustic impacts to marine mammals and how they were addressed. (See http://www.nmfs.noaa.gov/pr/permits/incidental.htm.)

Magnuson-Stevens Fishery Conservation and Management Act

The MSA has jurisdiction over the management and conservation of marine fish species, including areas designated as Essential Fish Habitat (EFH), which encompass most coastal waters (see http://sero.nmfs.noaa.gov/hcd/efh.htm). The trigger for EFH consultation is a federal action agency's determination that an action or proposed action, funded, authorized, or undertaken by that agency may adversely affect EFH. There are many situations where designated EFH overlaps with the habitat (including critical habitat) of ESA-listed species, necessitating consultation under both section 7 of the ESA and Section 305(b)(2) of the MSA. Because of this dual obligation, the federal action agency and NOAA Fisheries would likely see efficiencies by integrating the two consultations to varying degrees, based upon proposed effects.

State Coordination

In addition to federal regulations for threatened and endangered species, many states have programs through which listed species are actively managed. These include both state wildlife agencies and more encompassing state "NEPA-like" regulations (e.g., the California Environmental Quality Act). While some airport actions do not affect federally listed species or their critical habitats, they may affect state-listed, or regulated, endangered or threatened species. Airport sponsors must ensure the environmental documents prepared for such airport actions address effects on state-protected resources and that coordination with the appropriate state agency(s) occurs.

Although the ESA does not address state-protected species or habitats, it recognizes the importance of engaging the states in USFWS's efforts to conserve federally listed species and their ecosystems (16 U.S.C. § 1531, et seq.). Section 6 of the ESA mandates this cooperative relationship

and, under certain circumstances, authorizes USFWS to enter into a cooperative agreement with a state in furtherance of species conservation. For example, USFWS and the Florida Fish and Wildlife Conservation Commission (FWC) renewed a section 6 Agreement (May 14, 2012) that provides the framework for USFWS to recognize FWC permits as federal approval of direct or incidental take of federally endangered species. While this agreement does not delegate federal authority to FWC and by itself does not authorize the FWC to issue any permits for federally listed species, FWC could seek development of a program to issue incidental take permits in the future, thereby eliminating the need for two incidental take permits—one from the state and one from the USFWS.

SECTION 4

Identification of Potential Conflicts with Airport Actions

The ESA is primarily dedicated to species protection, but when drafting the Act, Congress also sought to avoid ESA confrontations between proposed federal actions and listed species where it could. As a result, the ESA incorporates seeking protection for species with accommodation of other public policy needs by attempting to identify "reasonable and prudent alternatives" that allow projects to go forward without harming the species in question. This section presents airport activities and plans that could affect listed species and an overview of how listed species could affect airport operations and safety. Also included is a discussion of the applicable regulatory guidance, the roles and responsibilities of the airport sponsor, and known conflicts and challenges that airports routinely face related to the occurrence of listed (or potentially listed) species and their habitats.

Roles and Responsibilities of the Airport Sponsor

The FAA's primary mission is to ensure aviation safety, security, and efficiency. Actions taken by the FAA reflect sensitivity to regional ecological and economic needs but still support FAA's mission to ensure aviation safety. Per statutory and regulatory requirements, the FAA must evaluate the environmental consequences of all proposed developments under NEPA, the Clean Air Act, the ESA, the Airport and Airway Improvement Act, and other regulations. (See http://www.faa.gov/airports/environmental/.)

Prior to commencement of a project, it is important for airport sponsors to confirm that proposed actions comply with all local, state, and federal regulations as they pertain to impacts to protected species and habitats. While the responsibility for environmental compliance under NEPA resides with the federal action agency (typically the FAA), the airport sponsor is responsible for maintaining compliance with all relevant rules, regulations, and grant assurances and must provide the FAA with sufficient information to facilitate the appropriate level of coordination with the agencies responsible for management of listed species. Alternately, the airport sponsor may be primarily responsible for compliance in situations where there may not be a federal nexus (e.g., an action that would not trigger federal involvement for funding or project approvals, such as a locally funded project). Listed species may occupy and use natural areas, structures, stormwater facilities, and maintained areas on airport property and are not always readily visible. Prior to implementation of any new action, the airport should coordinate either directly with the relevant regulatory agencies, or work with a qualified environmental professional to determine the presence of listed species within the project area.

Roles and Responsibilities of Regulatory Agencies

As discussed previously, the ESA requires federal agencies to ensure that actions they authorize, fund, or perform are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The Services' mission is to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

The Services' two major goals are to (1) protect endangered and threatened species and then pursue their recovery and (2) conserve candidate species and species at risk so that listing under the ESA is not necessary. These goals are achieved through the various programs, which include the Candidate Conservation Program, consultations, grants, HCPs, listing and critical habitat, recovery plans, and other mechanisms.

Typical Airport Actions that Could Create Conflict

There are a variety of airport actions that could affect (or be affected by) listed species including, but not limited to:

- Airport development projects,
- Airport master planning,
- Airport expansion or land acquisition,

- Airport operations,
- Airport maintenance, and
- Mitigation for other impacts (e.g., wetlands).

As this list encompasses many airport actions, it is important that airport sponsors understand the potential conflicts and challenges as well as the regulatory implications of addressing those challenges. While it is not inclusive of all potential conflicts, Table 1 outlines three key areas of conflict that airport sponsors routinely face related to the occurrence of listed (or potentially listed) species and their habitats: (1) wildlife hazard management, (2) maintenance and operational requirements, and (3) development of airport property. These three key areas are discussed in more detail in the following sections.

Wildlife Hazard Management

Whether or not an airport is regulated under FAR Part 139 (Title 14 CFR Part 139.337: Part 139), wildlife hazard assessments and management plans can be valuable tools for the determination of onsite and offsite listed species and their habitats and what potential for impacts to airport operation and safety they may represent. Either through a formal wildlife hazard assessment (as detailed in the joint FAA/U.S. Department of Agriculture [USDA] document *Wildlife Hazard Management at Airports: A Manual for Airport Personnel* [Cleary and Dolbeer 2005] and other FAA guidance) or more informally, it is important for airport sponsors to understand the wildlife and habitats that occur at the airport in order to coordinate effectively with agencies to obtain any required permits or clearances and to have the appropriate

Table 1. How the presence of endangered species may affect typical airport activities.

Key Issue Area	Potential Conflict	Potential Issue for Airport
Wildlife Hazard Management	Onsite breeding/nesting for listed species	*Direct*: Strike hazard *Indirect*: Operational restrictions
	Wetland mitigation on or near airport	*Direct*: Potential attractant for federally listed or non-listed hazardous wildlife *Indirect*: Operation and maintenance restrictions
	Stormwater management systems	*Direct*: Potential attractant for federally listed or non-listed hazardous wildlife *Indirect*: Operation and maintenance restrictions
	Establishment of species preserve or conservation areas	*Direct*: Potential attractant for federally listed or non-listed hazardous wildlife *Indirect*: Operation and maintenance restrictions
Maintenance and Operations	Onsite breeding/nesting for listed species	Aircraft delays, increased congestion due to species protection buffers or operations limits (i.e., mowing), restricted access to safety systems (i.e., NAVAIDS)
	Mitigation, natural areas, or preserve areas on or near airport	Mowing/vegetation clearing restrictions, deterrent use restrictions, temporal or seasonal limitations on access or uses, restricted access to safety systems
	Special events	Short durations of increased airport activity can require additional maintenance or operational adjustments, timing could conflict with restrictions on managed habitat
	Onsite preservation of burrowing species	Impacts to paved and non-paved surfaces, refugia for prey species
Airport Development	Construction, land acquisition, demolition	*Direct*: Need to mitigate due to impacts to species or habitat, increased costs, and/or schedule for regulatory review and approvals *Indirect*: i.e., need for buffers or altered schedule due to construction noise impacts
	Natural habitat or conservation areas on or near airport	Habitats onsite or required management could be incompatible with operations or safety Coordination with ESA agencies/permits often required
	Stormwater management systems	Onsite or near-site mitigation may restrict development, maintenance, or operations Coordination with ESA agencies/permits and specific operations and maintenance actions required

For all areas of potential conflict, coordination with ESA agencies and/or permits may be required.

training to effectively manage potential risks to operations or safety.

Natural areas have a potential to attract both listed and non-listed hazardous wildlife or in the case of forested areas, can result in penetrations of protected airspace. Whether or not the natural areas on an airport are protected or slated for future development, it is important for the airport sponsor to ensure compatibility of these natural areas with the airport's ALP. The type of habitat and potential for occurrence of listed species may affect development potential, as well as the mechanisms available for management.

Airports are obligated to develop and maintain facilities in a manner that complies with all FAA advisory circulars in order to ensure a safe and efficient operational environment. A wide variety of listed species (especially birds) have the potential to create wildlife hazard concerns as they transit airport property or airspace. Additionally, while specific species may not be a direct concern from a strike standpoint, they, or their habitat, may attract predators (e.g., coyotes) or other wildlife that could pose a significant risk to aviation.

The FAA actively encourages the voluntary reporting of wildlife strikes and makes available information on the process and importance of reporting strikes (Advisory Circular 150/5200-32A: Reporting Wildlife Aircraft Strikes). Because strike reporting has not been consistent across the industry, it is expected that a number of strikes involving federally listed species are either not reported or reported incorrectly as other species within their guild. As strike reporting awareness increases, strike reports become more detailed and accurate, and wildlife conservation efforts result in population rebounds for listed species, there will likely be an increase in the reported number of conflicts between listed species and aircraft.

Regulations, habitat conservation plans, mitigation lands, and other agreements related to listed species and protected habitats for those species may conflict with FAA guidance related to wildlife hazard management at airports. In addition to ACRP publications (e.g., *ACRP Report 32: A Guidebook for Addressing Aircraft/Wildlife Hazards at General Aviation Airports* [Cleary and Dickey 2010]), the FAA and other agencies have regulatory guidance, agreements, and information related to wildlife hazard management readily accessible. A majority of these resources are publicly available through the FAA website (http://www.faa.gov/airports/airport_safety/wildlife/guidance/) including the following:

- Advisory Circular 150/5200-33B: Hazardous Wildlife Attractants On or Near Airports (provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports).
- Certalert No. 98-05: Grasses Attractive to Hazardous Wildlife.
- Certalert No. 04-09: Relationship between FAA and Wildlife Services.
- Certalert No. 06-07: Requests by State Wildlife Agencies to Facilitate and Encourage Habitat for State-Listed Threatened and Endangered Species and Species of Special Concern on Airports.
- *Wildlife Hazard Management at Airports: A Manual for Airport Personnel* (Cleary and Dolbeer 2005).

In addition to these published documents, new documents—such as the pending AC discussing protocols for wildlife hazard assessments and plans—and updates and clarifications to existing guidance are continually added to this resource repository.

The FAA, the U.S. Air Force, the U.S. Army, the U.S. Environmental Protection Agency (EPA), the USFWS, and the USDA are parties to a memorandum of agreement (MOA) that recognizes each agency's role in aircraft-wildlife strikes and establishes procedures to coordinate their missions to more effectively address environmental conditions contributing to aircraft-wildlife strikes. The MOA helps facilitate multi-agency, cooperative review of proposed activities that include, but are not limited to: (1) airport siting and expansion, (2) development of conservation/mitigation habitats or other land uses that could attract hazardous wildlife to airports or nearby areas, and (3) responses to known wildlife hazards or aircraft-wildlife strikes. The MOA directs the appropriate signatory agencies to cooperatively review proposed actions that would create or expand habitat areas that could attract hazardous wildlife and to develop mutually acceptable and consistent guidance, manuals, or procedures addressing the management of habitats attractive to hazardous wildlife. This MOA is included on *CRP-CD-160: Airport Toolbox for ACRP Report 122*, which is bound into this report and available on the *ACRP Report 122* web page. (See also http://www.faa.gov/airports/environmental/media/wildlife_hazard_mou_2003.pdf.)

In some cases, a regional memorandum of understanding (RMOU) can be developed that addresses specific regional concerns. One example of this includes the RMOU developed for the Southern Region (includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands), which builds upon the national MOA discussed above. This region-specific agreement identifies coordination procedures established to minimize wildlife risks to aviation and human safety, while protecting the region's valuable environmental resources. (See http://www.faa.gov/airports/southern/airport_safety/media/so_wildlife_strikes_mou.pdf.)

Maintenance and Operational Constraints

The occurrence of listed species and/or protected habitat on an airport can pose operational and maintenance constraints

on activities such as stormwater management and maintenance of safety or navigational areas and equipment, as well as removal of penetrations into airspace protection surfaces. Some examples in which the occurrence of listed species could potentially conflict with airport operations include the following:

- Temporary closures of portions of the airfield during nesting period(s) for onsite listed species can result in aircraft delays, increased congestion, and potential safety concerns. Restrictions on tree trimming and other vegetation management activities can impact Part 77 obstruction surfaces (14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace). This can result in an increase in approach minimums for an airport and also require relocation of runway landing thresholds.
- Restricted access to airport navigational aids (NAVAIDS) due to nests and other wildlife activities can limit the ability to properly maintain equipment and facilities and can potentially impact equipment effectiveness and reliability.
- Listed species occurrence or management requirements may alter maintenance schedules for activities such as mowing, vegetation clearing, or trimming (e.g., nesting season restrictions).
- Burrowing species, such as gopher tortoises, may impact the integrity of paved surfaces and non-paved safety areas and may also create refugia for both listed and non-listed prey species whose predators may pose a strike risk.

Often airport operators are not fully aware of all of the implications that habitat management for listed species can have on maintenance and operations. Additionally, many wildlife agencies may not be familiar with the potential risks associated with creating, enhancing, or preserving some types of habitats on, or near, airports. For instance, in recent years, many state wildlife agencies have requested that airport operators facilitate and encourage habitat on airports for state-listed threatened and endangered species or species of special concern. The FAA's Certalert No. 06-07: Requests by State Wildlife Agencies to Facilitate and Encourage Habitat for State-Listed Threatened and Endangered Species and Species of Special Concern on Airports stresses that airport operators must exercise great caution in adopting new management techniques, particularly where they may create conditions attractive to hazardous wildlife and detrimental to aviation safety. Adopting such techniques could place an airport operator in violation of their grant obligations to maintain compatible land uses and subject them to an FAA enforcement action and possible civil penalties (49 U.S.C. §44706, as implemented by 14 CFR § 139.337). Although Certalert No. 06-07 addresses state-listed species, the same considerations apply in addressing federally listed species and their habitats.

It is important to note that not all habitat is considered an attractant for hazardous wildlife and that many habitats that are potentially attractants can often be managed to reduce the risk. In Certalert No. 06-07, the FAA identifies the key land management practices that could affect aviation safety and provides recommendations for each. These include the following:

- Adhering to proper turf, landscaping, and habitat management practices that do not encourage the presence of, or attract, hazardous species;
- Avoiding deliberate preservation or development of on-airport wildlife habitats that attract hazardous wildlife;
- Adhering to the wildlife harassment and repellent techniques (where applicable) to prevent hazardous wildlife species from becoming established and complicating the ability to adhere to prescribed habitat management practices;
- Disallowing hazardous species (including listed species) to remain on the airport if it requires managing the airport environment contrary to FAA recommendations;
- Ensuring that existing and future agreements with federal, state, or local wildlife agencies are as consistent with federal obligations concerning hazardous wildlife as possible; and
- Mitigating wetland impacts off-airport, where possible (AC 150/5200-33A, §2-4.c (1)).

Where the potential for conflict between operations and wildlife may occur, a wildlife hazard management plan (WHMP) can be a useful tool. The multi-agency MOA, referenced previously, provides a mechanism for cooperative support from the agencies in developing these plans. In general, a WHMP can provide airport-specific recommendations for operational and/or maintenance activities that avoid impacts to wildlife populations or sensitive habitat to the greatest extent possible while maintaining safe operations consistent with those in Certalert No. 06-07. There are a number of ways that airports can be managed that are consistent with the FAA's guidance (safe for aircraft) and consistent with the laws, regulations, and policies governing listed species and their habitat. Examples are included in Case Studies #2, #4, and #7.

Development of Airport Property

Airports have been designated as areas for aviation and aviation support uses (including revenue-generation projects). In many cases, airports have a significantly positive effect on the local/regional economy. While airport operators strive to meet local, state, and federal regulations concerning environmental impacts (including wetlands, listed species, surface water, and landscaping requirements), in many cases,

protecting natural resources on the airport will conflict with the ability to accommodate future demand. Airport development projects that must address listed species coordination and/or mitigation can have notably increased schedule delays and cost and can result in less-than-desired outcomes for the development of the airport facilities, if the endangered species issues are not addressed early in the planning process. By signing the MOA, the signatory agencies agreed to consult with airport proponents during early planning processes (initiated by the FAA) and work together to evaluate alternatives that avoid adverse impacts to regulated habitats or species. According to the MOA, if those habitats support hazardous wildlife and practical alternatives for site development do not exist, the agencies have agreed to work together to develop "mutually acceptable measures, to protect aviation safety and mitigate any unavoidable wildlife impacts."

The FAA estimates that "in 2009, civil aviation supported over 10 million jobs, contributed $1.3 trillion in total economic activity and accounted for 5.2 percent of the total U.S. Gross Domestic Product." (FAA Office of Performance Analysis and Strategy 2011). As the global economy continues to rapidly evolve, aviation linkages throughout the United States will become increasingly important for the transfer of passengers and goods. Airports represent significant infrastructure investments and require considerable land mass. They also raise significant compatibility considerations such as noise, airspace, safety areas, and so forth. As a result, very few new airports are being developed. The future growth of the aviation system relies almost exclusively on the expansion of existing facilities. With long-term projected growth in aviation demand both domestically and internationally, it is important to ensure that existing airport facilities can expand as appropriate without undue burden.

There are several types of development actions that have the potential to affect federally listed species or their habitats. Those can be generally categorized as (1) construction, (2) land acquisition, and (3) mitigation. These are discussed in more detail below.

Construction Impacts

Construction projects at airports, such as facility improvements or expansions within existing property, are the most apparent way that potential impacts to federally listed species can occur. These impacts may be direct (e.g., physical removal of a species or habitat or a habitat component such as trees) or indirect (construction noise) and encompass a wide variety of airport actions. In general, airport construction projects involve extensive planning and design prior to implementation. This process can work to the airport operator's advantage if environmental conditions are evaluated and identified in the early phases of the project. In Chapter 5 of Advisory Circular 150/5070-6B: Airport Master Plans, the FAA identifies the importance of including environmental reviews in planning and recommends that the planning process consider the needs of subsequent environmental review processes. It explains that "the consideration of environmental factors in the planning process will typically result in an inventory (overview) of the airport's environmental setting, the identification of potential environmental impacts of airport development alternatives, and the identification of environmentally related permits that may be required for recommended development projects." Documentation during the planning phase will allow airports to identify and address potential conflicts between projects and federally listed species well in advance of impact occurrence or construction commencement.

Land Acquisition

Airport operators may seek to acquire land to ensure current or future airport expansion and for both remedial and preventative land-use management. FAA's *Airport Improvement Program Handbook—Order 5100.38A* sets forth FAA policy as follows: "The acquisition of land for future airport development must meet the requirements of the National Environmental Policy Act (NEPA) of 1969, as implemented by Orders 1050.1 and 5050.4" (FAA 1989, pp. 70–71).

The *Airport Improvement Program Handbook* dictates that as part of the planning process and subsequent FAA approval of an airport layout plan depicting the land to be acquired, environmental issues must be assessed to comply with NEPA requirements (FAA 1989). It is important for airport sponsors to review proposed land acquisitions for the occurrence of federally listed species as well as for habitats that might attract listed or non-listed hazardous wildlife. If these conditions exist on the acquisition parcel(s), it is critical for the airport to coordinate with all relevant agencies and establish future development plans with input from those agencies. This includes addressing endangered species issues early in the planning process and incorporating conservation measures and mitigation requirements into those plans. Failure to do so could result in increased risk, unanticipated development costs, and project delays.

Mitigation

Protecting natural resources on an airport can conflict with the ability to accommodate future demand and compliance with ever-evolving safety mandates. If coordination has not occurred in the planning process, airport development projects that involve listed species coordination and/or mitigation can run into notably increased schedule delays and costs and see modifications to the development plans for

airport facilities. Mitigation measures for impacts to listed species can include alteration of management actions, preservation or creation of suitable habitat, or development of various mitigation strategies as part of an HCP. Additionally, impacts to other resources, such as wetlands, may also require mitigation that involves habitat management or establishment. While there are a number of ways that these mitigation actions can be accomplished that do not conflict with operations or safety at airports, there are a large number of actions that have the potential to conflict. In the federal agency MOA addressing aircraft-wildlife strikes, the signatory agencies agree that while not all habitat types attract hazardous wildlife, one of the activities of most concern is the development of conservation or mitigation habitats or other land uses that could attract hazardous wildlife to airports or nearby areas. The MOA identifies the importance of collaborative review of proposals to develop or expand wetland mitigation sites or wildlife refuges that may attract hazardous wildlife. Additional challenges arise when impacts involve habitats that provide unique ecological functions or values (i.e., critical habitat for federally listed endangered or threatened species). It is in those cases where innovative approaches may be necessary to overcome typical process challenges. Examples of these are included in several of the case studies in this primer.

SECTION 5

Innovative Process Solutions

Identification of Typical Process Challenges

Regulatory agencies and airport sponsors may occasionally find themselves on different sides of endangered species issues. To overcome this, it is important to identify those areas where potential conflicts exist between airport safety and endangered species protection and develop processes to overcome them. Examples of such processes include the MOA and the various case studies included in this publication. By developing the Airport Environmental Program website, the FAA established a mechanism to provide airports with a variety of guidance, resources, and even funding opportunities for environmental compliance. Similarly, by creating mechanisms for coordination and incidental take, Congress and the agencies that regulate listed species have recognized that development and operations can occur alongside endangered species conservation. The challenge is to make the process work—to ensure that airport activities do not reduce the likelihood of the survival and recovery of at-risk species and that the conservation of species does not compromise airport operations and safety. This section includes a series of typical process challenges and describes mechanisms for overcoming them.

Process Challenge: Variable Experience

Inexperience on the part of one or both entities in dealing with the other entities' issues (e.g., an airport sponsor and a regulatory agency) is a common process challenge. While mechanisms usually exist for both sides to reach an acceptable compromise, lack of institutional knowledge, inexperience with non-standard compliance options, or a variety of other case-specific issues may make those situations challenging. On the one hand, airport managers are responsible for every aspect of their airport(s), including, but not limited to, maintenance of all facilities, FAA compliance, budgeting, staffing, public relations, and comprehensive environmental compliance. With such a wide range of responsibilities, it is understandable that most airport managers may not have background, specialized education, or experience in addressing endangered species issues. On the other hand, federal regulatory staff charged with the implementation of federal law related to species protection and conservation of wildlife may not have experience specific to aviation facilities and airport safety requirements, including requirements that may affect suitable habitat for listed species. Additionally, as non-federal entities, airport sponsors must support the lead federal agency's (FAA's) obligations to consult with the Services and comply with section 7 of the ESA. This means that the relationship is not two sided and limited to the airport and the regulatory agency, but also includes the lead federal agency (per NEPA). This three-way relationship can create challenges, but also presents an opportunity for constructive collaboration.

Mechanism(s) for Overcoming the Challenge

It is important for all parties to establish a common understanding of each other's perspective and mission. While most airports have well-established working relationships with their FAA Airport District Office (ADO) and often the environmental specialists, they less frequently have a well-established relationship with Services regulatory staff. One mechanism to help build this relationship might be working with the local Service office to request a single point of contact, or in cases of larger or multi-airport sponsors, a dedicated reviewer. Having a single point of contact has advantages to both parties. The airport sponsor can take the time to educate the reviewer on the myriad of airport safety and operational requirements and various restrictions or requirements related to funding and/or the FAA (including schedule). The reviewer can work with the airport sponsor to identify high-priority resources (i.e., suitable habitat)

within the airport area, while the airport sponsor can educate the reviewer on the typical types of activities required at the airport to maintain safety and operational compliance. Providing information on the types and location of suitable habitat at the airport provides a common reference point and offers early guidance to planners without unduly restricting the range of alternatives. Improved understanding of airport operational requirements can improve reviewer skills in conducting effects analysis at the airport, decrease data requests, and focus analysis where the impacts are most likely to occur.

It is important to maintain positive working relationships with all reviewers, but there are advantages to having a dedicated reviewer. Key considerations include the following:

- Strong working relationships form the basis for cooperative negotiation.
- A single point of contact can significantly streamline a complex process.
- A dedicated reviewer may require cost sharing. If the airport sponsor has the ability to fund or partially fund a reviewer position, it may be more readily accomplished.
- Existing agreements can provide models for the process.

Example

In June of 2004, *Successes in Stewardship*, a newsletter published by FHWA, reported on an effort in Arkansas to streamline the compliance process required by NEPA (FHWA 2004). Staff at the Arkansas Highway and Transportation Department (AHTD), the Arkansas Division of the FHWA, and the three Arkansas USACE offices worked for years within what was felt to be a restricted, multi-USACE, district structure. Over the years, they learned to communicate effectively, built relationships based on trust, and saw the mutually beneficial results of their efforts. When the transportation agencies approached their counterparts at the USACE about streamlining the Section 404 permit process, representatives from each of the agencies worked to develop an agreement that changed the long-standing standard application process. This effort ultimately created a single point of contact for all transportation-related Section 404 inquiries and permit applications within the state of Arkansas (view the agreement at http://environment.fhwa.dot.gov/strmlng/ar_coe.asp). This was made possible because AHTD and the Arkansas Division of the FHWA agreed to fund a dedicated USACE staff position for transportation projects.

The cooperative agreement was signed in December 2002, and the funded position was filled in the spring of 2003. Since then, all parties have noted improvements in process, communication, and outcome. The central processing of permits has improved processing time and consistency for the transportation agencies and has alleviated internal coordination and workload constraints for the USACE. Because the dedicated USACE reviewer must interface with all three of the USACE districts as well as with the AHTD/FHWA and other resource agencies, that reviewer has developed a thorough understanding of the specific issues and policies of all parties.

Process Challenge: Level of Review at Planning Stage

Another process challenge is the lack of early coordination with regulatory agencies during the planning phase of projects. Because of various grant and funding requirements, airport sponsors often engage in planning efforts for projects that may take several years to get from planning to design to construction or implementation. Although many critical decisions affecting resources are made during the initial planning process, it is during NEPA review that most resource agencies become involved. Even then, workload priorities and the availability of staff may limit agencies' ability to participate in this review. Additionally, resource agencies often require development of a project description beyond typical airport planning detail in order to sufficiently review the project. While the FAA encourages early coordination, early design concepts may not contain sufficient detail to accurately estimate the extent of potential impacts or the level of endangered species coordination required. When the level of coordination is underestimated during planning or FAA NEPA review, an airport may experience unexpected mitigation requirements coming late in the design process or even design modifications during permitting that adversely affect project cost and schedule.

Mechanism(s) for Overcoming the Challenge

One way to obtain consistent and accurate coordination is to provide relevant and sufficient environmental data as early in the process as possible, including making conservative assumptions on the extent of the project "footprint" or extent of physical impacts. While this may translate into added upfront costs, the additional level of detail can allow the resource agencies to make more accurate impact determinations at an earlier point in the process. As addressed in Draft FAA Order 1050.1F:

> Preparation for any applicable permit application and other review process requirements should be part of the planning process to ensure that necessary information is collected and provided to the permitting or reviewing agencies in a timely manner. The FAA or applicant, as applicable, should prepare a list noting all obvious environmental resources the proposed action and the alternatives would affect, including specially protected resources. These tasks should be completed at the earliest possible time during project planning to ensure full consideration of all environmental resources and facilitate the FAA's NEPA process. Sufficient planning and project justification should be available to support the environmental review.

It is equally important for the airport sponsor to engage the regulatory agencies early by proactively facilitating informal dialogue between the lead federal agency and the regulatory agency, and for those agencies to be receptive to this potentially expanded coordination period. This may include providing opportunities for resource agencies to comment on proposed alternatives, ALPs, and master plans. The early coordination can help airport operators to identify potential issues and create solutions. If all parties can exercise flexibility and thoroughly document the activities, agreements, and concerns of the early coordination, it can create a framework for more streamlined consultations. It should be noted, however, that it is recommended that the airport sponsor first develop an initial project description, including purpose of the project and the need it will fill, before meeting with the agencies so that it is clear what the project is (and equally, what it is not).

Example

The Florida Department of Transportation (FDOT) reports on an effort to improve procedures that was undertaken, in response to the "streamlining" provisions contained within TEA-21 (FDOT n.d.). In this effort, FDOT revised the procedures for planning transportation projects, conducting environmental reviews, and developing and permitting projects, with the Efficient Transportation Decision Making (ETDM) process. Before ETDM, agency interaction did not begin until the NEPA process, which typically occurred at the 60-percent project design point, when a significant amount of time and money had already been invested. Additionally, long time gaps between steps meant that environmental information collected early in the process could be obsolete. To facilitate reviews, FDOT implemented an Internet-accessible interactive database tool called the Environmental Screening Tool (EST). Two opportunities to review projects, the "Planning Screen" and the "Programming Screen," are open to agencies prior to the start of significant engineering work. The Planning Screen occurs in conjunction with development of cost-feasible plans where the information provided by agencies and the public helps identify project configurations that would avoid or minimize adverse effects on Florida's natural or human environments. In the case of known unavoidable effects, agencies provide commentary on suggested alternatives or mitigation measures. This information supports project cost estimates, and, in some cases, a project might not advance due to the costs associated with adverse effects. The Programming Screen occurs before projects are considered for the FDOT work program. Agency input during the Programming Screen is more detailed, and the agencies provide specific information to identify technical issues that must be addressed by engineers and planners during the NEPA phase. Agency input during the "Programming Screen" is used to develop the NEPA scope of work which focuses the study and therefore reduces costs.

Process Challenge: Inconsistency

Airport sponsors may receive inconsistent project conditions that are included in biological opinions or other types of incidental take permits due to changes in review agency policies or regulations, baseline conditions over time, or even staff turnover. The consultation process for any given project can be highly variable within a single airport or throughout a region depending on the type of species or habitat involved, the type of consultation (section 7 versus section 10 for example), the specific region, and other factors. Lack of predictability can make it difficult to accurately forecast and quantify compliance costs or schedule. The unpredictability ultimately leads to higher cost estimates to cover process uncertainties. Moreover, uncertainty in permitting and consultation outcomes does not promote investment in the process by the regulated community.

Mechanism(s) for Overcoming the Challenge

While having a dedicated reviewer is ideal for maintaining consistency, this is not always possible. One mechanism for overcoming inconsistency in review is to establish a thorough documentation process, including historical information to determine precedence. In some cases, airport sponsors may choose to utilize tools such as geographic information systems (GIS)-based permit tracking software to comprehensively track project impacts and compliance actions over time. Permit tracking software can usually be customized to a particular airport's needs and integrated into a variety of other systems, including aerial web viewers. While effectiveness of permit tracking requires maintenance of the data, the benefit is that the airport can maintain a detailed history of regulatory coordination, consultations, mitigation, and other actions that can serve as a basis for consistency in future agency coordination (as well as documentation of precedence). As an extension of permit tracking, many airports are researching and implementing environmental management systems (EMSs) to manage critical and complex issues of environmental performance and compliance. More information on implementing an EMS is available from FAA Order 1050-21A at http://www.faa.gov/documentlibrary/media/order/1050.21a.pdf and in *ACRP Synthesis 44: Environmental Management System Development Process* (Delaney and Thomson 2013).

Example

Westchester County Airport (New York) is located within an environmentally sensitive area, contains diverse operations,

and falls under the jurisdictions of a variety of county, state, and federal agencies. The airport, located in a community that values environmental protection, implemented an EMS to help manage the complex site and to support stakeholder confidence in the airport's environmental management. Included as a case study in *ACRP Synthesis 44*, Westchester County Airport's EMS consists of a management structure and processes that allow the sponsor to better identify, analyze, avoid, and reduce the environmental impact of all airport activities (Delaney and Thomson 2013).

Developing and Maintaining Stakeholder Relationships

Establishing relationships with stakeholders is essential to building support for an airport's mission. Agency and public stakeholders can provide valuable input to help identify issues and to garner support for airport objectives. When an airport sponsor strives to work with stakeholder partners on environmental issues, the resulting projects can be beneficial to the airport, the protected species and their habitats, and the community. One example of this is the Indianapolis Airport Authority's (IAA's) Environmental and Conservation Program, which is highlighted in Case Study #3. Through this program, IAA works with stakeholder partners to reduce environmental impacts, help maintain economic growth, and integrate IAA's actions with the needs and values of the local community.

It is important to define how stakeholders will work together to achieve an objective. This includes establishing mutually acceptable processes for information sharing and decision making. This may include formal agreements with agency stakeholders (e.g., MOAs) to identify how airport and agency stakeholders will work together in specific situations. One such situation is the federal process for listing species and critical habitat designation. It may also be advantageous to agree to conflict resolution processes upfront in order to resolve disputes in a timely manner while preserving the relationships.

Planning for Listing (Pre and Post)

It is important not only for individual airports but also the FAA to be aware of changes to regulations that could have impacts, either positive or negative, on airport development or operations. Conversely, it is important for regulatory agencies to be aware of changes to FAA regulations that could affect the trust resources under their purview. Before a species is listed, the Service must consider whether there are areas of habitat believed to be essential to the species' conservation. The Service then may propose "critical habitat" designation, which normally excludes developed areas such as airports, but not always. According the USFWS, "the determination and designation of critical habitat is one of the most controversial and confusing aspects of the ESA" (USFWS n.d.).

Pre-Listing

It is important for airports to understand designation of critical habitat. Designating critical habitat helps protect areas that may or may not be occupied by the species proposed for listing, but this designation may result in project modifications that would not have occurred without the critical habitat designation. The critical habitat designation is to be based both on scientific data and "economic impact and any other relevant impact" and may even exclude an area from critical habitat if the benefits of exclusion outweigh those of inclusion (unless exclusion for this reason will cause species extinction). Airports can contain habitat that is identified as critical habitat for one or more species, and, in many cases, the habitat can be managed for those species without adversely affecting airport operations or safety (see Case Study #2). There are circumstances, however, in which a proposed listing could adversely affect an airport's ability to develop airside lands or perform required maintenance to effectively manage wildlife hazards (see Case Study #2). One such example is the case of the streaked horned lark (*Eremophila alpestris strigata*), which was proposed for listing and critical habitat designation in October 2012. This was an unusual case because it involved a species restricted to a small number of sites in the Pacific Northwest that was dependent on grassland habitats that were becoming increasingly scarce. Civilian airports and military installations—including Olympia Regional Airport, Shelton Airport, Corvallis Airport, Portland Airport, and Joint Base Lewis McChord (including McChord Airfield)—represented some of the largest areas of remaining suitable habitat. But birds are a known hazard to aircraft, and several of these facilities have active wildlife hazard management practices that could have been affected by the proposed designation.

To address this case, a workshop on the streaked horned lark and Pacific Northwest airports was convened on March 9, 2011, in Vancouver, Washington. The key objective of the workshop was to explore opportunities for conserving the species without impacting aircraft safety (see http://cascadiaprairieoak.org/documents/Proceedings-of-Streaked-Horned-Lark-and-Airports.pdf).

The workshop drew stakeholders from airports, state and federal wildlife agencies, the USDA, the U.S. Navy's Bird Aircraft Strike Hazard (BASH) Program, and nonprofits (e.g., The Nature Conservancy). By the end of the workshop, all participants better understood the issues, and a working group was developed that led to compromises. On October 3, 2013,

the streaked horned lark was listed as a threatened species under the ESA. USFWS designated 2,900 acres in Washington and 1,729 acres in Oregon as critical habitat for the lark, half of which are federal lands belonging to the USFWS. The Service also announced a special rule to exempt the "take" or harm of streaked horned lark associated with civilian airport maintenance and operation, agriculture management, and noxious weed control on non-federal lands. The exemption means anyone engaged in those permitted activities will not be held responsible if the activities harm members of the subspecies. The streaked horned lark example underscores the importance of vigilance on regulatory decisions.

Post-Listing

In some cases, the conservation goals for a species are reached and it is removed from the federal list. When conservation goals for a species are met, the Services may consider changing its classification from "endangered" to "threatened" or delisting it. When delisting or downlisting, the Services follow the same legal procedures as for listing; they (1) propose the action in the *Federal Register*; (2) seek comments from independent species experts, other federal agencies, state biologists, and the public; (3) analyze the comments received on the proposed rulemaking; (4) decide whether to complete the proposed action or maintain the species status as it is; and (5) render a final decision and response to comments in the *Federal Register*. While the federal ESA listing and delisting process is clear, issues can arise when a species is federally delisted, but retains state protection and/or protection under another federal statute. One example is the bald eagle (see Case Study #8).

Since federal delisting of the species on August 9, 2007, bald eagles are no longer protected under the ESA, but they retain protection under the MBTA and the BGEPA. Expansion of runways and airport improvement projects designed to increase safety often involve tree clearing and protection of airspace. Removal of trees with eagle nests may also be desired to reduce wildlife hazard and strike potential. Removal of trees with eagle nests, whether occupied or unoccupied, is illegal without a permit under the BGEPA. Unlike the ESA, neither the MBTA nor the BGEPA have explicit provisions that address incidental take, which has caused confusion within the Services and to airports dealing with active nests in and around runways. Additionally, in many states, the overlapping nature of federal and state permits for the bald eagle, a delisted species, can be particularly confusing to airport managers. Despite delisting, a federal permit from the USFWS is required for the take of eagles and eagles that pose a risk to human health or safety, and state consultation and permits to "take" bald eagles are often still required.

Tools and Innovative Approaches

With the large number of airports in the United States and significant acreage of land on those airports, there is a role for airports in the conservation of habitat. While habitat conservation must be consistent with airport requirements for safe operation, there are numerous agreements, plans, and approaches (tools) that can be used to document the conservation intents and goals for federally listed species on airports. Not every tool is right for every airport, but this primer has discussed many options and provided examples of successes to guide airports to some of the tools that will best fit their needs and management goals. Some additional tools are described below, with more information available on *CRP-CD-160: Airport Toolbox for ACRP Report 122* (bound into this report and available on the *ACRP Report 122* web page) and on provided websites.

In a **Safe Harbor Agreement**, a landowner volunteers to maintain, create, restore, or improve habitat for endangered or threatened species in exchange for release from liability for the attraction or propagation of new or more species. A baseline condition (usually stated as a number of listed individuals or a quantification of the habitat conditions) for each species is established. Once it is determined that the proposed actions will result in a net conservation benefit, in return for the participant's efforts, USFWS will authorize incidental take through the section 10 (a)(1)(A) process of the ESA. In other words, these agreements essentially relieve landowners of liability under the ESA if conservation practices on their land attract and/or perpetuate federally listed species. To date, nearly three million acres of land have been enrolled in Safe Harbor Agreements, benefiting a variety of listed species. Because Safe Harbor Agreements establish baseline conditions, they have the potential to be utilized for ecosystem-based management rather than individual-species-focused management. Such an innovative approach could provide conservation benefits for multiple species sharing the same habitat including listed, candidate, and unlisted species. In return, it would be appropriate to expand the assurances under a Safe Harbor Agreement to include assurances similar to those of the candidate species agreements described below because measures would be in place for at-risk species. The intent of expanding the focus of Safe Harbor Agreements to ecosystem-based conservation is to provide a greater conservation benefit while at the same time providing broader assurances to the land manager for existing and future operations.

A **Candidate Conservation Agreement** is a formal agreement between USFWS and one or more parties to address the conservation needs of proposed or candidate species or species likely to become candidates before they become listed as endangered or threatened. Landowners voluntarily commit to conservation actions that will help stabilize or restore the

species with the goal that listing will become unnecessary. In return, USFWS provides assurances that in the event that a species covered in the Candidate Conservation Agreement is subsequently listed as endangered or threatened, USFWS will not assert additional restrictions or require actions additional to those the property owner voluntarily committed to in the agreement. At the time the parties enter into the Candidate Conservation Agreement, USFWS would issue an Enhancement of Survival Permit under section 10(a)(1)(A) of the ESA authorizing the property owner to take individuals or modify habitat to return the property to the conditions agreed upon and specified in the Candidate Conservation Agreement, provided that the take is at a level consistent with the overall goal of precluding the need to list. The effective date on the permit would be tied to the date any covered species becomes listed.

Candidate Conservation Agreements may benefit landowners in several ways. First, if the actions preclude listing, the landowner is not regulated by the ESA. Second, if the conservation actions are not sufficient and the species is listed, the Candidate Conservation Agreement automatically becomes a permit authorizing the landowner's incidental take of the species. Thus, Candidate Conservation Agreements provide landowners with assurances that their conservation efforts will not result in future regulatory obligations in excess of those they agree to at the time they enter into the agreement. While such agreements have been utilized in the past, their use could be expanded by incorporating them with other ESA compliance tools such as Safe Harbor Agreements (discussed above) to provide complementary assurances and conservation benefits. (See http://www.fws.gov/endangered/what-we-do/cca.html.)

Habitat Conservation Plans are planning documents required as part of an application for an incidental take permit. They describe the anticipated effects of the proposed taking, how those impacts will be minimized or mitigated, and how the HCP is to be funded. But HCPs are not always tied to specific "take" actions and can apply to both listed and non-listed species, including candidates for listing. Conserving species before they are in danger of extinction, or are likely to become so, can also provide early benefits and prevent the need for listing. HCPs offer non-federal landowners an opportunity to use or develop land that would likely be untouchable due to the ESA. Additionally, HCPs give local and state governments a viable option in determining their land-use planning and growth management techniques. HCPs can be a valuable planning tool where critical habitat of threatened or endangered species occurs and may provide for ecosystem-based management for species as opposed to individual-species-based management. Such an approach would allow HCPs to address management of multiple species that share the same habitat regardless of their status under the ESA, and the applicant could receive assurances for listed, candidate, and at-risk species. Utilizing HCPs focused on ecosystems rather than individual species on a project-by-project basis provides greater conservation benefit, consistent management operations, and regulatory predictability for the land manager.

The Services are not just regulators of the HCP program; they can also provide technical assistance and work closely with an airport throughout the development of an HCP. This early involvement can reduce the probability of developing an HCP that does not meet all criteria. The Services play a "leadership" role in the HCP program, which involves not only technical expertise but attitude and philosophy (*Habitat Conservation Planning and Incidental Take Permit Processing Handbook* 1996). Although the Services do not initiate HCPs, they encourage them and are to support them to the maximum extent possible with experienced staff that can provide timely review of draft documents, advice on mitigation programs, and help with solutions to contentious issues.

Because airports may be owned or managed by local governments, there is also the potential to develop a local land-use comprehensive plan to serve as an HCP for select areas and for certain land-use activities, including airports. Such an approach provides upfront planning and conservation while at the same time providing a mechanism for the local government/airport sponsor to impose impact fees for development within the areas subject to the HCP and thereby adding a funding source for needed wildlife management operations. Expanding HCPs as regional habitat conservation planning tools and covering multiple species not only provides the opportunity for greater conservation benefit but also provides an opportunity for streamlining regulatory approval processes. For example, in Florida, the primary tool for managing the Florida Manatee is county manatee management plans, which are planning documents that are incorporated into each coastal county's local land-use plan. USFWS has issued a programmatic concurrence that any proposed project determined to be consistent with the applicable manatee management plan is authorized under the ESA. Such an approach has significantly reduced the time and effort spent on regulatory review while also providing consistent management of the listed species. Airports could take a similar approach, utilizing HCPs as the management plan and in return gaining the benefit of programmatic approval versus project-by-project review under the ESA. (See http://www.fws.gov/endangered/esa-library/pdf/HCPsWorkingTogether5-2005web%20.pdf.)

Conservation banking is a mechanism that allows a variety of landowners—private landowners and tribal, state, and local governments—to permanently protect lands with specific natural resource value and manage those lands for spe-

cies that are endangered, threatened, candidates for listing, or "at risk." These banks function similarly to wetland mitigation banks in that in exchange for preservation, enhancement, or restoration of habitat for species, USFWS approves a specified number of habitat "credits" that may be utilized by an airport for its operations or sold to third parties to offset impacts to those species within a designated "service area." While lands previously designated for conservation purposes through another program, such as wetland mitigation, are typically not eligible, there are cases where the additional protections afforded by the conservation bank could qualify for some valuation. Requirements for establishing a conservation bank include obligations from the landowners to manage the bank in perpetuity. This involves entering into a Conservation Banking Agreement with the USFWS, granting a conservation easement to an eligible third party, and developing a long-term management plan and establishing funding for the perpetual management. In some cases, it may make sense for an airport to establish a conservation bank or partner with local government(s) or other landowners to develop a conservation bank that includes the airport in their service area. Often, with some assurance of future credit needs by an entity such as an airport, private investors are willing to establish the bank in return for future credit purchase.

Conservation banking can be accomplished through a variety of mechanisms and is typically beneficial to all parties, including the species under protection. (See http://www.fws.gov/endangered/landowners/conservation-banking.html.)

Adaptive management plans are a mechanism often used in complex environmental restoration projects to provide management flexibility for the land manager within the context of applicable regulatory programs such as the ESA. Essentially, the plans are protocols that the land manager and the regulatory agencies have agreed upon in advance to address outcomes that were not expected or factors that were unknown at the time of permitting. Consequently, if the unexpected should occur, the land manager has a framework to respond to the new circumstances while ensuring primary operations are not compromised and without the need for additional permitting. Such an approach could be utilized by airports for species management under the ESA. The plans could be incorporated into the conservation measures of an HCP, Safe Harbor Agreement, or standard biological opinion providing upfront incidental take authorization so long as the protocols agreed upon are followed. Since the adaptive management plan would be a component of the airport operations, there is a potential for public financing for the plan so that there would always be funding available for unexpected recovery actions (airport managers would need to be aware of any tax implications).

Programmatic consultations and biological opinions are tools that allow frequently repeated actions to be evaluated on a program basis and thereby eliminating the need for individual consultation on a project-by-project basis. Instead of evaluating each activity authorized by a federal agency on a project-by-project basis, the federal agency's regulatory program would be evaluated under the ESA in connection with a specific type of activity/project within a geographically defined area. Therefore, instead of having multiple consultations, only one section 7 consultation would be required for applicable projects. The resulting biological opinion would set out the scope of the activities covered and the conservation measures that must be employed for the associated take authorization to apply. Any proposed project that falls within the scope of an existing programmatic biological opinion would not require further section 7 consultation, significantly expediting the authorization process.

A key point is that the programmatic consultation and resulting biological opinion must carefully define the scope of activities covered (by location, type, and size) and the protection measures that must be followed (i.e., included as permit conditions). In essence, such an approach sets up a compliance process for a particular type of federal agency permitting program as applied to specific types of activities that are common in nature and/or impacts. The advantages to such a streamlined approach include (1) promoting consistent application and expectations of conservation measures, (2) addressing the effects of multiple activities on a regional scale, (3) managing project loads more efficiently, and (4) enhancing regulatory predictability (costs, timelines, and obligations). Given that there are a number of airport-related projects that could be categorized by type of activity, approaching such projects programmatically might serve to expedite authorizations and enhance conservation. An example would be airport-related projects that include dredging or filling of jurisdictional waters and thereby require a Clean Water Act permit from the USACE. Instead of conducting section 7 consultations for every proposed permit, the USACE could consult with the appropriate wildlife agency and develop a biological opinion with incidental take authorization for the permitting program itself as it applies to certain defined airport projects within a defined geographic area. With such a biological opinion and incidental take authorization in place, any future airport-related project that falls within the scope of the biological opinion (type of activity and location) is deemed to have completed the section 7 consultation in advance and would, therefore, require no further action under the ESA. By evaluating the regulatory program and establishing standard conservation measures, the need for project-by-project evaluation becomes unnecessary and the consultation process is streamlined.

Federal land managers use **recovery credits** to mitigate impacts to listed species when onsite mitigation is not appropriate. Essentially, the federal land manager receives conservation credits for impacts occurring on the federally managed lands by providing mitigation outside of the managed lands. Currently, recovery credits have limited use for airports, but as many airports are either in proximity to or share habitats with federally or state-managed lands, the recovery credit tool could be expanded to allow airport managers to receive conservation credits for offsite mitigation they undertake on federal or state lands. Such an approach would enhance conservation measures on federally or state-managed lands (overall conservation benefit to listed species) while at the same time avoiding onsite mitigation that may result in increased wildlife hazard.

SECTION 6

Case Studies for Innovative Airport Responses to Threatened and Endangered Species

This section includes a number of case studies from U.S. airports that have addressed listed species issues on and adjacent to airport lands. Each case study provides information on how a particular airport used innovative approaches to achieve desirable outcomes related to listed species and their habitat. The selected case studies are intended to present a diverse set of situations, regulatory settings, and challenges/conflicts that airports may face when actions could affect federally listed species. The general topics covered by the case studies include the following:

- Section 10 incidental take permits,
- Section 7 consultation,
- Innovative mitigation strategies,
- Habitat Conservation Plans,
- Critical habitat,
- Candidate species and proposed listings,
- Stakeholder and community involvement,
- Federal regulation of non-ESA species,
- Conflicts between USFWS and FAA regarding regulations and guidance, and
- FAA and USFWS agreements.

While no case study is relevant in all situations, generalized tools and approaches are intended to be adaptable to meet a specific airport's need. Table 2 lists the selected case studies, the key issues addressed in each case, and the innovative response(s).

Table 2. Case studies.

No.	Airport	State	ESA-Listed Species	Case Study Highlights	Innovative Response(s)
1.	Mid-Sized Regional Hub	CA	Giant Garter Snake	▪ Section 7 Consultation ▪ HCP ▪ Innovative Mitigation ▪ Multi-Agency Coordination	Multi-species mitigation plan
2.	Portland International Airport (PDX)	OR	Streaked Horned Lark	▪ Habitat Management/ Conservation Plans ▪ Hazardous Wildlife Management Conflicts ▪ Candidate Conservation Agreements with Assurances ▪ Stakeholder Involvement	Extensive coordination on species pending listing
3.	Indianapolis International Airport (IND)	IN	Indiana Bat	▪ Section 7 Consultation ▪ Habitat Conservation Plans ▪ Innovative Mitigation Strategy ▪ Multi-Agency Coordination ▪ Stakeholder / Community Partnering	Allowed for critical airport development and was one of the most successful relocations of an endangered species conducted under the oversight of USFWS
4.	Mineta San Jose International Airport (SJC)	CA	Burrowing Owl	▪ State-Listed Species/ Candidate Federal Listing ▪ Habitat Management ▪ Mitigation Lands and Compensatory Mitigation	Example of successful management of listed species habitat within airfield
5.	Vero Beach Municipal Airport (VRB)	FL	▪ Florida Scrub Jay ▪ Wood Stork	▪ Habitat Management ▪ Multi-Species Conservation ▪ Section 10 Consultation ▪ Umbrella HCP	Legal and fiscal burden caused by ESA led to umbrella HCP by USFWS
6.	Roseburg Regional Airport (RBG)	OR	Coho Salmon, Oregon Coast ESU	▪ Take Avoidance Through Innovative Design ▪ Innovative Mitigation Strategies ▪ NMFS Coordination	NOAA Fisheries consultation involving innovative design strategy
7.	Brown Field Municipal Airport (SDM)	CA	▪ San Diego Fairy Shrimp ▪ San Diego Button-Celery ▪ Coastal California Gnatcatcher	▪ Multi-Agency Coordination ▪ Critical Habitat ▪ Innovative Mitigation Strategy ▪ Habitat Conservation Plans	Innovative multi-agency coordination and mitigation planning
8.	Sanford-Orlando International Airport (SFB)	FL	Bald Eagle	▪ Hazardous Wildlife Mitigation ▪ Species Delisting ▪ Multi-Agency Coordination ▪ Non-ESA Species Regulation	Includes take of a species no longer regulated under ESA, but still under federal protection
9.	Kodiak Airport (ADQ)	AK	▪ Steller Sea Lion ▪ Humpback Whale ▪ Northern Sea Otter ▪ Steller's Eider	▪ Critical Habitat ▪ NMFS section 7 Consultation ▪ Innovative Mitigation Strategy ▪ Multi-Agency Coordination ▪ Airport Safety Improvements ▪ NEPA Compliance	Multi-species coordination within critical habitat which included NMFS review and in-water work with mitigated impacts

Case Study Highlights

- Section 7 Consultation
- Habitat Conservation Plan
- Innovative Mitigation
- Multi-Agency Coordination

Case Study 1

Mid-Sized Regional Hub, California

Giant Garter Snake

Species: Giant Garter Snake *(Thamnophis gigas)* - Federally Threatened

Species

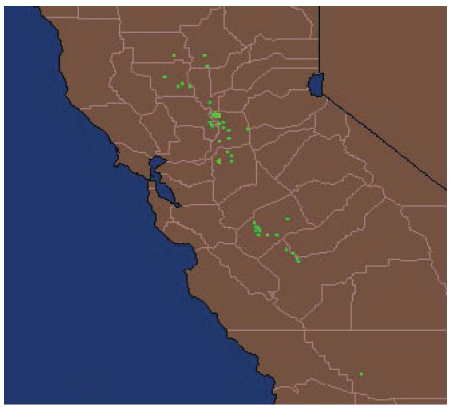
Giant Garter Snake
(Thamnophis gigas)

Federally Threatened

The largest of the garter snake species, the Giant Garter Snake lives a highly aquatic lifestyle and is rarely found away from water. It is an active hunter, eating mainly fish, amphibians, and their larvae and taking advantage of pools that trap and concentrate prey. The Giant Garter Snake is found in the western United States, where it has historically occurred in the Central Valley (Sacramento and San Joaquin valleys) of California, from Butte County in the north to Kern County in the south, at elevations of up to 122 meters. It has now disappeared from most of its original range in the San Joaquin Valley as a result of habitat loss, introduction of contaminants, and predation by and competition with non-native species.

Habitat

Giant Garter Snake habitat includes marshes, sloughs, ponds, small lakes, low gradient streams, and other surface waters such as irrigation and drainage canals and flooded fields. Adjacent uplands area is also considered important habitat. Essential habitat components consist of (1) adequate water during the snake's primary active period (i.e., early spring through mid-fall); (2) a suitable prey base; (3) abundant wetland vegetation (such as cattails) for escape, cover, and foraging habitat; (4) upland habitat for basking, cover, and retreat sites; and (5) higher elevation uplands for cover and refuge from flood waters.



Distribution area for Giant Garter Snake *(Thamnophis gigas).*

From November to mid-March, Giant Garter Snakes use small mammal burrows, rip-rap along canal banks, and other underground retreats to escape cold temperatures. These retreats are usually, but not always, located above flood elevations and often include a degree of sun exposure (U.S. Fish and Wildlife Service 1999).

A recovery plan for the Giant Garter Snake (1999) recommended a number of conservation actions for the species, including the protection of existing populations and habitat, restoration of former habitat, population surveys and monitoring, further research into the species, and outreach and incentive programs.

Key Issues

Critical Habitat

This airport was evaluating a facilities expansion as part of its Master Plan. The FAA developed an Environmental Assessment and Biological Assessment to evaluate the potential impacts of the expansion. An existing Habitat Conservation Plan (HCP) recognized part of the land included in the expansion as "upland habitat"for the Giant Garter Snake as well as a state-listed raptor species. Actual suitable habitat impacts were avoided by the expansion. However, the U.S. Fish and Wildlife Service and state department of fish and wildlife felt that the removal of this upland habitat could potentially

jeopardize the integrity of the existing HCP.

Airport Actions & Innovative Solutions

Innovative Mitigation Strategy

In coordination with the FAA, the airport used innovative solutions to proactively consolidate mitigation requirements into an existing mitigation area for a state-listed species to demonstrate that the baseline conditions of the HCP would not be affected. Through early consultation and the development of an innovative mitigation strategy, the airport was able to receive incidental take authorization and negotiate mitigation requirements so that:

- Potential effects on airport operations were minimized;
- Mitigation areas overlapped with existing mitigation lands set aside for a state-listed species; and
- Long-term management of mitigation lands were conducted by the airport instead of a third party to ensure proper maintenance of habitat (in part, to manage the habitat for hazardous wildlife).

Innovative Mitigation Strategy

Through section 7 consultation, the airport was able to bring in provisions of an existing HCP (from a prior section 10 consultation) to use lands previously set aside for another listed species as mitigation for the Giant Garter Snake. This resulted in a successful multi-species conservation area without requiring the airport to purchase or encumber additional lands.

Multi-Agency Coordination

The actions were conducted under formal consultation between the FAA and U.S. Fish and Wildlife Service under section 7 of the federal Endangered Species Act. However, there were also interactions with a locally approved HCP, as the Proposed Action required development of uplands that are covered under the HCP. It also required coordination with state widlife officials to address a state listed species covered under Section 2080 of the California Fish & Game Code.

Notes/Citations

U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office: Species Account - Giant Garter Snake, *Thamnophis gigas* (February, 2010).

U.S. Fish and Wildlife Service: Species Profile - Giant Garter Snake *(Thamnophis gigas)* (February, 2010).

U.S. Fish and Wildlife Service: Draft Recovery Plan for the Giant Garter Snake *(Thamnophis gigas).* U.S. Fish and Wildlife Service, Portland, Oregon (1999).

This case study is a good example of how airports may encounter conflicts between local, state, and federal conservation policies, and how they may be resolved.

Case Study 2

Portland International Airport (PDX), Oregon

Case Study Highlights

- Habitat Management / Conservation Plans
- Hazardous Wildlife Management Conflicts
- Candidate Conservation Agreements with Assurances
- Stakeholder Involvement

Streaked Horned Lark

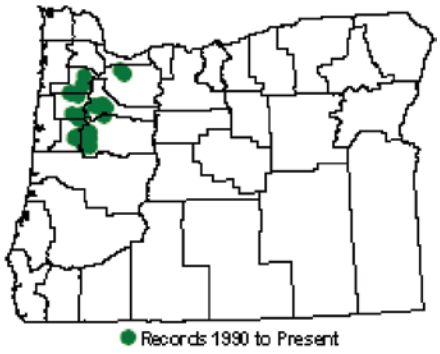
Species: Streaked Horned Lark *(Eremophila alpestris strigata)* - Candidate Species, Proposed Threatened

Species

The streaked horned lark (SHLA) is endemic to the Pacific Northwest, and is a subspecies of the wide-ranging horned lark. The SHLA is a small ground-dwelling bird with a historic breeding range extending from southern Oregon to British Columbia, Canada. The current range-wide population of SHLAs is estimated at about 1,170–1,610 individuals (Altman 2011), with about 900–1,300 breeding SHLAs in the Willamette Valley, Oregon (Altman 2011).

Habitat

SHLAs are birds of wide open spaces with no trees and few or no shrubs. The SHLA nests on the ground in sparsely vegetated sites dominated by grasses and forbs, including prairies, coastal dunes, fallow fields, pasture, and seasonal wetlands. Nests have also been documented in disturbed areas, such as dredge spoil islands along the lower Columbia River. SHLAs are found at many airports within the range of the subspecies. As native prairies and scoured river beaches in the Pacific Northwest have declined, airports, with their large spatial requirements and treeless settings, have become suitable habitat for the SHLA.



Key Issues

Candidate Listing/Critical Habitat

On October 3, 2013, the U.S. Fish and Wildlife Service (USFWS) listed the SHLA as threatened (78FR61451) and designated a total of 12,159 acres of critical habitat in Washington and Oregon. (Critical Habitat 78FR61505). As originally proposed by the USFWS, critical habitat units in the state of Washington included three training areas and two military airfields (at Joint Base Lewis-McChord in Pierce County); two civilian airports (Olympia Airport in Thurston County and Sanderson Field in Mason County); coastal beaches on Willapa National Wildlife Refuge; state, private, and tribal lands in Grays Harbor and Pacific Counties; and three islands in Wahkiakum and Cowlitz Counties on the Washington side of the Columbia River. In Oregon, proposed critical habitat units included five civilian airports (Portland International Airport [PDX] and regional airports in McMinnville, Salem, Eugene, and Corvallis); three National Wildlife Refuges; and one private prairie habitat restoration site.

This case study demonstrates a situation where the destruction of a species' natural habitat has led to its adaptation to the most suitable areas remaining (i.e., flat spaces on dredge placement sites, agricultural land, and airports, all man-made habitats where man's activity creates the early successional habitat niche the subspecies depends on). Consequently, the USFWS intended to designate six airports in the Pacific Northwest, including PDX, as critical habitat for the species. This is a prominent example of a case where the affected airports need to be informed of the issues, involved in the decision making, and proactively manage the outcomes.

Airport Actions & Innovative Solutions

Stakeholder Involvement

Due to the potential impact of the SHLA listing on airports and aviation facilities in this region, there have been a number of collaborative efforts among the various stakeholders (USFWS, the FAA, U.S. Department of Agriculture [USDA], Port of Portland [Port], ACI-NA, and AAAE). Since 2007, PDX personnel have been actively

engaged in an SHLA Working Group consisting of federal, state, and private stakeholders who are working to identify and resolve land management actions affecting the SHLA. PDX, owned and operated by the Port, assumed the lead airport role in the regional dialog at SHLA Regional Working Group meetings and at "Streaked Horned Lark and Pacific Northwest Airports, A Collaborative Workshop," which identified the issues and concerns with listed avian species (specifically SHLAs) and designated critical habitats on airports. The workshop took place on March 9, 2011, prior to the final rule under the Endangered Species Act (ESA), in Vancouver, Washington, and was attended by representatives from the USFWS, The Nature Conservancy, the USDA, Washington Department of Fish and Wildlife, and a number of aviation facilities. Stakeholders addressed two potentially conflicting issues: (1) Pacific Northwest airports contain some of the last remaining habitat for the rare and declining SHLA, and (2) birds are a known hazard to aircraft safety. The key objective of the workshop was to explore opportunities for conserving the SHLA without impacting aircraft safety and airport operations. The workshop brought together partners from the aviation and the SHLA conservation communities to discuss how lark conservation might occur at the airports and airfields, without increasing safety hazards to aircraft and their passengers. By the end of the workshop, professionals from both sides better understood the issues and the need for increased cooperation and buy-in from partners as the ESA listing process progressed. Next steps included surveys of airports with SHLA habitat, wildlife assessments for airports with known populations, recommendations to be incorporated into management plans, and possible conservation incentives for airport operators. Extensive stakeholder collaboration shows that conservation of the SHLA and the maintenance of airport safety did not need to be mutually exclusive goals.

During the SHLA listing process in 2012 and 2013, PDX personnel coordinated extensively with other airports, the FAA, ACI-NA, and AAAE to communicate to USFWS the concerns over designating critical habitat on airport lands, which include the following: (1) creating habitat that appears suitable to larks, but due to aircraft/bird collisions acts as an ecological sink for SHLA populations; (2) placing constraints on airport operations, including FAA-authorized wildlife hazard management strategies designed to minimize safety risks; and (3) placing constraints on future airport development.

Once immediately prior to listing and once subsequent to listing, SHLAs were involved in aircraft collisions at PDX, with damage sustained to the aircraft in one of the incidents. PDX personnel were able to positively identify the SHLA remains and demonstrate clearly to USFWS the multiple issues with incorporating airport property into the recovery plan of a threatened species.

Habitat Management/ Wildlife Hazard

As part of PDX's Aviation Wildlife Hazard Management Program, habitat for the SHLA was unintentionally created where dredge materials were placed to fill wetlands with the intention of reducing waterfowl habitat adjacent to active runways and to facilitate future development. SHLA habitat is also inadvertently created at PDX by disking grasslands twice a year to deter grazing by Canada geese and other waterfowl species. Three pairs of SHLA have been confirmed nesting at PDX in areas that have been converted from wetlands to uplands to deter waterfowl use. Prior to listing and post-listing of the SHLA, PDX has employed a few different habitat management strategies to reduce impacts including disking fields outside of the breeding season (April 1 through August 31) and using mowing equipment that minimizes the tire footprint and therefore the risk of harming an active SHLA nest. PDX personnel who are specifically trained in SHLA identification are also surveying/monitoring Port property for SHLAs to determine the extent of breeding and wintering use.

The PDX case study provides an example of a large international airport proactively working towards managing its lands for safe airport operations while furthering the conservation of streaked horned lark populations.

In 2007, the Port joined Metro, a Portland area regional governmental body, in a cooperative research project on Metro property located in close proximity to known nesting habitat on Port property in an effort to determine if the creation of alternate habitats for SHLAs could be created. This led to a same species attraction study by the Center for Natural Lands Management (CNLM) co-sponsored by the Port utilizing decoys and audio recordings to attract SHLAs to the site, with some success.

As part of the SHLA Working Group, PDX is helping craft qualifications for personnel who are tasked with field identifying SHLAs during breeding and wintering seasons. Positive field identification of the SHLA is an important component of monitoring occupancy and potential impacts to the bird. PDX also voluntarily worked with the Smithsonian Institution to identify bird remains through MtDNA

analysis (Smithsonian Bird Lab, 2013) and documented two individual bird strikes involving SHLAs within an 18-month period, one pre-listing and one post-listing. The Smithsonian published its genetic sequencing results from this exercise, which advances the science of identifying tissue and feathers from aircraft strikes in a peer-reviewed journal *(Conservation Genetics Resources*).

Policies or Laws Affected

The Port's engagement in the SHLA working group and with the FAA / USFWS during the listing process affected the outcome of the SHLA listing and critical habitat designation.

Exemption/Special Rule

The USFWS believes that regular mowing and maintenance at airports and many agricultural activities benefit the SHLA by providing the open habitat and low vegetation structure needed by the bird. Thus, they proposed to promulgate a 4(d) rule (under section 9, 4(d) of the ESA) that would remove the take prohibitions for specific activities associated with airport maintenance and operation and certain agricultural activities. The exemption means that anyone engaged in those permitted or regular management activities at airports (mowing, hazing of hazardous wildlife, routine management, repair and maintenance of roads and runways) would not be held responsible if the activities harm individuals. Additionally, based on input from the Port and other stakeholders, the exemption of bird strikes was also added to the 4(d) rule for the SHLA. Ultimately, USFWS determined that excluding non-federal airport lands from the designation of critical habitat for the SHLA outweighs the benefits of including these areas in critical habitat. The Secretary therefore exercised discretion under section 4(b)(2) of the Act to exclude the following airports from critical habitat for the SHLA: (1) Sanderson Field in Unit 1-376 ac (152 ha); (2) Olympia Airport in Unit 1-575 ac (233 ha); (3) Portland International Airport and Broughton Beach in Unit 3-431 ac (174 ha); (4) McMinnville Municipal Airport in Unit 4-600 ac (243 ha); (5) Salem Municipal Airport in Unit 4-534 ac (216 ha); (6) Corvallis Municipal Airport in Unit 4-1,103 ac (446 ha); and (7) Eugene Airport in Unit 4-313 ac (126 ha). The positive working relationship among the USFWS, the Port, and other stakeholders was instrumental in drafting regulatory language that meets the needs of airports and species conservation.

Notes/Citations

"Streaked horned lark, Northwest's latest candidate for endangered species list, favors airports, farms and dredge islands; Scott Learn, *The Oregonian*; November 8, 2012.

http://www.fws.gov/oregonfwo/Species/Data/ StreakedHornedLark/ (Oregon office FWS).

Proceedings of the "Streaked Horned Lark and Pacific Northwest Airports, A Collaborative Workshop," March 9, 2011, Vancouver, WA. http://cascadiaprairieoak. org/documents/Proceedings-of-Streaked-Horned-Lark-and-Airports.pdf.

Federal Register Volume 78, No. 192. Department of the Interior, Fish and Wildlife Service. 50 CFR Part 17 "Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Taylor's Checkerspot Butterfly and Threatened Status for the Streaked Horned Lark; Final Rule." 2013.

Altman, B. 2011. Historical and Current Distribution and Populations of Bird Species in Prairie-Oak Habitats in the Pacific Northwest. Northwest Science, 85(2):194-222.

Case Study Highlights

- Section 7 Consultation
- Habitat Conservation Plans
- Innovative Mitigation Strategy
- Multi-Agency Coordination
- Stakeholder/Community Partnering

Case Study 3

Indianapolis International Airport (IND), Indiana

Species: Indiana Bat *(Myotis sodalis)* - Endangered

Species

Indiana Bats are quite small, weighing only one-quarter of an ounce (about the weight of three pennies) though they have a wingspan of 9 to 11 inches. They hibernate during winter in caves or, occasionally, in abandoned mines. During summer they roost under the peeling bark of dead and dying trees. Indiana Bats eat a variety of flying insects found along rivers or lakes and in uplands.

The Indiana Bat was listed as endangered in 1967 due to episodes of people disturbing hibernating bats in caves during winter, pesticide use, and decrease in summer habitat resulting in the death of large numbers of bats. Indiana Bats are vulnerable to disturbance because they hibernate in large numbers in only a few caves (the largest hibernation caves support 20,000 to 50,000 bats). Indiana Bats are found in most of the eastern United States but almost half of them hibernate in caves in southern Indiana.

In the early 1990s, development of an aircraft maintenance center and U.S. postal hub impacted an area frequented by the Indiana Bat. The new Indianapolis International Airport (IND) project began in 2001 and included a new airport terminal and associated infrastructure as well as a new federal highway interchange and related changes. This development, which occurred from 2002 to 2008, similarly impacted adjoining areas frequented by the Indiana Bat and also impacted wetlands.

Key Issue

Section 7 Consultation

Through section 7 consultation, the airport received authorization for incidental take and short-term net loss of Indiana Bat habitat. This was based upon the avoidance, minimization, and mitigation measures proposed in the Habitat Conservation Plan (HCP), which was submitted as part of the application for a permit for incidental take of Indiana Bats for the construction of road improvements and associated development in the vicinity of IND. The biological opinion noted that habitat quality in areas set aside for bat conservation should gradually increase and that over time, a large portion of the dedicated Conservation Management Area and adjoining preserved forested areas were anticipated to result in a net benefit to Indiana Bats in the action area as compared to current conditions. Compared to baseline conditions, there would be more forested habitat, a larger block of contiguous habitat, greater connectivity among habitat patches, and improved habitat conditions along the riparian corridors. This permanent protection was particularly crucial because future opportunities for bat conservation within the range of this colony were limited. These permanently protected parcels were the largest block of habitat available to Indiana Bats, as well as other species of forest wildlife, over a large geographic area.

Airport Actions & Innovative Solutions

The Conservation Management Area, initially established in the mid 1990s, was developed to provide mitigation for unavoidable impacts to the federally endangered Indiana Bat.The Indianapolis Airport Authority (IAA) Conservation Management Area and HCP represents a very successful project that allowed for critical development of IND and one of the most successful relocations of an endangered species conducted under the oversight of the U.S. Fish and Wildlife Service (USFWS). A substantial investment (>$10M) has been made to ensure that critical

IND development may occur with a net benefit to an impacted federally endangered species. The plan was conceived and implemented in partnership with federal, state, and local agencies. The project has now spanned over 20 years and is still currently active with annual efforts and reporting to verify the success of the habitat relocation while ensuring that the conservation area provides benefits to the local community. Meanwhile, the airport has fully implemented its development plan and continues to do so in concert with the HCP.

Stakeholder Partnering: Interagency Task Force

An Interagency Task Force consisting of the Federal Aviation Administration, Indiana Department of Transportation, Indianapolis Airport Authority, Indianapolis Department of Public Works, Indianapolis Department of Metropolitan Development, and the Hendricks County Board of County Commissioners was formed and signed an implementation plan for the HCP. The Task Force sought and obtained the appropriate permit from the USFWS, who worked with the Task Force to obtain and implement a successful mitigation plan.

Conservation
Protecting and preserving precious natural resources is essential in maintaining Central Indiana's ecosystem and wildlife habitat. The IAA has established a 2,000+ acre conservation area focusing on providing critical habitat to the endangered Indiana Bat and wetland mitigation to enhance water quality. At its conservation area, the IAA has developed an ongoing land, farm, and watershed management program. The site also serves as an outreach facility, regularly providing educational opportunities for local elementary, middle-, and high-school students to learn about the principles of conservation and stewardship.

Innovative Mitigation Strategy

There was no template for creating the alternative habitat for the endangered species so the plan provided for the planting of over 500,000 trees, establishment of supplement bat roosts, designation of over 2,000 acres for conservation, and requirement that the acquisition of land meet the conservation plan goals as well as coordinate with lands acquired for noise mitigation. The Task Force partnered with local universities (Indiana State University and Purdue University) to conduct bat and vegetation monitoring, respectively, and to verify and report on the success of the project. Annual Reports are produced to document activities.

Community Partnering: Sodalis Nature Park

Perhaps the best example of the IAA's commitment to conservation management is the Sodalis Nature Park, which represents a creative, holistic approach to conservation that creates benefits for multiple stakeholders of the airport. The park, which was opened in Hendricks County in 2011 on IAA land reserved for habitat conservation, was made possible through an unprecedented partnership among the Hendricks County Park Board, the IAA, and the USFWS. It makes 210 acres of land previously inaccessible to the public available as a public park and offers trails, picnic areas, year-round educational programs, and a 5.5 acre pond with fishing pier. At the same time, it serves as a refuge for more than 100 species of wildlife, including the Indiana Bat.

Notes

Detailed information is available (e.g., Habitat Conservation Plan, U.S. Fish & Wildlife Permit, materials relating to Sodalis Nature Park, Annual Reports etc.).

Environmental & Conservation Program Overview
IAA takes its commitment to supporting sustainability principles seriously. It strives to reduce environmental impacts, help maintain economic growth, and work to integrate its actions with the needs and values of the local community.

The Environmental and Conservation Program works to ensure that IAA meets and exceeds its environmental responsibilities, manages and oversees IAA's conservation area, and works with airport partners and the community on environmental and conservation issues. IAA partners with local academic experts at Purdue, Indiana, and Indiana State Universities and other institutions; Hendricks County Parks and Recreation; City of Indianapolis; Indiana Department of Transportation; Marion County Soil and Water Conservation District; and many other public institutions and non-profit organizations. IAA's commitment to sound environmental and sustainability principles is longstanding.

Case Study 4

Mineta San Jose International Airport (SJC), California

Case Study Highlights

- State-Listed Species / Candidate Federal Listing
- Habitat Management
- Mitigation Lands and Compensatory Mitigation

Species: Western Burrowing Owl *(Speotyto cunicularia)* - California Species of Special Concern and Federal Candidate Listing

Species

Western Burrowing Owls are small, long-legged owls that are active in the daytime, often visibly perched outside their burrows. They occur in suitable grassland, prairie, and desert habitat in areas that have "openness, short vegetation, and burrow availability" (Zarn 1974). Burrows are the principal component of suitable habitat, as the owls rely on burrows dug by other animals, and are the major factor controlling the abundance of the species.

Key Issues

Habitat Management

Located on approximately 1,050 acres in Santa Clara County, California, San Jose International Airport (SJC) serves international and domestic air carrier flights, as well as general aviation. There are approximately 355 acres of grassy infields at the airport that provide habitat for resident and transient wildlife species, including a resident population of Burrowing Owls. The airport must manage the wildlife hazard risk as well as provide for the long-term maintenance of a stable Burrowing Owl population.

Mitigation Lands and Compensatory Mitigation

At various times, the airport has held U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game permits for the relocation of Burrowing Owls. These permits were issued to enable burrow excavation and owl relocation to allow for construction of facilities. The airport had to develop an airport construction mitigation plan based upon the Master Plan of proposed improvements.

Airport Action & Innovative Solution

Beginning in 1981, in compliance with the FAA's FAR Part 139 requirements, the airport has been monitoring wildlife activity at the airport. The wildlife studies originally focused on large diurnal (daytime active) raptors (Red-Tailed Hawks, Rough-Legged Hawks, etc.), but with more than 25% of the strikes from 1980 to1995 attributed to "owls," the airport had to find a way to reduce the potential for Burrowing Owl strikes while still maintaining habitat for the listed species. In 1997, the airport's environmental consultant developed the Burrowing Owl Management Plan for SJC in order to minimize bird strike potential while also managing the Burrowing Owl habitat and nesting areas on airport property. This plan, which the airport has been following since 1997, identifies objectives and implementation activities to achieve those objectives. They are as follows:

Objectives

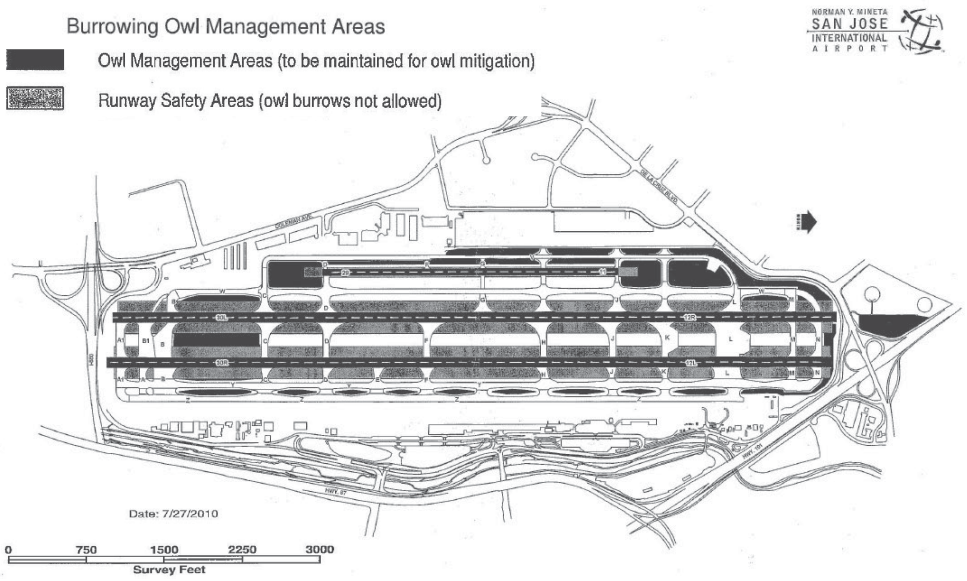
- Reduce the potential for aircraft strikes of Burrowing Owls,
- Develop an approved plan of action to mitigate airport construction impacts to Burrowing Owls and their burrows consistent with state policy, and
- Provide for the long-term maintenance of a stable Burrowing Owl population.

Implementation Activities

- Maintain Runway Safety Areas (RSAs) and taxiway pavement shoulders free of nesting owls,
- Implement an airport construction mitigation plan based upon the airport's Master Plan of proposed improvements,

- Establish Burrowing Owl management areas in the airport's Master Plan open space where resources will be managed to maintain breeding Burrowing Owls,
- Monitor the airport's breeding owl population, and
- Obtain California Department of Fish and Game and USFWS approval of the management plan as well as FAA compliance review.

At the time of the plan development, 12 artificial burrows had been installed at the airport as mitigation for prior projects. The data showed that the owls readily accepted the artificial burrows in areas where there were previously no natural burrows. The management plan, developed to mitigate impacts of airport construction associated with the Master Plan, included the relocation of owls from planned construction areas and RSAs to areas that provided less risk for strikes. It was determined that due to their low flight patterns and use of runway lights as hunting perches, the centers of the runways were the most hazardous to the owls. As such, the management areas were located off the ends of the runways and between certain taxiways where the strike hazard should be lower given that approaching and departing aircraft are well above the owls or moving slowly in these zones. On an ongoing basis, the RSAs along each runway (ranging from 75 to 175 ft) and pavement shoulders are inspected and maintained free of burrows. Any closure required (collapsing burrows using approved procedures) is compensated through the installation of one artificial burrow in an adjacent Burrowing Owl management area.



Habitat Management

The management areas are maintained according to the regular mowing regime used throughout the airport infields. This maintains the low, open vegetation that is an important characteristic of Burrowing Owl habitat. The population of owls is monitored on a regular basis, with population census data collected, young birds banded for identification, and annual survey results reported. The annual reports include a discussion of management activities implemented the prior year such as any relocations and artificial burrows.

The management plan required approval from the state and USFWS, as well as review by the FAA for compliance with federal aviation regulations regarding bird strike hazard reduction. According to CertAlert 06-07, FAR 139 certified airports should "not deliberately preserve or develop on-airport wildlife habitats such as wetlands, forest, brush, or native grasslands having characteristics that attract hazardous wildlife" and "not allow hazardous state-listed threatened and endangered species or species of special concern to remain on the airport if it requires managing the airport environment contrary to FAA recommendations," in order to stay in compliance with FAA Advisory Circular 150/5200-33A. Due to the fact that SJC's Burrowing Owl Management Plan has been in place since 1997, it was grandfathered in and accepted by FAA.

Citations

Zarn, M. 1974. Burrowing owl. U.S. Department of the Interior Bureau of Land Management. Technical Notes T-N-250. Denver, Colorado. 25 pp.

Case Study Highlights

- Habitat Management
- Multi-Species Conservation
- Section 10 Consultation
- Umbrella Habitat Conservation Plan

Case Study 5

Vero Beach Municipal Airport (VRB), Florida

Florida Scrub Jay

Species: Florida Scrub Jay *(Aphelocoma coerulescens)* - Threatened

Wood Stork *(Mycteria americana)* - Endangered

Species

Florida Scrub Jay *(Aphelocoma coerulescens)*

Threatened

Florida Scrub Jays eat a wide variety of acorns, seeds, peanuts, insects, tree frogs, turtles, snakes, lizards, and young mice. The Florida Scrub Jay is one of the few cooperative breeding birds in North America. Fledgling Florida Scrub Jays remain in their parents' habitat for several years in family groups that range in size from two to eight birds. After about 2 to 3 years, fledglings leave the group to form mating pairs of their own. Mating season ranges from March to June.

Habitat

The Florida Scrub Jay is found only in Florida scrub habitat, an ecosystem that exists solely in central Florida and that is characterized by nutrient-poor soil, occasional drought, and frequent wildfires. Because of its somewhat harsh weather pattern, this habitat is host to a small assortment of very specific plants, many of which are also listed species.

Wood Stork *(Mycteria americana)*

Endangered

A subtropical and tropical species, the Wood Stork is the only stork that presently breeds in North America. In the United States there is a small endangered breeding population in Florida, Georgia, and South Carolina, along with a recently discovered rookery in southeastern North Carolina.

Habitat

Wood Storks seek food where lowering water levels concentrate fish in open wetlands, including ditches and other surface waters. A resident breeder in lowland wetlands with trees, Wood Storks nest communally with up to 25 nests in one tree.

Key Issues

Critical Habitat Management

Florida Scrub Jay habitat is listed with both the Florida Fish and Wildlife Conservation Commission (FWC) and the U.S. Fish and Wildlife Service (USFWS), and these habitat areas at the Vero Beach Municipal Airport have been claimed as critical habitat. Similarly, the onsite ditches have been identified as desirable habitat for Wood Storks and the airport is within the "core foraging consultation area" for the species. Both of these species are being managed differently by the airport, but with the shared goal of supporting protection of the listed species while maintaining airport operational safety.

Alternative Habitat Management

Wood Storks are often attracted to stormwater facilities, and ditches are often considered desirable Wood Stork habitat. Regulatory agencies were concerned that Wood Stork habitat might exist on airport property, particularly within elements of the stormwater management system, which includes drainage swales and ditches designed to direct runoff from the airport facilities. Management of these potential habitats required a balance between ensuring proper function of the stormwater system and minimizing wildlife hazards and attractants, which required an alternative habitat management strategy.

Section 10 Consultation

Since the listing of the Florida Scrub Jay in 1987 as threatened (52 FR 42661), the majority of landowners with property in urban areas that is occupied by Florida Scrub Jays have been faced with the choice of (1) complying with the prohibited take provisions of the Endangered Species Act (ESA) by not clearing or constructing in occupied Florida Scrub Jay habitat, (2) complying with the ESA by obtaining a section 10(a)(1)(B) incidental take permit prior to land clearing, or

(3) violating the take prohibitions by clearing lots without coverage from an incidental take permit.

Airport Actions & Innovative Solutions

Umbrella Habitat Conservation Plan (HCP)

Florida Scrub Jay

While not related specifically to the situation at Vero Beach Municipal Airport, recognition of the limitations that the traditional section 10 consultation process alternatives placed on property owners in urban areas led the USFWS to consider methods to streamline the section 10(a)(1)(B) permitting process, while still providing conservation benefits to the Florida Scrub Jay. The USFWS worked with stakeholders and municipalities to develop an umbrella HCP and environmental assessment (EA). Although the focus of the HCP/EA is on modifications to permitting processes, the premise for these modifications is biological information indicating that Florida Scrub Jays in some urban areas will not persist long term and are unlikely to substantially contribute to the recovery of the species.

Critical Habitat Management

Florida Scrub Jay

The northeastern portion of the airport property contains upland sand scrub habitat that supports colonies of the Florida Scrub Jay. The airport recognizes that the birds typically fly in very low patterns across the northeast end of the airport; the airport staff and the FAA Air Traffic Control Tower controllers are acutely aware of the colonies and their periodic movements across the runway approaches. Because of the birds' habits, they do not create a significant wildfire hazard.

Though the airport has added several thousand feet of new security fence in the vicinity of the Florida Scrub Jay habitat, they have used special care in identifying colony locations and more specifically nest tree locations. The airport ensures protection of the critical habitat by actively notifying contractors and staff of the limits of the critical habitat, providing identification information to facilitate recognition of the jays, and stressing the importance of identifying and documenting presence of the species. This applies to new construction on the airport as well as during regular maintenance and turf management activities. Additionally, the airport has refrained from using any pesticides or herbicides in or around the vicinity of the critical habitat and minimizes disturbance to the birds and their habitat wherever possible.

Wood Stork

Although most wildlife hazard management planning suggests clearing vegetation from airport drainage ditches, the Wildlife Hazard Assessment (WHA) documented limited wildlife within the steep side-sloped ditches, which were full of weedy and brushy vegetation. Although the airport's turf management program does keep vegetation trimmed along the steep side slopes, the FAA-qualified wildlife biologist conducting the WHA recommended retaining the vegetation within the main conveyance of the ditches to prevent attracting a potentially

Wood Stork

hazardous, and federally listed, wildlife species. A comparison of these "unmaintained" ditches with some fully cleared ditches at a nearby airport demonstrated that the mucky bottoms of the cleared ditches actually encouraged Wood Stork foraging. In fact, Wood Stork foraging continued for several days following reoccurring rainfall events at the other airport. Consequently, following assurances that the weeds would not impede the required stormwater conveyance and discharge, the recommendation for clearing these ditches was revised to encourage maintaining the vegetation. Since incorporating this recommendation, there have been no observations of Wood Storks being attracted to these areas.

Resources

Link to FWS Umbrella HCP for Florida Scrub Jay: http://www.fws.gov/northflorida/ScrubJays/Docs/Umbrella/2012100_ver_FSJ_ Umbrella_HCP_EA.pdf.

Case Study 6

Roseburg Regional Airport (RBG), Oregon

Case Study Highlights

- Take Avoidance Through Innovative Design
- Innovative Mitigation Strategies
- NMFS Coordination

Species: Coho Salmon *(Oncorhynchus kisutch)* - Federally Threatened

Coho Salmon

Species

Coho Salmon *(Oncorhynchus kisutch)*

Federally Threatened

Adult Coho Salmon can measure more than 2 feet (60 cm) in length and can weigh up to 35 pounds (16 kg). Coho Salmon have dark metallic blue or greenish backs with silver sides and a light belly and small black spots on the back and upper lobe of the tail while in the ocean. Spawning fish in inland rivers are dark with reddish-maroon coloration on the sides.

Coho Salmon adults migrate from a marine environment into the freshwater streams and rivers of their birth in order to mate (called anadromy) at around 3 years old. They spawn only once and then die. Spawning males develop a strongly hooked snout and large teeth. Females prepare several redds (nests) where the eggs will remain for 6 to 7 weeks until they hatch.

Coho Salmon spend approximately the first half of their life cycle rearing and feeding in streams and small freshwater tributaries. Spawning habitat is small streams with stable gravel substrates. The remainder of the life cycle is spent foraging in estuarine and marine waters of the Pacific Ocean. Critical habitat was designated on May 5, 1999, for the Central California Coast and Southern Oregon/ Northern California Coast Coho Salmon.

Key Issues

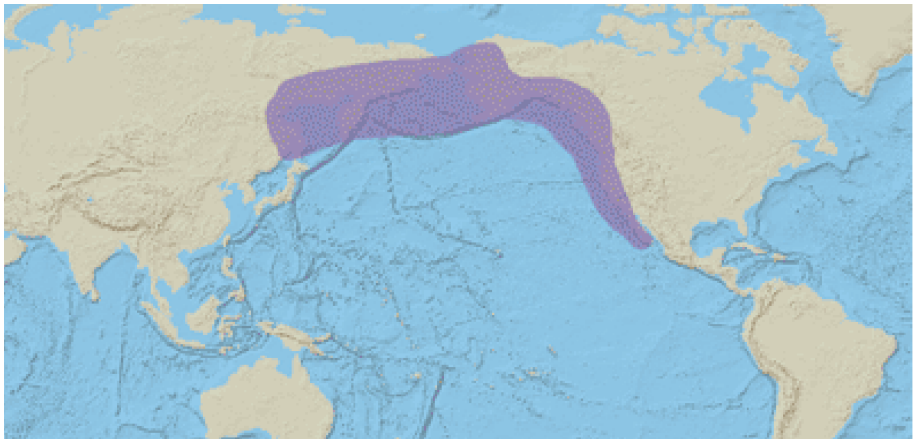
Airport Safety Improvements

This project involved the relocation of a taxiway parallel to the airport's runway to increase the separation distance in accordance with FAA design criteria and safety standards. This shift would increase the runway/taxiway separation distance from 200 feet to 240 feet, which is appropriate for the aircraft operating at the airport.

The taxiway relocation required extending an existing culvert that conveys a waterbody known as Newton Creek beneath the runway and taxiway. This creek is used by Oregon Coast Coho Salmon, which is a federally threatened species protected under the Endangered Species Act (ESA).

Design Constraints

The condition of the existing culvert and the vertical drop at the culvert outlet presented challenges for meeting Oregon Department of Fish and Wildlife (ODFW) and National Marine Fisheries Service (NMFS) fish passage design criteria for culverts. The "stream simulation" approach often preferred by these agencies could not be used due to the grades required to make up the elevation difference between the culvert outlet and streambed. There were also concerns about the long-

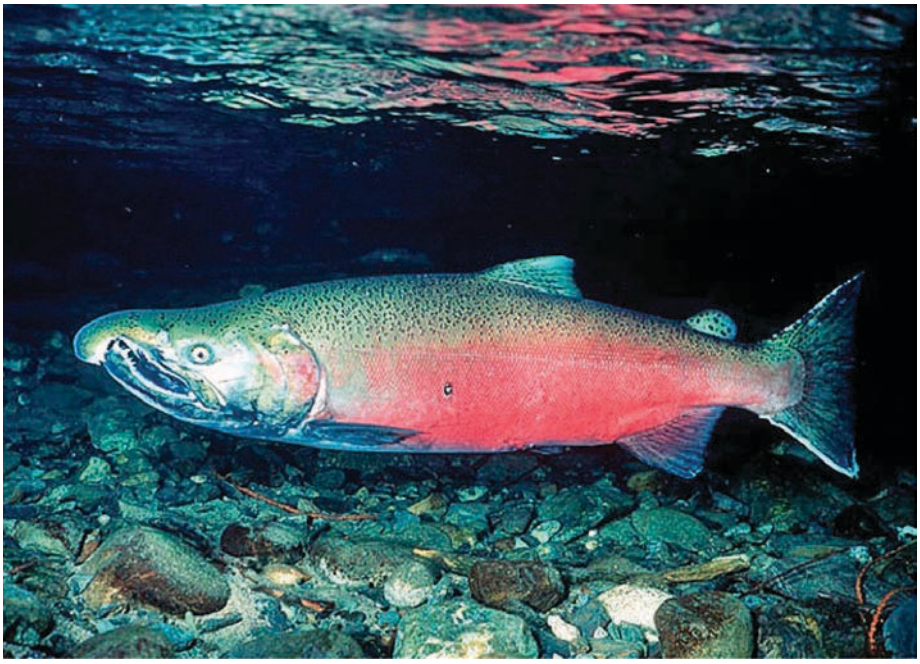


Coho Salmon Habitat Range

term stability of anything short of concrete at the culvert outlet.

Airport Actions & Innovative Solutions

The existing culvert passing Newton Creek beneath the airport's runway and parallel taxiway is 550 feet long and represents a barrier to upstream fish passage, due primarily to a large vertical drop at the culvert outlet (~4.5 feet from outlet to stream bed below) and a lack of hydraulic complexity within the culvert (flat concrete bottom). The taxiway relocation project requires extending (lengthening) this culvert, which will have unavoidable impacts to Newton Creek and Oregon Coast Coho Salmon. To address the situation, the project is integrating a pool and chute fishway as well as other stream improvements into the culvert extension element of the project. Sediment retention sills and streambed material are also being added to the existing length of the culvert. These improvements will significantly improve passage conditions for native migratory fish, including the Oregon Coast Coho Salmon, providing access to habitat upstream of the culvert that is currently inaccessible.



The project team coordinated with NMFS and ODFW fish passage engineers to develop a pool and chute fishway design, coupled with a roughened channel downstream, that could ultimately be approved by ODFW and NMFS fish passage coordinators, providing long-term stability while substantially improving fish passage conditions for target native migratory fish species.

The project involved close coordination with biologists and engineers from NMFS and ODFW and innovative design and strategy. A number of juvenile Coho Salmon were captured on the downstream side of the culvert during fish salvage operations for the project work area isolation, indicating that Coho are indeed using this part of Newton Creek and will benefit from the passage improvements.

The incorporation of fish passage improvements into the culvert extension element of the project helped to satisfy regulatory requirements under a number of laws/regulations, including the following:

- Federal ESA,
- Federal Clean Water Act (Section 404/401),
- Oregon Removal-Fill Law,
- Oregon Fish Passage Statutes, and
- Oregon Fish and Wildlife Habitat.

Laws or policies were not changed or modified as a result of the action.

Case Study Highlights

- Multi-Agency Coordination
- Critical Habitat
- Innovative Mitigation Strategy
- Habitat Conservation Plans

Species: San Diego Fairy Shrimp *(Branchinecta sandiegonensis)* and San Diego Button-Celery *(Eryngium aristulatum ssp. parishii)* - Endangered

Coastal California Gnatcatcher *(Polioptila californica californica)* - Threatened

Case Study 7

Brown Field Municipal Airport (SDM), California

Species

San Diego Fairy Shrimp *(Branchinecta sandiegonensis)*

Endangered

Named for the fairy-like motions it makes while swimming and feeding, Fairy Shrimp are not just in San Diego, but live throughout the country. Fairy Shrimp live in vernal (seasonal) pools, once extremely common in San Diego across the mesas, but now greatly reduced in number, in part because the pools are common in many prime real-estate areas. The ½-inch to 1-inch long shrimp only live during the wet season when the pools hold water.

San Diego Fairy Shrimp

San Diego Button-Celery *(Eryngium aristulatum ssp. parishii)*

Endangered

Vernal pools are the preferred habitat for San Diego Button-Celery. This herbaceous biennial is usually restricted to vernal pools and is severely declining, with continued losses despite its state endangered status.

Coastal California Gnatcatcher

Coastal California Gnatcatcher *(Polioptila californica californica)*

Threatened

The Coastal California Gnatcatcher is a small blue-gray songbird with dark blue-gray feathers on its back, grayish-white feathers on its underside, and a white ring around its eyes. It is the northern-most subspecies of California Gnatcatcher, occurring in Ventura and Los Angeles Counties and south to Baja Mexico. Development, wildfire, habitat conversion, and climate change all pose a threat to the survival of this species. The species is listed wherever it is found.

Key Issues

Impacts to Critical Habitat

Brown Field Municipal Airport (SDM) is undertaking a public/private venture to lease undeveloped airport lands for the development of aviation and supportive non-aviation facilities. The construction of the proposed facilities will impact vernal pool habitat that contains the federally endangered San Diego Fairy Shrimp and state endangered San Diego Button-Celery. In addition, proposed offsite stormwater pipes in sensitive habitat located in the City's Multi-Habitat Planning Area boundary would potentially impact the federally threatened Coastal California Gnatcatcher.

Multi-Agency Coordination

This project would potentially impact a number of listed species and their habitat. While federally listed species impacts are a concern, there are also potential impacts to resources under the purview of state and local agencies. This project required coordination between the regulatory agencies, FAA, and the airport owner (City of San Diego) to ensure the best mitigation strategy for all parties.

Airport Actions & Innovative Solutions

The project includes the development of multiple land uses on approximately 331 acres of land within the limits of SDM. The City of San Diego Real Estate Assets Department, Airports Division, is the project sponsor for the proposed development and FAA is the federal lead agency.

The federal action requested is the unconditional approval of the Phase 1 project components shown on the Airport Layout Plan and master site plan, which includes general aviation facilities (business jet, fixed-base operator [FBO], helicopter FBO, large and small t-hangars) and supportive non-aviation facilities such as office uses and commercial uses (i.e., hotels).

San Diego County is known nationwide for the tremendous diversity of its plants and animals and the number of species that are rare or endangered. It is even considered a "hot spot" for unique and unusual species. San Diego County is also known for its remarkable population growth.

In 1992, the State of California enacted the Natural Communities Conservation Planning (NCCP) Act. This voluntary program allows the state government to enter into planning agreements with landowners, local governments, and other stakeholders to prepare plans that identify both the most important areas for a threatened or endangered species and the areas that are not as important. These NCCP plans may become the basis for a state permit to take threatened and endangered species in exchange for conserving their habitat. The federal government has a similar program under section 10(a) of the federal Endangered Species Act providing for the preparation of Habitat Conservation Plans (HCPs). In California, the Wildlife Agencies have worked to combine the NCCP program with the federal HCP process, to provide permits for listed species. Local governments, such as San Diego County, can take the lead in developing these plans and become the recipient of state and federal permits.

Benefits of the MSCP

Without MSCP

- Developers and local agencies bear all costs
- Multiple permit authorities
- Project-by-project negotiations for mitigation requirements
- Disruption from future listings under the state and federal Endangered Species Acts

With MSCP

- Cost sharing by developers and county, state, and federal agencies
- Local agency permit authority granted to county by state and federal agencies
- Pre-established mitigation requirements
- No disruptions from future listings under the state and federal Endangered Species Acts for covered species

Multiple Species Conservation Program (MSCP)

The San Diego County Multiple Species Conservation Program (MSCP) is the result of 6 years of intense planning and review by a diverse group of private conservationists, developers, and agencies, and culminated with the County entering into an Implementing Agreement with the Wildlife Agencies for the County Subarea Plan on March 17, 1998.

The overall effect of the MSCP is that it provides for large, connected preserve areas that address a number of species at the habitat level rather than by individual species. This creates a more efficient and effective preserve system as well as better protection for the rare, threatened, and endangered species in the region. It preserves San Diego's native habitats and wildlife and works across political boundaries in a unique regional conservation effort.

Complying with the MSCP Subarea Plan for San Diego, the mitigation strategy for the SDM project included development of vernal pool habitat on airport property to provide suitable replacement habitat for the suite of species impacted by the development.

Compensatory Mitigation

The proposed mitigation will recreate vernal pool habitat in historic vernal pool locations while ensuring the mitigation areas meet all separation criteria for both aviation and non-aviation uses. Additionally, FAA guidance on hazardous wildlife attractants was reviewed as part of the mitigation planning. The airport will conduct a Wildlife Hazard Assessment to ensure the mitigation is consistent with safety requirements.

Finally, as an added benefit to the project, it was determined that the mitigation area contained habitat that was suitable for state-listed Burrowing Owl mitigation. This allowed the airport to tier the Burrowing Owl mitigation with the vernal pool sites and develop a multi-species mitigation strategy.

Case Study 8

Sanford Orlando International Airport (SFB), Florida

Case Study Highlights

- Hazardous Wildlife Mitigation
- Species Delisting
- Multi-Agency Coordination
- Non-ESA Species Regulation

Bald Eagle

Species: Bald Eagle *(Haliaeetus leucocephalus)* - Federally Delisted (ESA) Federally Protected (Bald & Golden Eagle Protection Act [BGEPA] & Migratory Bird Treaty Act [MBTA])

Species

Distinguished by a distinctive white head and white tail feathers, Bald Eagles are powerful, brown birds that may weigh 14 pounds and have a wingspan of 8 feet. Bald Eagles are mostly dark brown until they are 4 to 5 years old and acquire their characteristic coloring. Bald Eagles live near wetlands and waterbodies where they can find fish, their main food source, though they will also feed on a variety of small land animals and carrion. Bald Eagles require a reliable food source and trees (or other similar areas) for perching and nesting. Eagles mate for life, building nests at the top of large trees, which they typically use and enlarge each year. In areas without trees, they may nest in cliffs or on the ground. Eagles may also have one or more alternate nests within their breeding territory. The birds travel great distances but usually return to breeding grounds within 100 miles of the place where they were raised. Bald Eagles may live 15 to 25 years in the wild, longer in captivity. Breeding Bald Eagles typically lay one to three eggs once a year, which hatch after about 35 days. Young eagles typically fledge within 3 months and are independent about a month later.

Bald Eagles were removed from the federal endangered species list in August 2007 because their populations recovered sufficiently. The U.S. Fish and Wildlife Service (USFWS) continues to work with state wildlife agencies to monitor the status of Bald Eagles as required by the Endangered Species Act (ESA). If the species should need the protection of the ESA, the USFWS can relist it as endangered or threatened. In the meantime, individual states may also pass or implement laws to protect Bald Eagles. Although delisted from the ESA, eagles remain regulated under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA) and may also be subject to coordination through state listing or conservation management plans in states where the species occurs, such as Florida. Though ultimately delisted in Florida in 2008, to ensure that the conservation goal and objectives continue to be met, the Florida Fish and Wildlife Conservation Commission (FWC), and a group of stakeholders, developed a management plan compatible with the BGEPA and the associated National Bald Eagle Management Guidelines (U.S. Fish and Wildlife Service 2007). This plan provides guidance for activities that require coordination or permitting under the state or the BGEPA, and recommends a suite of conservation actions that employ adaptive management to allow adjustment to policies, guidelines, and techniques based on science and observed responses to implemented conservation measures. Coordination under the BGEPA is still evolving, with the USFWS developing a permitting process under that regulation.

The Bald Eagle is an ESA success story. Forty years ago, this species was in danger of extinction throughout most of its range within the United States. Habitat destruction and degradation, illegal shooting, and the contamination of its food source (largely as a consequence of the insecticide DDT) decimated the eagle population. Under the ESA, the banning of DDT, and other conservation actions, Bald Eagles have made a remarkable recovery.

Key Issues

Wildlife Hazard Management

There are liability issues inherent in bird-strike incidents at airports, and failure to implement management actions could ultimately lead to human safety issues, loss of property, financial liability, litigation, adverse media attention, and public criticism. While each airport may handle the hazard threat posed by listed species uniquely, this case study is an example where the risk and liability outweighed the detrimental effect on the species.

This case represents one end of that spectrum and, when contrasted with other cases where Bald Eagles are managed onsite, demonstrates that airports must weigh the protection of the species with aviation safety and find the balance that works in their specific situation.

Species Delisting, Non-ESA Species Regulation

This case study provides information on the regulatory processes associated with "taking" a species that was delisted from the ESA but still retains federal protections through the BGEPA and the MBTA. It also includes precedent-setting state legislation related to "harassment" or "taking" of federally protected species that are also state-listed, but that pose a threat to aviation safety.

Airport Actions & Innovative Solutions

Beginning in late 2006, large numbers of Bald Eagles were identified on and around Sanford Orlando International Airport (SFB). The occurrence of eagles on the runways led to a number of actions including runway closure(s) and the airport securing an eagle "harassment" permit. On November 17, 2006, a Cessna 414 (taking off from Runway 27R) struck an eagle, which led to the airport's request for emergency consultation with USFWS to address the safety issue and remove the eagle nest trees. Through a series of petitions and legal challenges, in March and April of 2007, as authorized by the USFWS and the FWC, airport personnel cut down three nests and three candidate Bald Eagle nest trees.

In 2006 to 2007, monitoring revealed that eagle activity on and near the airport was in direct conflict with aircraft flight patterns, which constituted a wildlife, human, and property emergency. This triggered the FAA to initiate emergency consultation with USFWS to take emergency action to remove three nests and relocate the chicks to foster nests. An incidental take permit was issued for the removal of the three active nest trees, as well as additional candidate nest trees and the "harrassment" of the six adult eagles and three eaglets at the airport. It also included a take for the "harassment" of six adult eagles and three eaglets in the foster nests that received the relocated eaglets.

Due to the sensitive nature of the nest removal and eaglet relocation, the airport worked closely with the Audubon National Birds of Prey Center (Audubon) to facilitate the relocation of the chicks from the nest trees that were to be removed. The chicks were medically evaluated at Audubon's Florida Birds of Prey Center, and once suitable foster nests were identified, they were relocated. Extensive monitoring was conducted and the status of the relocated eaglets was reported to FWC by the airport and Audubon. Ultimately, the relocation was successful with the foster eagles caring for, feeding, and successfully fledging the relocated eaglets.

Policies or Laws Affected

Larry Dale, President and CEO of SFB, was instrumental in getting legislation passed in Florida related to wildlife hazards posed by listed species. In addition to the airport exemptions incorporated into the state's Bald Eagle management plan, the FWC proposed new rule 68A-9.012 "Take of Wildlife on Airport Property." Through collaboration with stakeholders including the Florida Airports Council, U.S.Department of Agriculture (USDA), USFWS, and environmental groups, the rule was adopted effective March 21, 2010. The rule states that "Any airport may take wildlife on airport property for the purpose of ensuring aircraft and human safety in accordance with this rule."

Notes

https://www.flrules.org/gateway/RuleNo.asp?title=MISCELLANEOUS PERMITS&ID=68A-9.012.

http://m.myfwc.com/media/1381857/2010_Jun_AirportSafetyandWildlife_FinalRules.pdf.

April 28, 2008 Biological Opinion for Sanford Orlando International Airport (FWS).

U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management Guidelines.

Case Study 9

Kodiak Airport (ADQ), Alaska

Case Study Highlights

- Critical Habitat
- National Marine Fisheries Service (NMFS) section 7 Consultation
- Innovative Mitigation Strategy
- Multi-Agency Coordination
- Airport Safety Improvements
- National Environmental Policy Act (NEPA) Compliance

Species: Steller Sea Lion *(Eumetopias jubatus)* and Humpback Whale *(Megaptera novaeangliae)* - *Endangered*

Northern Sea Otter *(Enhydra lutris kenyoni)* and Steller's Eider (*Polysticta stelleri)* - Threatened

Species

Steller Sea Lion *(Eumetopias jubatus)*

Endangered

The Steller Sea Lion, also known as the Northern Sea Lion, prefers the colder temperate to sub-arctic waters of the North Pacific Ocean. Haulouts and rookeries usually consist of beaches (gravel, rocky, or sand), ledges, or rocky reefs. The Steller Sea Lion was listed under the Endangered Species Act (ESA) as threatened throughout its range on December 4, 1990. This listing included animals from Alaska, California, Oregon, and Washington. On June 4, 1997, the Western "distinct population segment (DPS)" (west of 144° W longitude) was listed as endangered.

Steller Sea Lion

Humpback Whale *(Megaptera novaeangliae)*

Endangered

Humpback Whales live in all major oceans from the equator to sub-polar latitudes. In 1946, the International Convention for the Regulation of Whaling regulated commercial whaling of Humpbacks and, in 1966, the International Whaling Commission prohibited it. In June 1970, Humpback Whales were designated as endangered under the Endangered Species Conservation Act (ESCA). In 1973, the ESA replaced the ESCA and Humpbacks continued to be listed as endangered.

Under the Marine Mammal Protection Act, threats to humpbacks are mitigated by regulations implementing the Pacific Offshore Cetacean Take Reduction Plan and the Atlantic Large Whale Take Reduction Plan.

Northern Sea Otter

Northern Sea Otter *(Enhydra lutris kenyoni)*

Threatened

Northern Sea Otters occur in nearshore coastal waters of the United States along the North Pacific Rim from the Aleutian Islands to California. The species is most commonly observed within a depth of 40 meters and landward since the animals require frequent access to benthic foraging habitat (sea floor) in subtidal and intertidal zones. Sea Otters in Alaska are not migratory and generally do not disperse over long distances. Alaska has three populations of Sea Otters, and the southwest DPS was listed as threatened under the ESA in 2005 and is, therefore, classified as a strategic stock under the Marine Mammal Protection Act.

Humpback Whale

Steller's Eider

Steller's Eider *(Polysticta stelleri)*

Threatened

The Steller's Eider is a small, diving duck that feeds on shellfish, with mussels being a favored food. Large flocks of up to 200,000 birds can form on suitable coastal waters. Three recognized breeding populations of Steller's Eiders

include two in Arctic Russia and one in Alaska. On June 11, 1997, USFWS listed the Alaska-breeding population of Steller's Eiders (62 FR 31748) as threatened pursuant to the ESA. On March 5, 2001, the USFWS added a designation of critical habitat for the Alaska-breeding population of the Steller's Eider.

Key Issues

Critical Habitat

Steller Sea Lions

Critical habitat has been defined for this species as a 20-nautical-mile buffer around all major haulouts and rookeries, as well as associated terrestrial, air, and aquatic zones, and three large offshore foraging areas (50 CFR 226.202 on Aug. 27, 1993).

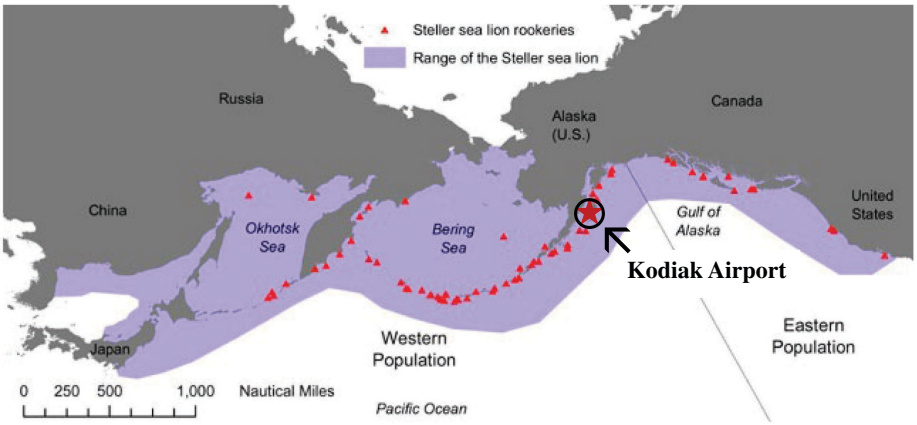
Steller's Eider

Steller's Eider critical habitat encompasses approximately 7,300 square kilometers. The area includes breeding habitat on the Yukon-Kuskokwim Delta and Kuskokwim Shoals, Sea Islands, Nelson Lagoon, and Izembek Lagoon in western Alaska.

Northern Sea Otter

St. Paul Harbor is designated critical habitat for the Northern Sea Otter and is also identified as essential fish habitat and juvenile rearing habitat for Sockeye and Coho Salmon.

The FAA determined that designated safety areas for two of Kodiak Airport's (ADQ's) runways (Runway 18/36 and Runway 07/25) do not meet federal standards. The deficiency of the runway safety areas (RSAs) at ADQ needs to be remedied.



Airport Actions & Innovative Solutions

ADQ is located in St. Paul Harbor, which is part of the Alaska Maritime National Wildlife Refuge. ADQ has natural physical barriers constraining runway location changes. St. Paul Harbor is to the east of the airport, Barometer Mountain is to the west, and Buskin River is to the north. In addition, U.S. Coast Guard facilities are south of the airport. With these physical and airspace constraints, insufficient landmass exists at ADQ for the runways to be re-aligned or relocated such that the runway length is maintained while providing RSA improvements. Therefore, there is no other alternative but to fill a portion of St. Paul Bay in order to get the required landmass for the RSA improvements.

NEPA Compliance

In compliance with the National Environmental Policy Act (NEPA), an Environmental Impact Statement was prepared for FAA approval that evaluated a number of alternatives for implementation of the required safety improvements at the airport. The preferred alternative includes improvements to the RSA at the east end of Runway 07/25 (Runway End 25) through a 600-foot extension into St. Paul Harbor.

Additionally, the project will enhance the RSA at the north and south end of Runway 18/36 through a 600-foot-long by 500-foot-wide landmass extension into St. Paul Harbor. The potential environmental impacts related to these improvements to the RSAs for both runway complexes would be associated with fill placement into St. Paul Harbor and the long-term changes resulting from the new fill in the marine environment.

Conservation Measures

The FAA developed conservation measures that would be implemented during construction to reduce or minimize environmental impacts. Use of these measures will ensure potential construction impacts are minimized to the extent practicable.

Some of the conservation measures to be utilized at ADQ include:

Wildlife Observers

- Adhering to the USFWS's Observer Protocols for Fill Placement and Dredging in the marine environment (USFWS 2012a). Designated observers will oversee construction activities.
- Fill placement will not occur when viewing conditions make it impossible to monitor the applicable distances unless additional observers (i.e., positioned in boats) could be added to provide complete visual coverage of the area.

- If a listed or candidate bird is within 300 meters of fill placement activities, wildlife observers will inform the Engineer and work will be delayed until the bird or birds have moved out of the area on their own.
- Should a Sea Otter or Sea Lion be observed within 300 meters of the project fill footprint prior to filling activities, Engineer notification and work initiation/ramp up/stop procedures would be followed.

Barge Operations

- Boat and barge operations are to follow the USFWS's Boat Operation Guidance to Avoid Disturbing Sea Otters (USFWS 2012b) to minimize impacts to marine mammals. The wildlife observer(s) will notify the captain if any new areas with federally listed species are observed.

Habitat Avoidance

- Barges will avoid known Sea Lion rookeries and major haulouts completely and avoid other areas with high densities of endangered or threatened species to the extent practicable.
- Material barges will not be grounded in high-density kelp stands, which can be an important foraging habitat.
- Barges hauling construction materials to the site during the winter will avoid specific identified areas heavily used by Steller's Eider and Emperor Goose, which may provide important habitat for individuals displaced from the airport area during construction.

Acoustic & Visual Impact Minimization

- Placement of fill and other in-water noise production would occur only after other noise-generating activities have ramped up and animals have had the opportunity to leave the area of their own accord.
- Lighting would be kept to the minimum level needed for safety and security. This includes using motion sensors to keep lights off when not needed; down-shielding and directing lights to minimize horizontal and skyward illumination; and avoiding high-intensity, steady-burning, or bright lights.

Construction Timing

- In-water construction work (below high-tide line) would be excluded from April 1 to July 15 to avoid impacts to aquatic species.
- Pre-construction nest surveys will be conducted. If Bald Eagle nests are found, the National Bald Eagle Management Guidelines will be followed with potential incidental take permit(s) required for nests within 660 feet of activities that may cause nest disturbance. Any nests from 660 feet to 0.5-mile from construction activities would be monitored by a qualified biologist. If resident birds appear disturbed by construction activities, construction activities would cease until young have fledged.

This project exemplifies a case where an airport was severely constrained by its location and the sensitive nature of the surrounding habitats but was able to work with the regulatory agencies and develop a plan where both airport safety and listed species protection could occur.

By agreeing to modify some standard construction protocols, establishing site-specific best management practices, and providing compensatory mitigation for unavoidable impacts, the airport was able to make the required improvements while preserving the functions and values of high quality habitats in the ADQ area that are related to anadromous fisheries, migratory birds, and marine resources and habitats.

Citations

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SWCA Environmental Consultants. (2012, October). *Draft Biological Assessment of Federally Listed Marine Mammals under National Marine Fisheries Service Jurisdiction for the Kodiak Airport of Proposed Runway Safety Area Improvement Project*. Prepared for FAA and Alaska Department of Transportation and Public Facilities.

SECTION 7

Overview of *CRP-CD-160: Airport Toolbox for ACRP Report 122*

CRP-CD-160: Airport Toolbox for ACRP Report 122 (bound into this report and available on the *ACRP Report 122* web page) is a cache of resources that airports may use to identify potential listed species issues as well as strategies and tools to aid in resolution of those issues. The individual toolbox items are included on *CRP-CD-160*, grouped into four sections:

- Understanding Airports
- Endangered Species Act Information for Airports
- Tools for Airports: Assessing and Documenting Listed Species
- Additional Information

Brief descriptions of the individual toolbox components in each group and a discussion of how these tools might be useful are provided below.

Understanding Airports

This section of the *Airport Toolbox* includes information that may be shared with agencies, stakeholders, and the public related to the rules, regulations, policies, operations, and other considerations specific to airports.

Understanding the Airport Environment—This informational overview, which can be customized into a brochure-style handout, may be used by airports to provide agencies, stakeholders, decision makers, and the public with easily understandable information related to airport operations and safety and how those regulations and requirements may relate to listed species and protected habitats on airports. An airport may choose to add site-specific information, including specific listed species that occur on a particular airport.

MOA—An MOA was executed in 2003 as a joint agreement between the FAA, the U.S. Air Force, the U.S. Army, the U.S. EPA, USFWS, and USDA to address aircraft-wildlife strikes. This MOA is included in the Airport Toolbox to provide awareness of the document as well as access to this resource for both airports and regulatory agencies. The named agencies in the MOA establish procedures necessary to coordinate their missions to more effectively address existing and future environmental conditions contributing to aircraft-wildlife strikes throughout the United States. These efforts are intended to minimize wildlife risks to aviation and human safety, while protecting the nation's valuable environmental resources.

Endangered Species Act Information for Airports

The information included in this section of the *Airport Toolbox* is intended to assist airports in understanding the ESA, including the regulations, responsible agencies and parties, and compliance actions specific to airports.

ESA Basics (USFWS factsheet)—This factsheet was developed by USFWS and provides a summary of the ESA and the various components, terms, and processes covered under the ESA.

Endangered Species and Airports: An Overview of Endangered Species Issues for Airports under the National Environmental Policy Act (NEPA) and Endangered Species Act (ESA)—This document was developed to provide a quick overview of how the ESA is handled under NEPA and how that applies to airports. This is intended to provide a brief background on NEPA, a summary of the NEPA process, and definition of the terms used in NEPA coordination. The document also includes web addresses for obtaining additional information.

Endangered Species Act (ESA) Section 7 Consultations: An Overview of Endangered Species Issues for Airports—This document was developed to provide a summary of section 7 consultation under the ESA, including relevant terminology, the typical process, and timeframes for review. It includes web addresses for obtaining additional information.

The Endangered Species Act (ESA): Section 10 Incidental Take Options for Airports—This document was developed to provide a summary of section 10 incidental take under the ESA, including relevant terminology, conditions, and helpful tips. It includes web addresses for obtaining additional information.

Habitat Conservation Plans under the Endangered Species Act (USFWS factsheet)—This factsheet was developed by USFWS and provides a summary of HCP planning documents required as part of an application for an incidental take permit. This factsheet discusses when HCPs are required, what they do, and the process and responsible parties.

Candidate Conservation Agreements (USFWS factsheet)—This factsheet was developed by USFWS and provides a summary of Candidate Conservation Agreements. Collaborative approaches, such as Candidate Conservation Agreements with assurances, may provide airports with opportunities to better control land-use restrictions in the future.

U.S. Fish & Wildlife Service Native Endangered & Threatened Species Permit Contacts—This is included to provide airports with a quick reference to find the appropriate USFWS office and contact information for issues associated with federally listed species.

Tools for Airports: Assessing and Documenting Listed Species

The information included in this section of the *Airport Toolbox* can assist airports in assessing and documenting listed species and their habitats and also provides templates for managing those habitats.

Environmental Resources Inventory Methodology and Checklist—This document includes instructions on how to develop an inventory of the natural resources, potential listed species occurrence, and protected habitats on or near the airport. This information is intended to assist airports in development of site-specific inventories and tools.

Airport Wildlife Incident Report (Form Template)—This is intended to be a user-friendly form for airports to use as required for accidental and lethal take incidents involving wildlife. The form is a sample template, which is intended to be adapted or expanded with airport-specific information for use by airport employees, contractors, or other stakeholders.

Sample Template for Listed Species Identification Cards—This is a business-card-sized template (when produced for an airport, it is usually laminated) that may be incorporated into contractor and employee training related to projects with the potential to encounter listed species. The species included would be specific to the individual airport. The identification cards can be combined into a brochure or poster if more appropriate.

Construction Project Environmental Awareness Brochure Template—This is a sample brochure, which when produced for an airport, would be project and site specific. This sample is included to demonstrate the type of information regarding listed species and other environmental considerations that may be conveyed to contractors and/or employees in a simple but useful format.

Additional Information

The information included in this section of the *Airport Toolbox* is intended to provide other relevant information that may be useful in the management of listed species and their habitats on airports.

Delisting a Species: Section 4 of the Endangered Species Act (USFWS factsheet)—This factsheet, developed by USFWS, describes the federal down listing/delisting process and includes information on what occurs once a species is downlisted/delisted.

Migratory Bird Permits: Authorized Activities Involving Migratory Birds (USFWS factsheet)—This factsheet is included to provide airports with information on the regulations and USFWS contact information for activities that may affect migratory birds, including Bald Eagles.

Midwest Region Division of Migratory Birds: Authorized Activities Involving Unintentional Eagle Disturbance (USFWS factsheet)—This factsheet, developed by USFWS, includes information on the recently changed regulations and rules that apply specifically to Bald and Golden Eagles. This includes information on recent ESA delisting of the Bald Eagle and how eagles are currently regulated, including take permit provisions.

Federal Fish and Wildlife Permit Application Form (Take of Depredating Eagles & Eagles that Pose a Risk to Human or Eagle Health or Safety) (USFWS permit application)—A Federal Eagle Depredation Permit is required to intentionally take or disturb (haze) Bald Eagles or Golden Eagles that have become injurious to wildlife, agriculture, or other personal property, or human health and safety. A depredation permit is intended to provide short-term relief from depredation damage until long-term measures can be implemented to reduce or eliminate the depredation problem through nonlethal control techniques. This USFWS application is the mechanism for obtaining that authorization.

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Acronyms, Abbreviations, and Initialisms

AC	Advisory Circular
ADO	Airport District Office
ADQ	Kodiak Airport
AHTD	Arkansas Highway and Transportation Department
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ARP	Office of Airports (FAA)
BASH	Bird Aircraft Strike Hazard
BGEPA	Bald and Golden Eagle Protection Act
CatEx	Categorical Exclusion
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNLM	Center for Natural Lands Management
DPS	Distinct population segment
EA	Environmental assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EMS	Environmental management system
ESA	Endangered Species Act of 1973
ESCA	Endangered Species Conservation Act
EST	Environmental Screening Tool
ETDM	Efficient Transportation Decision Making
FBO	Fixed-base operator
FDOT	Florida Department of Transportation
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic information systems
HCP	Habitat Conservation Plan
IAA	Indianapolis Airport Authority
IND	Indianapolis International Airport
MBTA	Migratory Bird Treaty Act
MMC	Marine Mammal Commission
MMPA	Marine Mammal Protection Act of 1972
MOA	Memorandum of agreement
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSCP	Multiple Species Conservation Program
NAVAIDS	Navigational aids
NCCP	Natural Communities Conservation Planning
NEPA	National Environmental Policy Act

NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ODFW	Oregon Department of Fish and Wildlife
PDX	Portland International Airport
PFC	Passenger Facility Charge
Port	Port of Portland
RBG	Roseburg Regional Airport
RMOU	Regional memorandum of understanding
RSA	Runway Safety Area
SDM	Brown Field Municipal Airport
SFB	Sanford Orlando International Airport
SHLA	Streaked Horned Lark
SJC	San Jose International Airport
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VRB	Vero Beach Municipal Airport
WHA	Wildlife Hazard Assessment
WHMP	Wildlife hazard management plan

Abbreviations and acronyms used without definitions in TRB publications:

A4A	Airlines for America
AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation