B R I E F I N G D O C U M E N T

SUMMARY DOCUMENT: OVERVIEW OF HABITAT CONSERVATION PLANS FOR THE FLORIDA BEACHES HABITAT CONSERVATION PLAN VERSION 1, REVISION 1

Prepared for

Florida Department of Environmental Protection -
Bureau of Beaches and Coastal Systems
Florida Fish & Wildlife Conservation Commission

December 24, 2008

URS

URS Corporation
1625 Summit Lake Drive, Ste. 200
Tallahassee, FL 32317

Table of Contents

This document is part of a series prepared in support of the Florida Beaches Habitat Conservation Plan (FBHCP) Section 6 ESA Grant. These resource documents are intended to provide background information about subjects integral to the development of the FBHCP, including an understanding of the Federal Incidental Take Permitting (ITP) process, the key elements of the Florida Department of Environmental Protection Bureau of Beaches and Coastal System's Coastal Construction Control Line (CCCL) permitting program and general approaches to HCP development derived from several other existing large-scale HCP/ITP programs. This document set is intended to provide project teams, which include the Project Steering Committee, the Project Work Group and the various support committees (e.g., Science Committee), with a common set of background information necessary to make informed decisions and recommendations about the project.

These documents function as a related set, meaning that each contains only a portion of the information necessary to understand the overall nature of the program. They are also presented as evolving documents with the potential for revisions and updates. To help organize track revisions, each document is provided with a version and revision number. Changes in the revision number represent minor modifications while changes in the version number represent significant changes in the content or organization of each document. Executive summaries are included in each report. Related visual presentations (PowerPoint Presentations) are also available. The list of documents given below will expand in time. An up-to-date list is available at http://flbeacheshcp.com/Documents.aspx.

LIST OF DOCUMENTS:

Briefing Documents:

The CCCL Program for the Florida Beaches Habitat Conservation Plan, vers.1 rev. 1.

Chapter 161 Florida Statutes for the Florida Beaches Habitat Conservation Plan, vers.1 rev. 1.

Overview of Habitat Conservation Plans for the Florida Beaches Habitat Conservation Plan, vers.1 rev. 1.

Implementation of the Florida Beaches Habitat Conservation Plan, vers.1 rev. 1

The Endangered Species Act for the Florida Beaches Habitat Conservation Plan, vers. 1 rev. 1.

Resource Documents:

Preliminary List of Data Sources for Best Management Plans for the Florida Beaches Habitat Conservation Plan, vers.1 rev. 1.

Florida Beaches Habitat Conservation Plan Framework Document, vers.1 rev. 1.

Preliminary List of Data Sources for the Florida Beaches Habitat Conservation Plan, vers.1 rev. 1.

Acronym	Definition of Acronym
ACEC	Areas of Critical Environmental Concern
BMP	Best Management Practices
BLM	Bureau of Land Management
CCC	Caribbean Conservation Corporation
CCCL	Coastal Construction Control Line
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CLS	Conservation Land System
CLUP	Comprehensive Land Use Plan
CNDDB	California Natural Diversity Database
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DFC	Desired Future Condition
DWMA	Desert Wildlife Management Areas
EBRPD	East Bay Regional Park District
EIA	Effective Impervious Area
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Graphical Information Systems
HCA	Habitat Conservation Area
HCP	Habitat Conservation Plan
IRC	Indian River County
ITP	Incidental Take Permit
MLW	Mean Low Water
MOA	Memorandum of Agreement
MSHCP	Multi-Species Habitat Conservation Plan
MSRP	Multi-Species Recovery Plan
NCCA	Natural Community Conservation Area
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NGO	Non-Governmental Organizations

Acronym	Definition of Acronym
PCANGO	Priority Conservation Areas Non-Governmental Organizations
PVSPCA	Priority Vulnerable Species Priority Conservation Areas
RWQCBPVS	Regional Water Quality Control Board Priority Vulnerable Species
SCCRWQCB	Science Conservation Commission Regional Water Quality Control Board
SDCPSCC	Sonoran Desert Conservation Plan Science Conservation Commission
STATSDCP	Science Technical Advisory Team Sonoran Desert Conservation Plan
SWRCBSTAT	State Water Resources Control Board Science Technical Advisory Team
UDASWRCB	Urban Development Area State Water Resources Control Board
ULLUDA	Urban Limit Line Urban Development Area
USACE	United States Army Corps of Engineers
ULL	Urban Limit Line
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Six existing Habitat Conservation Plans (HCPs) have been reviewed and are summarized in the following report. This report has been developed in support of the Florida Department of Environmental Protection's (FDEP) effort to prepare an application for an Incidental Take Permit (ITP) covering all areas regulated by the Coastal Construction Control Line (CCCL) Program. The plans included in this review are relevant to the development of the statewide Florida Beaches HCP because they cover large land areas, protect multiple species, or both.

The Endangered Species Act (ESA) of 1973 protected listed species and their habitat by prohibiting activities that threaten or impair their ability to survive and recover. These threats are defined as *take*. This policy quickly became a concern for private individuals and developers. In 1982, to allow some flexibility under this Act, the law was amended to allow landowners to seek a permit for a limited amount of take of threatened and endangered species incidental to an otherwise lawful activity. Under Section 10 of the ESA, an individual is required to prepare an HCP as a component of an application for an ITP.

The ESA establishes basic requirements for the preparation of an HCP. The United States Fish and Wildlife Service (USFWS) is the issuing authority for ITPs and requires an HCP to specify the following: (a) the impacts resulting from the taking; (b) the measures the applicant will undertake to monitor, minimize and mitigate such impacts; (c) funding sources to implement these measures; (d) procedures to deal with unforeseen circumstances; (e) the alternative actions considered; (f) the reasons why the alternatives were not chosen and (g) additional measures USFWS or National Marine Fisheries Service (NMFS) [hereinafter referred to as the services] may require as necessary or appropriate for purposes of the plan. An HCP must meet four issuance criteria in order to be approved by the Services.

If an entity such as a private individual or non-federal permitting agency recognizes that their otherwise lawful activities may cause unauthorized take of a federally listed species, they may apply for an ITP and develop an HCP to ensure compliance with the ESA and minimize the risk of a potential third party grievance. Since the HCP is the applicant's document, the applicants are encouraged to work with, and seek guidance from, the services, as appropriate during development of the HCP. Under section 10(a) (1)(B), an ITP is voluntary. If an individual does not wish to violate the ESA then they can seek an ITP. If they choose to take the risk and move forward then they assume all risk. Guidance for the preparation of the ITP and supporting HCP is given in the Habitat Conservation Planning and Incidental Take Permit Processing Handbook. (USFWS and NMFS 1996). This document shows that the process of preparing the ITP and its supporting HCP varies considerably, not only according to the size and complexity of intended activity, number of listed species involved, and complexity of the associated habitats, but also according to the way the applicant chooses to organize the effort. The variability of the work organization, study content, and protection plan complexity motivated this review of previous and ongoing ITP applications with the intent of benefiting from their experience.

This review was directed at applications by government agencies and large landholders. The development of many large-scale HCPs has followed a rather similar process. The responsible parties either provide dedicated staff to coordinate the project or contract the work to a consultant.

The applicants in the HCPs reviewed ranged from a single county, as in the case of the Indian River County HCP in Florida (the impetus was the threat of a third party lawsuit from a conservation organization upon Indian River County and the Florida Department of

Environmental Protection), to several counties as in the case of Etowah's HCP. Seven counties and 16 cities are within the Etowah River Basin; however, four counties and nine cities are currently applicants in the plan. Often in large, multi-species HCPs, several counties, as well as the Water Districts, Utility Departments, and even federal agencies are applicants, as is seen in the West Mojave Desert HCP. The West Mojave HCP consists of two components: a federal component that will amend the existing 1980 California Desert Conservation Area Plan (BLM 1980), and an HCP that will cover development on private lands.

As the HCP development often necessitates the assistance and cooperation of a variety of private and agency stakeholders, a series of advisory committees are often formed. A Steering Committee can assist with tasks ranging from simple outside guidance to drafting the plan. While Biological and technical committees often aid in the development of mitigation plans and conservation measures. For the Pima County HCP, several committees were created. The Steering Committee was made up of 75 members from the local community with varying interests. The Science Technical Advisory Team (STAT), one of several technical advisory teams, defined the technical aspects of the HCP. In addition, a Project Management Team was created to serve as a mediator between the Steering Committee and the technical advisory teams.

In the case of the Etowah HCP, the Steering Committee was made up of representatives appointed by each of the local governments within the watershed, with several non-voting members representing water and sewer authorities, non-governmental organizations (NGOs), and state and federal agencies. An Advisory Committee was formed to assist the Steering Committee and Technical Committees with scientific and legal research, public education and outreach, and organization of meetings. Technical Committees were appointed by the Steering Committee.

Complex HCPs can cover a wide range of sizes. For instance, the Indian River County Emergency Armoring HCP only covered take over a narrow 20 mile linear stretch of beach in Indian River County, Florida. The Etowah HCP, which is broader in scope, covers several counties and the Etowah River watershed. The Pima County HCP covers the county, but not all the municipal jurisdictions within its boundaries. The West Mojave Desert HCP has the largest plan area in the country. It encompasses 9.3 million acres of both federal and private land in California.

The numbers of listed species covered by HCPs are variable. The Etowah HCP covers only three federally listed species. Similarly, the Indian River County HCP provides coverage to the five federally listed species of sea turtles that nest in the county and are impacted by shoreline protection activities. The Pima County, West Mojave, and the East Contra-Costa HCPs include many federally listed, state-listed, and other unlisted species in their plan.

The HCP must include an evaluation of alternatives. HCPs differ in the number and the scope of alternatives that are considered for investigation. Since the West Mojave HCP involved both federal land (administered by the Bureau of Land Management), as well as private and state lands, seven alternatives were evaluated within the context of this HCP. The Pima County HCP evaluated only four alternatives, which explored the inclusion or exclusion of jurisdictions within Pima County's boundaries. The Indian River County HCP included four alternatives; however, the scope was very restricted because two of the alternatives were considered by the applicant not to be economically feasible.

Mitigation and minimization measures vary depending on the size and scale of the HCP. The USFWS HCP handbook does not mandate the recovery of a species nor does it mandate net

benefit to a species. However, implicit in the understanding of this process is that the minimization and mitigation measures should contribute to the overall recovery of the species and should benefit the species' likelihood of survival. The Pima County HCP provides the most far-reaching protections to species and their habitats, because the county's Comprehensive Land Use Plan was developed with the HCP in mind. The Etowah HCP uses current regulations and ordinances already in place in most of the counties and local jurisdictions. It streamlines them for better understanding and uniformity of compliance. The Etowah HCP includes detailed plans for these policies in its appendices. Similarly, many of the mitigation measures for the West Mojave HCP originated as previously created Best Management Practices (BMP) that were a part of the already existing California Desert Conservation HCP.

Overall, large-scale HCPs provide a mechanism to reduce conflicts between listed species conservation and economically important activities such as development. In addition, large HCPs can enhance local agency ability to control of local development and land use patterns. They provide an alternative mechanism for projects to receive permits and comply with currently applicable state and federal regulations.

This report is one in a series of summary documents developed by URS Corporation for the, Florida Fish and Wildlife Conservation Commission (FWC) and the Florida Department of Environmental Protection (FDEP). The purpose of these documents is to enable project committee members, agency personnel, potential stakeholders, members of academia, and other interested participants to have a common understanding of the issues and the regulatory framework relating to the development of a large-scale, multi-species HCP.

The Endangered Species Act (ESA) was passed in 1973 in order to protect plant and animal species that are at risk of becoming extinct. The ESA prohibits any harassment or harm to a listed species. The best-known consequence of the ESA is the establishment of broad prohibitions against any take of endangered and threatened species. *Take* is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or the attempt to engage in any such conduct, and includes any significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. However, Congress recognized that during the course of otherwise lawful activities, a limited amount of take of a listed species could be allowed. It therefore amended the ESA in 1982 to authorize take of these listed species, through the issuance of an Incidental Take Permit (ITP), provided certain conditions were met. Under Section 10 (a)(1)(B)of the ESA, preparation of an HCP is required as a component of an ITP.

The Habitat Conservation Planning and Incidental Take Permit Processing Handbook developed by the services, hereafter referred to as the HCP Handbook, states that there are four mandatory elements in every HCP (USFWS and NMFS 1996). These are: (1) the impacts likely to result from the proposed taking; (2) measures the applicant will undertake to monitor, minimize, and mitigate these impacts; (3) alternative actions that were considered; and (4) additional measures that the USFWS may consider necessary for the HCP. The UFWS criteria for issuance of an HCP include the following; 1) the take is incidental to an otherwise lawful activity, 2) the applicant will minimize, mitigate and monitor the impacts of any incidental take to the *maximum extent practicable,* 3) adequate funding for implementation has been provided and procedures for unforeseen circumstances have been developed, and 4) applicant must ensure that the take will not significantly reduce the likelihood of the survival and recovery of the species in the wild.

In addition, the Services amended the HCP Handbook to provide additional guidance on HCP development in an addendum referred to as the Five Points. In general the five points are used to 1) establish biological goals for HCPs, 2) to clarify and expand the use of adaptive management, 3) to clarify the use of monitoring, 4) to provide criteria to be considered by the Services in determining ITP duration and 5) to expand the use of public participation.

Most HCPs include chapters that describe the scope and other aspects of the plan. Following the guidelines in the HCP Handbook, this report provides an overview of the contents of typical complex HCPs.

HCPs range in size, scope, complexity, and duration. The simplest HCPs affect a single species in a restricted area and are for one-time impacts that are well understood, can be mitigated, and are not expected to recur. In these cases the HCP is more of a mitigation plan than a long-term management plan. More complex HCPs are for projects that are physically larger, may affect more than one listed species, and may have continuing impacts on those species. For these projects, well-identified impacts and clear measures to address those impacts are required. The

applicant often includes in the HCP measurable biological goals and objectives for the project. At the highest end of this scale are programmatic HCPs that provide broad protection over many species and large areas. These HCPs are intended to permit whole categories of existing and future actions. They also promise to provide benefits to listed and non-listed species on an ecosystem scale, a task that is impossible to accomplish on private lands through any other ESA mechanism.

To better understand the process of developing an HCP, and to provide a template to guide the development of the Florida Beaches HCP, six HCPs were included in this study. They varied in size and scope, and are:

- *East Contra Costa County Habitat Conservation Plan, California* - allows the county, to manage and mitigate the take of listed species occurring within its borders. Additionally, it allows the county as a whole and the cities within its boundaries to engage in urban expansion and development. The plan was developed to accommodate the region's growing economic development while simultaneously increasing the habitat protection of the region's threatened and endangered species. The plan incorporates the strategy of multiple uses within protected areas. It shares the cost and burdens of the HCP among all involved parties.
- *Pima County Habitat Conservation Plan, Arizona* - developed as part of the Sonoran Desert Conservation Plan and the Pima County Comprehensive Land-Use Plan. It provides the county with an ITP for covered species for permitted activities and encompasses nearly 6 million acres, including the Tucson metropolitan area.
- *Indian River County Emergency Armoring Habitat Conservation Plan, Florida* - developed to address take to sea turtles associated with the issuance of emergency shoreline protection permits by Indian River County along the beaches of Indian River County.
- *Etowah Habitat Conservation Plan, Georgia* - developed to address the threats to aquatic communities and stream and water quality as a result of rapid development and population growth in the Etowah River Basin. The main objective of this plan was to promote development that was environmentally sustainable.
- *West Mojave Desert Habitat Conservation Plan, California* - the largest HCP in geographic area developed so far, which covers over 9.3 million acres of land. The HCP focuses on an adaptive management approach to protect the desert tortoise and the Mojave ground squirrel. It streamlines the ITP process for both public agencies and private entities. It is consistent with requirements for both federal and state endangered species acts.
- *NiSource Habitat Conservation Plan*, Southeastern US is in its planning phase and is being developed to address take that occurs as a result of routine maintenance activities around a multi-state oil and gas pipeline.
- For the purposes of this study, we focused primarily on the larger “Landscape Approach” HCPs. The East Contra Costa County and Pima County HCPs provide detailed and organized accounts of the processes involved with the collection, compilation, evaluation and presentation of biological data. The Etowah HCP was chosen because it has been described as a well-planned and streamlined plan that was developed with very few

conflicts along the way. The West Mojave and NiSource HCPs involve large areas and several counties and jurisdictions and therefore were considered very important to the development of the Florida Beaches HCP.

The Indian River County Emergency Armoring HCP is a smaller, county-wide, zone-specific HCP, and was considered very relevant to the development of the Florida Beaches HCP because it addresses the incidental take of endangered sea turtles along the beaches of a Florida county.

Many of the HCPs which were reviewed have not yet resulted in an ITP and are going through the National Environmental Policy Act (NEPA) process, while others are in draft form. The NiSource HCP is in its planning phase, and no document is currently available for review. However, details concerning the NiSource HCP have been included based on conversations with the NiSource and USFWS staff involved with that project.

The order in which the HCPs are discussed in each section of this document is based on their relevance to the development of the Florida Beaches HCP. That order is: 1) East Contra Costa HCP, 2) Pima County HCP, 3) Indian River County Emergency Armoring HCP, 4) Etowah HCP, 5) West Mojave HCP, and 6) NiSource HCP.

The Endangered Species Act (ESA) was amended in 1982 to allow the "incidental" take of a listed species by any person provided that they first develop an HCP that minimizes and mitigates the effects of the person's activities on the species in question. The ESA defines the term "person" to mean *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.* Additionally non-federal entities that issue permits in areas where listed species are known to occur and unauthorized take occurs, then the permitting entity could be held equally liable under section 9.

The HCP Handbook and the 2000 Five Points Addendum are the guiding document for the development of HCPs. As stated in the preface of the HCP Handbook, "One of the great strengths of the HCP process is its flexibility. Conservation plans vary enormously in size and scope and in the activities they address--from half-acre lots to millions of acres, from forestry and agricultural activities to beach development, and from a single species to dozens of species. Another key is creativity. The ESA and its implementing regulations establish basic biological standards for HCPs but otherwise allow the creative potential of HCP participants to flourish. As a result, the HCP program has begun to produce some remarkably innovative natural resource use and conservation programs." http://www.fws.gov/endangered/pdfs/HCP/HCPBKTOC.PDF).

Numerous unique circumstances contributed to the development approach adopted for each of the HCPs in this study. Often the contents of the HCPs are dependant on the level of state protection afforded to declining species. Many states have an endangered species act. Most often the states maintain their own lists of threatened and endangered species and have enacted restrictions against take which are similar to those found in the ESA. Enforcement of the state's act varies from state to state. Florida has an endangered species act and issues ITPs for the incidental take of many state-listed species. Compliance and enforcement have been a problem primarily due to a lack of funds, manpower, and infrastructure.

California, on the other hand, has the most comprehensive and strongly enforced state endangered species act in the country, the California Endangered Species Act (CESA). Modeled after the Federal Endangered Species Act the CESA provides a mechanism for listing and prohibits taking of or trafficking in listed species. Prohibitions of take apply not only to threatened and endangered species but to candidate species as well. In addition, the CESA covers both plants and animals. It requires recovery plans and agency consultation on the impact of proposed state agency projects on endangered species. The state amended the CESA in 1997 specifically to add a procedure for ITPs, retroactively validating take permits previously authorized by the state without statutory authority. Although the permits are only authorized if an HCP is in place, these plans have been highly controversial and the subject of litigation. Currently it is common practice that, for most HCPs in California, both federal and state-listed species are included.

Arizona, where most of the United States Sonoran Desert is located, is one of only a handful of states without an endangered species act for animals. Instead, the state relies on procedures developed by the Arizona Game and Fish Commission for the reestablishment of "threatened native wildlife." The procedures, which were the result of an Arizona Game and Fish

Commission policy approved in 1987, do not include recovery plans or critical habitat designations. Arizona has a law for endangered plant species, but it similarly fails to designate critical habitat or require preparation of recovery plans.

Some HCPs rely heavily on maps to prioritize habitat acquisitions and guide mitigation assessments. Other HCPs are process-driven and rely on habitat and species goals to be met through land acquisition and management rather than the acquisition of specific areas on a map. Often, when addressing the issue of species lists, the HCP Handbook encourages the inclusion of unlisted species. It lists the main reasons for including them as: (1) to provide planning certainty to the permitee and (2) to boost the biological value of HCPs through comprehensive multi-species or ecosystem planning.

Mitigation measures vary depending on whether the project is a small-scale, low-effect project or a large-scale project. The handbook advises the applicant on their options relating to mitigation. Habitat mitigation requires the acquisition or replacement of habitat lost to development and other activities. The types of habitat mitigation, as well as its proximity to the area of impact, are to be considered. The types of habitat mitigation that could be considered are: acquisition, protection of existing habitat, enhancement or restoration or disturbed habitats, prescriptive management of habitats, and creation of new habitats.

Compliance and effectiveness monitoring are critical components in the implementation of an HCP. The data acquired through these programs provide important feedback regarding the effectiveness of the minimization and mitigation processes of the plan. Adaptive management plans involve the acquisition and application of this monitoring data to natural resource management over time. Adaptive management programs reduce the uncertainty associated with HCP development. The main reason for creating an adaptive management plan is to incorporate changes to the mitigation programs so as to ensure that the goals of the HCP are met. The USFWS requires that the applicants mitigate to the maximum extent practicable.

The scope of an HCP identifies its purpose. It outlines the need for the HCP and thus provides a framework for defining the goals of the plan. The scope also helps determine the participants in the plan and the size of the area to be considered. The minimization and mitigation measures must be commensurate with the size and scale of the HCP; therefore, clear and definitive objectives should be identified in the scope.

The *East Contra Costa HCP* and *Natural Community Conservation Plan* was developed to provide a framework to protect the natural resources in Eastern Contra Costa County while simultaneously improving and streamlining the permitting process for impacts on endangered species. Contra Costa County is home to numerous rare plants and animals. Its proximity to the City of San Francisco, mild climate, and rural landscape has provided the impetus for rapid population growth and development in the area. In 1998, development had been occurring at a much higher rate in the eastern portion of the county; and the USFWS and the California Department of Fish and Game (CDFG) urged local government agencies to develop a regional HCP for eastern Contra Costa County. The HCP would replace the then current time-consuming, case-by-case approach used by federal and state agencies to review project impacts and determine the appropriate mitigation for covered biological resources.

The purpose of this HCP was to streamline permitting for infrastructure as well as to guide commercial, residential, and industrial development and urban infrastructure. The HCP allows Contra Costa County; the Contra Costa County Flood Control and Water Conservation District; the East Bay Regional Park District (EBRPD); and the Cities of Brentwood, Clayton, Oakley, and Pittsburg (collectively, called the Permittees) to control endangered species permitting for activities and projects. The HCP provides for comprehensive species, wetlands, and ecosystem conservation and will contribute to the recovery of endangered species in northern California. An implementing entity made up of representatives from each of the participating jurisdictions and county agencies will be established to implement this HCP.

The HCP is intended to serve as the basis for subsequent applications for regional wetlands permits as well. The permittees coordinated with the U.S. Army Corps of Engineers (USACE), the State Water Resources Control Board (SWRCB), the San Francisco Bay Regional Water Quality Control Board and Central Valley Regional Water Quality Control Board (RWQCB), the U.S. Environmental Protection Agency (EPA), and the California Department of Fish and Game (CDFG) to develop and operate regional permit programs for jurisdictional wetlands and waters under Sections 404 and 401 of the Clean Water Act (CWA), the Porter-Cologne Water Quality Control Act, and Section 1602 of the California Fish and Game Code relating to Streambed Alteration Agreements.

The *Pima County HCP* is significant in that it forms the biological element of the already existing Sonoran Desert Conservation Plan (SDCP), which was developed as part of the application for a Section 10 permit under the ESA. The HCP was developed as part of the SDCP and the Pima County Comprehensive Land Use Plan (CLUP). In 1997, more than 40 conservation and neighborhood groups formed the Coalition for Sonoran Desert Protection to support the creation of a science-based regional plan to conserve the Sonoran Desert and its native pygmy owl. For decades prior to 1997, Pima County, which includes Tucson, had no comprehensive planning for its rapid population growth. Conservationists in Arizona wished to use federal law to require the county to improve its overall planning methods. In 1998, the Coalition for Sonoran Desert Protection submitted a proposed plan for the protection of the Sonoran Desert to Pima County's Board of Supervisors. Later that year, the Pima County Board

of Supervisors embraced the ideas in this plan and submitted an application to the USFWS for a section 10 (a)(1)(B) permit under the ESA. This permit would allow the county to gain relief from liability under the ESA, in exchange for creating a plan whereby endangered species in the region would be protected. Currently, Pima County alone is the jurisdiction requesting a permit from the USFWS. To assist and guide the HCP development process, several working committees were created. The Steering Committee was composed of members from the local community with varying interests while the STAT team played a major role in defining the technical portions of the HCP. A Project Management Team was created to serve as a mediator among the many working committees.

The *Indian River County Emergency Armoring HCP* was developed to address take to 5 federally listed species of sea turtles associated with the issuance of temporary emergency armoring permits along the beaches of Indian River County, Florida. More than 50 percent of Indian River County's 22-mile shoreline is experiencing erosion. Approximately 41percent of its beaches have been classified as critically eroded. A consequence of this erosion is that habitable structures adjacent to the beach have become very vulnerable to damage from storms.

In 1998, two private shoreline protection structures were installed under state and county Emergency Shoreline Protection Procedures. The issuance of the emergency permits led to legal challenges by the Caribbean Conservation Corporation (CCC) against the county and FDEP alleging that the structures authorized by Indian River County were inconsistent with state regulations and caused unauthorized take of sea turtles. The CCC also alleged that the structures were not constructed within 60 days of the erosion event, nor were they intended to be temporary. Both of these conditions are requirements under the state's Emergency Shoreline Protection Program.

In lieu of pursing legal action, the CCC entered into an Interim Agreement with the County, FDEP, and property owners in March 1999. Per the terms of this agreement, the county agreed to prepare an HCP and apply for an ITP to minimize and mitigate the impacts to sea turtles resulting from activities related to emergency shoreline protection activities. This Interim Agreement also constrained all parties from further legal action while the county prepared an HCP. This ITP authorizes Indian River County to permit the incidental take of habitat important to five federally listed sea turtle species during shoreline protection activities. The term of the permit is 30 years, which corresponds to the time frame for the implementation of the county's Beach Preservation Plan.

The *Etowah HCP* was developed to enhance stream conservation and to ensure the protection of imperiled fish without compromising urban growth and development in a seven-county and sixteen-city area in northern Georgia. In 2002, the counties and cities within the Etowah basin decided to create a conservation plan to ensure that the protection of endangered fish native to the Etowah basin did not compromise the ability of the region to grow and develop. Developers in the region, together with county officials, decided to do away with the individual, expensive and time-consuming ESA permit application process and pursue an alternative, more streamlined process. A Steering Committee made up of representatives appointed by each of the participating local governments within the watershed was formed, and included members from NGOs, as well as state and federal agencies. The Steering Committee then appointed an Advisory Committee to assist the newly created Technical Committees. The HCP was created to address threats to aquatic communities and stream quality. Six policies that most affected streams and stream banks, and were essential to protecting the imperiled fish, were considered for this HCP. Almost

all of the policies considered were based on existing local and state policies. The participating local governments will receive Incidental Take Permits which allow them to continue development in their areas as long as they follow the guidelines set forth in the HCP. So far only four counties and nine cities are participants in this plan. Other counties within the plan area have the option of signing on should they decide to do so at a later date. The proposed term of the permit is 25 years.

The *West Mojave HCP* was jointly prepared by agencies in California having administrative responsibility or regulatory authority over species of concern within the planning area. The 9,359,070-acre planning area is located to the north of the Los Angeles metropolitan area. This HCP is an amendment to a federal land-use plan that creates a comprehensive strategy to conserve and protect the desert tortoise, the Mojave ground squirrel, and nearly 100 other sensitive plants, animals and natural communities that are a part of the plan area. It also streamlines the process for complying with the requirements of both the CESA and the ESA. The HCP's collaborators include local jurisdictions (10 cities, 2 towns, 4 counties, and the Indian Wells Water District), the State of California (California Department of Fish and Game and California Department of Transportation) and two federal entities (the Bureau of Land Management [BLM] and the USFWS).

Fort Irwin is located in the West Mojave plan area. In the mid 1990s, the National Training Center at Fort Irwin sought to include additional public lands within its boundaries to expand and meet future needs. In 1996, the BLM issued the "Army's Land Acquisition Project for National Training Center" Draft Environmental Impact Statement (DEIS). In 2001, the Fort Irwin Military Land Withdrawal Act was enacted, allowing for the withdrawal of 110,000 acres of land from the BLM administered lands so that they could be reassigned to the Army base. However, because the West Mojave HCP planning phase was already started, the Army was precluded from using this land until it completed the National Environmental Policy Act (NEPA) required Section 7 consultation and the preparation of an EIS. Consideration of the Fort Irwin withdrawal is required to be coordinated with the review of the West Mojave HCP. This allowed the information presented in both documents to be evaluated together with regards to the potential and cumulative impacts that might occur.

The *NiSource HCP*, which is currently under development, covers maintenance activities around a 1-mile wide corridor of an already existing oil and gas pipeline network that runs through 17 states. Almost 90 percent of the work done by NiSource on a routine basis involves pipeline maintenance activities. These activities are sometimes in or near endangered or threatened species habitat, and thus could result in the taking of a listed species. The company has nearly 400 consultations each year with the USFWS to obtain individual ITPs for these activities. NiSource is currently developing an HCP in conjunction with its application for a more comprehensive ITP. The permit would cover all pipeline maintenance work within a 1-mile-wide corridor (a half mile on either side of the centerline of the pipe) that might result in take of a listed species. The impetus for this HCP was primarily to reduce time spent on the individual consultations, as well as the need to reduce the administrative burden of compliance with the ESA. NiSource wished to redirect funds currently spent on administrative compliance to tangible conservation and mitigation measures.

To effectively identify the likely impacts of a project on listed species, the HCP Handbook identifies the following sub-tasks: (1) delineation of the plan area; (2) collection of biological data; (3) description of the proposed activities; and (4) quantification of levels of take. Additionally the requirements of the Five Points Addendum must be addressed. This section addresses these sub-tasks as described in the HCPs we reviewed.

4.1 AREA

The first subtask that needs to be completed to suitably determine the effects of a project on federally listed species is the delineation of the HCP boundary or the plan area. To outline the scope of a project appropriately, the area that is to be covered needs to be identified. The USFWS encourages the applicants to consider as large and comprehensive an area provided that area is consistent with their land use, as feasible. This allows for comprehensive conservation of natural resources and endangered species.

The plan area for the *East Contra Costa HCP* encompasses about 175,000 acres, which is about one-third of the entire county, including a preserve system encompassing between 23,800 and 30,300 acres. Agencies administering this plan area include the City of Brentwood, City of Clayton, City of Oakley, City of Pittsburg, and Contra Costa County. Entities with a stake in the project also include the Contra Costa County Flood Control and Water Conservation District, the EBRPD, and the Implementing Entity that will be established to implement the plan.

As mentioned previously, the *Pima County HCP,* is an amendment to the Sonoran Desert Conservation Plan and is part of Pima County's CLUP. The planning area includes about 5,877,760 acres of Pima County. Two Native American reservations account for 42 percent of Pima County's land ownership. The state owns 15 percent of the County, and the U.S. Forest Service and BLM own 12 percent. National Parks and other public land account for about 17 percent of the County, whereas individual and corporate ownership account for 14 percent. Jurisdictions within Pima County include the Cities of Tucson and South Tucson and the towns of Oro Valley, Marana and Sahuarita. All of these cities and towns (including public and private lands) were included in the plan area regardless of their jurisdiction. Species and habitat data was collected for all of these areas in order to compile the most complete set of biological data that could be assembled and analyzed to develop the HCP. The permit area, however, covers an estimated 607,000 acres of unincorporated and county-owned lands and includes only lands under the Pima County Board of Supervisors legal authority. State of Arizona lands and lands incorporated under separate jurisdictions are not included under this permit.

The *Indian River Emergency Armoring HCP* includes about 22 miles of eroding coastline within the FDEP's Coastal Construction Control Line (CCCL) jurisdiction. The CCCL jurisdiction extends seaward from an inland limit defined as the portion of the beach-dune system subject to severe fluctuations associated with a 100-year frequency storm event. The plan area is bordered on the north by the Sebastian Inlet, and on the south the area is defined by the Indian River and St. Lucie County Line. The east and west boundaries of the plan area are the mean low water (MLW) line of the Atlantic Ocean and Highway A1A, respectively.

The *Etowah HCP* covers an area of 580,000 acres which includes 7 counties and 16 cities within its jurisdiction. The HCP includes local governments as permittees who have the authority to manage the pattern of land development in their areas and allows them to issue "Certificates of Inclusion" to developers who need to obtain government permits for activities that may impact

aquatic habitat. Various jurisdictions' implementation of policies to minimize the impacts of development on imperiled species will promote intelligent growth with conservation in mind. However, so far only four counties and nine cities are participants in this plan. Other counties within the plan area have the option of signing on should they decide to do so at a later date.

The *West Mojave HCP* was developed for the largest planning area in the United States. The West Mojave planning area is one of three major planning areas within the 12-million-acre California Desert Conservation Area (CDCA). The CDCA Plan (BLM 1980) is based on land-use management by geographic zones. The plan area for the West Mojave HCP includes 11 cities and 4 counties. It covers 9.3 million acres of land in the Mojave Desert of southwestern California. Of those 9.3 million acres, 3.4 million acres are public lands (BLM), 3 million are in private hands, 102,000 acres are administered by the state, and the remainder is administered by the Department of Defense. The HCP sets aside specific zones around fast-growing cities and towns where development will be allowed. Approximately 1.5 million acres have been set aside as a "desert wildlife management area" to protect the tortoise and other sensitive species.

The *NiSource HCP* will cover a 1-mile-wide corridor along a 15,500 mile network of interstate natural gas pipelines across 17 states: Louisiana, Mississippi, Tennessee, Kentucky, Virginia, West Virginia, North Carolina, Indiana, Ohio, Pennsylvania, New York, New Jersey, Delaware, New Hampshire, Maine, Maryland, and Massachusetts.

4.2 BIOLOGICAL DATA

The collection and synthesis of biological data is a necessary component of all HCPs. It requires the use of the most current scientific and commercially available data. Some HCPs are based on lists of specific protected species, and others are habitat based. Habitat-based HCPs assume the presence of a particular species because of the presence of its habitat type. The first stage in the process is the collection and review of existing information about the species, its distribution, and its ecology.

4.2.1 Species Lists

The need for an HCP is often triggered by the listing of one or more species. The decision as to which species should be included in the HCP is an important one. The HCP Handbook suggests that permit applicants should include all of the federally listed species that have a reasonable chance of being incidentally taken during the life of the permit. Proposed and candidate species (i.e. those that are likely to be federally listed in the foreseeable future) should be addressed as well. By including state-listed species the permitee is often able to streamline compliance with state endangered species acts as well. In many cases, these additional species utilize the same habitat as the federally listed species and can therefore be included in the HCP without additional mitigation requirements.

The *East Contra Costa HCP* provides take authorization for 28 listed and non-listed species. Some of these species are listed under more than one category. Of the 28 species, 9 are federally listed, 12 are state listed, 10 are listed in the California Natural Diversity Database (CNDDB), and 2 are unlisted. The HCP includes conservation measures for all 28 species whether or not they are currently listed. This action negates the need for additional conservation measures being adopted should any of the non-listed species become listed during the period of the ITP. The

terms of the permit allows the incidental take of species listed under both the ESA and the state NCCA (Natural Community Conservation Act). Special-status species are defined as plants and animals that are legally protected under the FESA, CESA, or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing. These species are typically the focus of avoidance, minimization, and mitigation requirements under the California Environmental Quality Act (CEQA). Detailed information was collected for each special-status species that had a likelihood of occurring within the plan area.

Pima County's Science Technical Advisory Team (STAT) reviewed an initial list of about 100 species that were recognized by the federal government as either being imperiled or having been extirpated from the county, as well as those species that were in decline or in jeopardy within the plan area. This list was analyzed based on a variety of criteria. This analysis resulted in a shortlist of 56 species, now designated as Priority Vulnerable Species. This list includes 9 mammal species, 8 bird species, 8 reptile species, 2 amphibian species, 6 fish species, 16 invertebrate species, and 7 plant species.

The *Indian River County Emergency Armoring HCP* formally provides coverage for the incidental take of five federally listed species of sea turtles that can be impacted by emergency shoreline protection activities. Several other species occupying this habitat benefit from some of the minimization and mitigation measures that have been incorporated into the HCP. These species include beach mice and several species of shorebirds and reptiles.

The *Etowah River Basin* is home to five endangered fish species, three threatened species, and five candidate fish species. Only three federally listed species are covered by the ITP associated with the Etowah HCP: amber darter, Etowah darter, and Cherokee darter. Additionally, six imperiled fish species (Coosa Chub, Coosa madtom, two species of holiday darter, freckled darter, and the bridled darter) are not formally covered but will benefit from this HCP through the avoidance, minimization, and mitigation measures developed for the covered species. This HCP can serve as a foundation for the development of an HCP covering the additional species should they become listed in the future.

The *West Mojave HCP* was initiated over concerns for two main species: the desert tortoise and the Mojave ground squirrel. In addition, it provides protection to almost 100 other sensitive plant and animal species within the plan area. As with the creation of the Pima County HCP species list, an initial list of threatened, endangered, vulnerable, and declining species was compiled by the state's wildlife agency using a set of established criteria. This list of 98 species included species for which incidental take permits would be sought, as well as those for which a public land conservation strategy would be adopted and implemented by the BLM. The United States Geological Survey (USGS) prepared detailed species accounts for each species on the list. A document titled *Current Management Situation of Special-Status Species* (BLM 1999) was published, detailing existing conservation measures for all 98 species. Using this information, a shortlist of species was compiled for inclusion in the plan. The HCP lists 49 species for ITP coverage.

The *NiSource HCP* covers approximately 75 species including mammals, birds, reptiles, amphibians, fish, mollusks, crustaceans, insects, and plants. All these species are on federal and/or state threatened, endangered, or candidate species lists.

4.2.2 Habitat

Some HCPs specifically provide for conservation of threatened habitats. Sometimes these habitats are the basis for developing conservation measures for the covered species in the plan. In the *East Contra Costa HCP,* land cover types were used as the basic unit for creating habitat models. The conservation strategy contained detailed guidelines and recommendations for management, enhancement, and restoration techniques for the following land cover types: grassland, including native grassland; oak woodland and oak savanna; wetlands and ponds; streams and riparian woodland; and chaparral and scrub. To achieve no net loss of jurisdictional wetlands and waters, and to contribute to the recovery of certain covered species, the HCP required not only preservation but also the restoration of these land cover types.

In *Pima County,* the creation of the Conservation Land System (CLS) was the primary conservation strategy for this HCP. Since a landscape approach to conservation was the basis of the Pima County HCP, the relationship of the conserved lands within the CLS to surrounding areas in terms of connectivity and adjacency was evaluated. The CLS lands were categorized as: important riparian areas, biological core management areas, scientific research areas, multiple-use management areas, special-species management areas, agriculture in-holdings within the CLS, and other riparian areas regulated by Pima County. In addition, six Critical Landscape Connections were also identified. The majority of the Priority Vulnerable Species (PVS) in Pima County are associated with aquatic and riparian-based ecosystems. Therefore, conserving this type of habitat was a priority. Pima County also focused its attention on three low-elevation communities that together comprise most of the permit area: Sonoran Desert upland, semi-desert grasslands, and riparian woodland and forest. Other important resources, known as Special Elements, which are more spatially restricted within the plan area, have received attention throughout the SDCP planning process because of their importance for the PVS. These Special Elements include: talus slopes, limestone outcrops, caves and adits, and bridges for bats.

4.3 ACTIVITIES

With respect to larger regional scale HCPs, the USFWS promotes the inclusion of a broad range of activities under what they call the “umbrella” of the permit. This allows for the inclusion of a wider range of mitigation activities, which in turn results in the conservation of many more species and habitats. Overall, large landscape-scale HCPs provide more effective conservation of species, habitat, natural communities, and ecosystem processes.

Covered activities in the *East Contra Costa HCP* fall into three distinct categories: (1) All activities and projects associated with urban growth within the Urban Development Area (UDA), (2) activities and projects that occur inside the HCP preserves, and (3) specific projects and activities outside the UDA. Impacts were categorized as direct, indirect, and cumulative. All activities or projects seeking coverage under the HCP were subject to approval by their local jurisdiction. Activities or projects that did not fall clearly within the descriptions provided were evaluated on a case-by-case basis.

Covered activities within the UDA included all ground or habitat-disturbing projects and activities that might occur within the UDA. This category was intended to be as inclusive as possible to accommodate urban growth; it included the construction and maintenance of typical urban facilities, public and private, consistent with local general plans and local, state, and federal laws. The permit area that covers urban development expands and contracts as a result of

local land use decisions made independently of the HCP. The UDA corresponds to the County Urban Limit Line (ULL) or the city limits of participating cities, whichever is largest. There are exceptions for certain special habitat areas, and these areas cannot exceed the maximum land cover or total impact projections set forth in the HCP. Covered activities outside the UDA include those projects that provide infrastructure that support urban development within the UDA. Only projects that were reasonably well defined at the time of HCP approval were included in the plan. The plan allows activities encompassing up to 933 acres for rural infrastructure. These projects are divided into three categories: transportation, flood protection, and utility. The operation and maintenance of these capital projects and of existing facilities are covered in the plan with certain specified regulations.

A majority of the activities within the HCP Preserve System provide a net benefit for all covered species. However, certain activities expected to occur within the HCP Preserve System could adversely affect some covered species. These activities include: management activities, recreation, habitat enhancement, species monitoring and research, and emergency activities. The effects of these activities, though limited in severity, could result in take and required coverage under the plan, but didn't require mitigation fees.

Some activities outside the UDA were not included in the plan because they would require individual consultation with the CDFG and the USFWS. Agricultural activities on existing irrigated agricultural land and rangeland were not included, nor were new irrigated agricultural operations, major roads and flood control projects, rural and urban residential development, and landfill operations.

To evaluate the direct effects on jurisdictional wetlands and waters, two main methods were used: Geographic Information System (GIS) analyses and field surveys. Impacts were assumed whenever the development land-use designation or the location of covered rural infrastructure projects overlapped with this land feature. The term "Impact Mechanism" refers to those impacts that affect biological resources. The main impacts considered are those associated with urban development within the UDA. These include the effects of population growth, spread of disease, competition and predation from non-native species, trash dumping, hazardous spills, water quality degradations from run-off, and increased wildfire ignitions. For example, feral cats are a threat to native birds; and ornamental plants compete with native species and could spread to adjacent areas. Urban development at the edge of the UDA presented potential impacts because of its proximity to natural areas. Urban run-off of pesticides, grease, and oil into stream habitats, and increases in impervious surfaces that in turn increase run-off pose potential threats to streams and aquatic habitats and to amphibian species. Infrastructure projects present ground-disturbing impacts to all areas included in this HCP. Road construction creates barriers to wildlife species. They create dispersal corridors for non-native plants, increase noise and physical disturbance, and generate litter and debris. Road expansion projects increase sedimentation in streams, impair wildlife movement, and increase habitat fragmentation.

The *Pima County* Board of Supervisors adopted a landscape approach in the creation of their HCP. They were committed to using scientifically based planning in the design process. Therefore, conservationists supported the county's creation of a multi-species conservation plan, and were closely involved with the process from the beginning. Activities that were covered include those activities within the permit area that are likely to result in the incidental take of a listed species, those that have a reasonable chance of occurring during the life of the permit, and those over which the county has some level of control. These activities include land-use related

permits such as those for development, roadway construction, extension of wastewater treatment facilities, installation of utilities, implementation of capital improvement projects, and maintenance and operation of county facilities. The county also included activities related to construction and maintenance of infrastructure located outside of the permit area but funded by the county, such as roadway improvements and sewer and flood control infrastructure. Also included were developer-constructed sewers in unincorporated areas of Pima County pursuant to the county's wastewater authority.

The *Indian River County Emergency Armoring HCP* in Florida covers activities related to emergency shoreline protection seaward of the CCCL. Probably the greatest direct threat to sea turtle nesting habitat in Florida is the construction of coastal armoring, including sand bags and sloped textile sand-filled containers (geotextiles), revetments, rock walls, and vertical metal and wood walls. Indian River County applied for an ITP to receive coverage for the take of sea turtles associated with shoreline protection activities during emergencies. Florida state law requires that local governments and municipalities who anticipate the take of a listed species during coastal emergency activities obtain prior authorization from the USFWS through an ITP. Construction-related impacts during emergency shoreline protection activities include: (1) movement-induced mortality and impacts resulting from the relocation of turtle eggs during emergency-related construction; (2) direct impacts to nests due to construction of temporary structures; (3) indirect impacts to sea turtle nests, adults, and hatchlings due to physical changes on the beach (changes in beach profiles, elevation changes, increased incidence of wave overwash, reflection and scour, compaction, and sediment moisture content); (4) construction-related impacts due to removal of temporary shoreline protection structures; (5) construction-related impacts during installation of permanent structures; and (6) direct impacts to sea turtles due to physical interactions with permanent shoreline protection structures. In addition, the county requested the retention of two "temporary" structures previously installed (the two structures that initiated the lawsuit against the county – see Section 3).

The *Etowah HCP* covers development activities performed by local governments, as well as those that are regulated by the local governments who are participants in this plan. These activities include most actions carried out by private and independent authorities, as well as state agencies within the plan area. It also includes water supply planning by participating jurisdictions. Certain land development activities were not included in the plan: construction of sewer lines, stormwater run-off from road construction activities by local jurisdictions, certain utility stream crossings, road construction by the Georgia Department of Transportation and federal highways, as well as other activities that were exempted from local government oversight by state and federal law. Agricultural and forestry-related activities were also not included in this HCP. Currently, the USFWS is preparing a programmatic biological opinion to address sewer line installation related to residential and commercial development in the Etowah basin.

In the *West Mojave HCP*, the proposed action (a federal component that will amend the existing 1980 California Desert Conservation Area Plan (BLM 1980), and an HCP that will cover development on private lands), affects two of the primary desert species: the desert tortoise and the Mojave ground squirrel. This subsequently affects two of the most dominant desert plant communities: creosote bush scrub and saltbush scrub. Impacts from recreation and route designation (motorized vehicle access network) would be cumulative in nature. In some of the more mountainous areas, increased routes would create habitat fragmentation. Riding through the fragile and important desert land-cover types would impact these communities. In addition,

soil compaction, infiltration, and erosion are major concerns in the desert, especially from recreational motor vehicle use. By allowing for the multiple use of BLM land, increased use by agriculture will result in increases in biosolids fields, and an increase in use of fossil fuels. Urban growth and development such as private land development and road building often result in decreases in air quality due to an increase in emissions. Sedimentation, especially during storm events, is often a result of non-point source run-off, which is a detriment to fragile ecosystems.

The *NiSource HCP* is still in its planning phase, and the draft is not available for public review. However, some of the concerns and potential sources of impacts to listed species within the plan area include activities conducted as part of routine maintenance activities, which could affect coastal projects and wetlands in states like Louisiana. Potential for loss of hardwood stands and the loss of species that occupy these areas is another consequence of some NiSource activities. Stream riparian disruption and increased sedimentation from driving activities and pesticide run-off are also impacts to be considered.

4.4 DETERMINING AND QUANTIFYING TAKE

Take, according to the ESA, is defined as "To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or the attempt to engage in any such conduct. The term harm has been further defined in the ESA implementation regulations as an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding or sheltering (50 CFR Part 17.3). The regulations further define the term harass as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to breeding, feeding or sheltering@ (50 CFR Part 17.3)."

The ESA states that for an HCP to be approved, the applicant must provide a detailed description of the activities for which the permit is being sought and must describe the impacts associated with these activities. Take of a listed species resulting from these actions can either be quantified in terms of the number of individuals of the species that will be affected or can be expressed in terms of acreage of habitat lost. In the HCPs reviewed, examples of both these options were described.

For the *Contra Costa HCP* the levels of incidental take are quantified based on the impacts to habitat. Detailed species profiles for each of the 28 covered species are compiled summarizing ecological information, distribution, threats, population trends, and management activities in the inventory area. Land cover types are used as the basic unit for habitat modeling. Cover types, together with other habitat features, are used to develop species distribution models for 20 covered species. Estimates of take are based on the outcomes of these models. For the remaining eight species, take is estimated using the "worst-case scenarios" regarding impacts to their habitats. The models were used to determine not just species distribution but habitat requirements as well. The models were also used to quantify the effects of covered activities and to develop conservation measures for the species. Restoration plans were also developed using these models to ensure that biological goals and regulatory standards are met. There is a likelihood that take could be overestimated by these models for two reasons: (1) the model might overestimate the amount of suitable habitat available; and (2) not all suitable habitats are occupied by the species in question.

Impacts related to take are determined based on the identification of the Permit Area Boundary, biological relationships of the species covered, activities that would result in take, and quantification of take. The aim of the *Pima County HCP* is to keep take within population thresholds established by their STAT as conservation goals for each of the covered species. The approach focuses on the use of biological data developed at the county scale, including models of high and medium potential habitat for each covered species and Priority Conservation Areas (PCA) identified for each covered species, both of which are used to calculate incidental take. These conservation thresholds are expressed as percentages of the medium and high potential habitat. The foundation layers of information developed for the Pima County Multi-Species Habitat Conservation Plan (MSHCP) are maps (models) of areas with high or medium potential for occurrence for each of the Priority Vulnerable Species (PVS) based on their known or estimated biological or physical habitat associations. Incidental take was then estimated by calculating the number of acres of high and medium potential that would be lost (i.e., projected for clearing, grading, and development) and gained (provided by acquisition, mitigation, or otherwise conserved) for each species.

Estimated losses to the various components of the PCAs for each species were also calculated. These losses provide a complementary assessment of the potential effects of implementation of the HCP on the proposed covered species. Incidental take was then estimated by calculating the net loss of acres of PCAs for each covered species.

In the Pima County HCP, indirect effects include habitat fragmentation and the sphere of influence of an activity covered under the plan. However, once again, because of the landscape approach to conservation planning, these effects would be far less than without the plan. Other indirect effects include increased artificial lighting, higher potential for wildlife to encounter traffic, increased ambient noise levels, air pollution, and increases in water-use, introduction of free roaming pets, feral dogs and cats, and the introduction of non-native species. The effects on identified Critical Habitats for listed species are also identified.

The *Indian River County Emergency Armoring HCP* defines the direct and indirect impacts to endangered sea turtles from activities related to emergency shoreline protection. Direct impacts to turtles are related to construction activities involving emergency shoreline protection processes. Indirect effects are primarily due to changes in beach characteristics due to the presence of shoreline protection structures. These structures are known to decrease the available nesting habitat for the turtles. Therefore, the amount of take as a result of the presence of a particular structure is related to the length of shoreline affected by the structure, its proximity to the surf zone, and the period during which the structure would affect nesting behavior. It is assumed that most of the temporary structures will result in the development of a permanent seawall. The primary effect of seawalls is a reduction in nesting area. Most turtles, it is assumed, will false crawl and then nest elsewhere. However, the time and energy invested in false crawls can reduce the turtle's annual reproductive output. Using the state's dune erosion model (Malakar and Dean 1995, Zheng and Dean 1997), estimates of the number of single and multi-family homes that will need emergency shoreline protection during the 30-year period were determined. These numbers were then translated to linear feet of shoreline that will be affected. Detailed species and habitat information for sea turtles was obtained from a variety of already existing sources. These included the South Florida Multi-Species Recovery Plan (MSRP; USFWS, 1999), the Sebastian Inlet State Recreation Area Unit Management Plan (FDEP 1998), the Final Environmental Assessment and Land Protection Plan for the Proposed Expansion of

Pelican Island National Wildlife Refuge (USFWS 1991), the Avalon State Recreation Area Unit Management Plan (FDEP 1997), and the Florida Natural Areas Inventory (FNAI 2000). These data were used to understand occurrence and distribution patterns within the plan area. Data from turtle nesting studies on various sections of beach in Indian River County, with and without seawalls, showed that nesting success was 69% lower on beaches with seawalls. Data from turtle surveys of the area, together with nesting success surveys, were then used to estimate the number of turtles that could be displaced or impacted annually (i.e., how much take would occur).

In the *Etowah HCP*, take was defined in two different ways. For the Etowah and amber darters, take was expressed in terms of "loss of occupied habitat," whereas for the Cherokee darter it was expressed as the loss of numbers of fish. The estimates of take were based on predictive models that were developed. The models correlated patterns of occurrence and abundance with an indicator of urban development Effective Impervious Area (EIA). These models were then used to make spatially explicit predictions of occurrence and abundance based on various "build-out" scenarios. Run-off limits, the most important management tool of this HCP, are defined for the various build-out scenarios. A variety of stressors are identified for the covered species of this HCP: increased sedimentation from construction sites, channel erosion, utility and road crossings, and forestry-related activities; hydrologic alterations from high reservoir use and stormwater runoff; riparian buffer loss due to agricultural activities and golf courses; contaminants from point sources, as well as from stormwater runoff; movement barriers; and channelization. Invasive species, temperature alteration, loss of woody debris, and eutrophication are among the other impacts of development on the imperiled fish species.

In the *West Mojave HCP*, take for all listed species other than the desert tortoise is specified as either acres of habitat lost or number and location of known occurrences. Take is calculated using data from surveys, as well as from baseline data collected. Take is permissible for new occurrences found on private land outside Habitat Conservation Areas (HCAs). Conservation efforts will keep pace with take, and habitat losses will not be allowed to outpace on-the-ground mitigation work. A mechanism to ensure that take does not outpace conservation will be included in the Implementing Agreement. The permit authorizes take of listed species on private land outside the HCAs subject to provisions of monitoring and adaptive management. Species not currently listed cannot be authorized for take. All lands developed within tortoise Desert Wildlife Management Areas (DWMA) and in tortoise survey areas outside of tortoise DWMAs constitute authorized loss of habitat (i.e., take), whether occupied or not.

The *NiSource HCP* is in its planning phase, and no information is currently available regarding levels of take in this HCP.

A listing and evaluation of Alternatives is a required part of an HCP. However, because there is a tremendous range in the scope, area, and number of species covered by conservation plans, the forms of Alternatives differ according to the scale of the HCPs. Where the plan is focused on a single species or a specific building site, the Alternatives are specific choices between different ways of limiting take. An activity may be limited in time or duration, such as seasonal restrictions on outdoor lighting. In other HCPs the Alternatives are much more general. These plans cover large areas, afford protection to many species, and have complex jurisdictional issues. In these instances the Alternatives are conceived as different ways to define the area to be covered, the overall intensity of the protection measures, and the changes in jurisdiction required to implement and manage the plan. In the following descriptions, we refer to these two categories of Alternatives as being *general* or *specific*.

The *East Contra Costa HCP* provides a good example of general Alternatives, which in this case focus on the choice of land area to be covered. The permit and plan were needed to address the expansion of development in the eastern region of the county. To provide for differing types of control, these activities were classified by their location: within the UDA, outside the UDA, or within the HCA. The plan considered the following four Alternatives.

Alternative 1 – This Alternative involved the creation of two permit areas based on predicted growth patterns in the county. The first permit area or UDA encompasses 10,000 acres and could be expanded to a second permit area or UDA of about 13,000 acres. It also calls for the creation of a Preserve System that would be 30,000 acres in size.

Alternative 2 – This Alternative is similar to Alternative 1. However, it allots much less acreage for each permit area. This option also involves the creation of the Preserve System.

Alternative 3 – Also known as the Reduced Development Alternative, it calls for the creation of a single permit area of about 1,000 acres. A Preserve System would be created for conservation.

Alternative 4 – The No Action Alternative, where permitting would continue on a project by project basis.

The *Pima County HCP* contains Alternatives distinguished by both the land areas covered and the administering agencies. A wide range of Alternatives were considered for the multi-species HCP. Four Alternatives were analyzed in detail, as follows:

Alternative 1 – The No Action Alternative. Pima County would see no change in their current conservation efforts, while each project would have to be evaluated individually for a Section 10 permit.

Alternative 2 – The Proposed Alternative. This plan provides regional-scale protection to 55 Priority Vulnerable Species. It includes the creation of the Conservation Land System (CLS). It does not include any other jurisdictions within the county. Therefore, the proposed HCP provides a means for Pima County to obtain a stand-alone Section 10 permit for *only* the covered activities under its authority inside and outside of the CLS. It does not include partnerships with any other jurisdictions within the county.

Alternative 3 – This Alternative is similar to Alternative 2, but includes partnerships and participation by other jurisdictions within the County, such as the towns of Marana, Sahuarita, and Oro Valley; the City of Tucson; state land and other State of Arizona departments; and other federal agencies.

Alternative 4 – This Alternative differed from the previous two in that it includes only federally listed species in the plan. Similar to Alternative 2, this option does not include any other jurisdictions within the county.

The county conducted a cost-benefit analysis of these Alternatives in terms of population and economic growth to predict future development over the next 10 years, 20 years, and at maximum future development. The results of this analysis were used to determine land costs for development and for mitigation over the period of the plan and also to develop the Alternatives explored in the plan.

The *Indian River County Emergency Armoring HCP* in Florida is the most limited conservation plan of those reviewed. It was developed specifically to minimize the effects of emergency shoreline protection measures on sea turtles and to increase the productivity of the county's beaches as sea turtle nesting habitat. Four Alternatives were considered in this plan.

Alternative 1 – The Proposed Alternative. This option allows the County to issue temporary shoreline protection structures. Individuals can then petition the FDEP to retain these structures on a permanent basis.

Alternative 2 – The No Action Alternative. Indian River County does not issue any emergency shoreline protection permits and relinquishes local authority to FDEP; or the County continues to issue permits without requiring an ITP and thereby risks penalty under federal law.

Alternative 3 – Land Acquisition Alternative. Indian River County purchases the threatened beachfront property and converts it to conservation land.

Alternative 4 – Retreat Alternative. Indian River County requires property owners to relocate vulnerable structures farther inland.

Alternatives 3 and 4 have substantial drawbacks to be realistically considered as feasible options. Alternative 3 is a prohibitively expensive Alternative fraught with legal implications. In addition, the county would lose tax revenue by purchasing these private properties and converting them to public ownership. Alternative 4 was also not a viable Alternative because relocation of these structures could cause more harm to turtles. In addition, there may not be adequate space to accommodate the relocation of these vulnerable properties.

The *Etowah HCP* did not consider any Alternatives although the evaluation and assessment of Alternatives is typically a mandatory section of an HCP. Almost all the policies described in their plan were based on existing local, regional, and state policies. These local regulations do, however, have significant flexibility, allowing the participating jurisdictions some flexibility in adopting these policies. These policies are described in greater detail in Sections 6 and 7. The HCP is currently in the EIS phase, and the USFWS is incorporating Alternatives to the proposed action into the document.

The *West Mojave HCP* covers a large desert area, of which 3.2 million acres are administered by the BLM, 3 million acres are in private ownership, 102,000 acres are administered by the State of California, and the remainder is administered by the Department of Defense. In 1980 the state implemented the CDCA. Although this state conservation plan serves to minimize the impact of development, it does not have authority through an ITP and its attendant HCP.

The West Mojave HCP seeks to unify the conservation provisions over the entire plan area. It consists of two components: (1) A component that amends the existing BLM's CDCA Plan and

(2) an HCP that covers development on private lands. Throughout the planning process, the BLM and the state and local governments have used the name "West Mojave Plan" to include complementary BLM and state and local actions.

Seven Alternatives were considered during the development of the West Mojave HCP. They were created in response to public input regarding the current uses of these lands, their future uses, and the desired environmental conditions for the area. The Alternatives considered differences in the land areas and individual species covered, as well as differences in the agencies administering the permit.

Alternative 1 – The Proposed Alternative is a multi-species conservation strategy applicable to public and private lands throughout the planning area. It will be an amendment to the BLM's CDCA for public land and involves the creation of an HCP for private lands. ITPs will be issued to participating jurisdictions and state agencies for 49 covered species.

Alternative 2 – This Alternative is applicable to public lands only (BLM lands) and consists of those elements of Alternative 1 that are applicable to, and could be implemented on, BLM-administered public lands.

Alternative 3 – Referred to as the Tortoise Recovery Plan, this option includes those elements of Alternative 1 that are applicable to the Mohave ground squirrel and other sensitive species, and also incorporates the management program developed by the 1994 Desert Tortoise (Mojave Population) Recovery Plan (USFWS 1994). As with Alternative 1, this option involves the CDCA Plan amendments and the development of an HCP. ITPs would be issued to participating local jurisdictions and state agencies.

Alternative 4 – Referred to as the Enhanced Ecosystem Protection Alternative, this alternative places a priority on the conservation of ecosystems and natural communities as a means to conserve sensitive plants and animals, even if adoption of those recommendations would limit motorized vehicle access and multiple uses of the western Mojave Desert. The CDCA Plan amendments and an HCP would be adopted and ITPs would be issued to participating local jurisdictions and state agencies.

Alternative 5 – Referred to as the Enhanced Recreation Opportunities Alternative, Alternative 5 places a high priority on multiple uses of desert lands, including motorized vehicle recreation. This alternative establishes a Desert Tortoise DWMA. The CDCA Plan amendments and an HCP would be adopted, and incidental take permits would be issued to participating local jurisdictions and state agencies.

Alternative 6 – Referred to as the Aggressive Disease and Raven Management Alternative, Alternative 6 relies on an aggressive program of tortoise disease management and raven control, supported by limited fencing, rather than establishing a Desert Tortoise DWMA to protect habitat. The CDCA Plan amendments and a habitat conservation plan would be adopted, and incidental take permits would be issued to participating local jurisdictions and state agencies.

Alternative 7 – No Action Alternative. The existing conservation strategies would continue, as would individual, case-by-case permitting.

In March 2006, a Record of Decision was issued by the BLM to approve the BLM's amendment of the CDCA Plan, and does not include the actions proposed by the state and local governments for non-federal lands, except where specified. The state and local actions comprise the proposed HCP for the 3.1 million acres of State of California and private lands.

The *NiSource HCP* effort is in its planning phase, and no information is currently available regarding the Alternatives being considered for this plan.

Whereas HCPs are often developed for listed species alone, larger HCPs and ecosystem-based HCPs should consider the inclusion of proposed, candidate, or other rare or declining unlisted species. This element of the HCP is voluntary, but is strongly encouraged by USFWS, as outlined in the handbook (USFWS, 1996). If an unlisted species becomes listed, and the project activities could result in the take of the newly listed species, the applicant would need to avoid take or revise their HCP. This could result in long delays and higher costs. The Alternatives section of large HCPs is often an ideal place to incorporate the inclusion of these unlisted species to allow for public comment and to consider the costs and difficulties that might be associated with such an action. All three of the larger HCPs that we reviewed incorporated several unlisted species into their plan. Within the CCCL zone of Florida's beaches there are several state-listed and declining species that should be considered for inclusion in the Florida Beaches HCP.

Another possible consideration in preparing an HCP is an economic assessment. The Pima County HCP included an elaborate economic assessment of several Alternatives before coming up with a short list of Alternatives that were to be included in the plan. This is a crucial step that provides insight into the potential costs of the plan based on planned development. It will be especially important to assess these costs during the development of the Florida Beaches HCP to see what the outlay might be at each jurisdictional level.

The USFWS Habitat Conservation Planning and Incidental Take Permit Processing Handbook. (USFWS, 1996) specifies that an HCP should contain a section on methods to monitor, minimize and mitigate the predicted impacts of the permitted activity. The handbook does not provide explicit rules for developing these methods. However, it states that they should be based on "sound biological rationale, and should be practicable and commensurate with the impacts that they address." This is a crucial section of the plan because it contains detailed explanations of the steps that are to be taken to minimize direct harm to the listed species and their habitats. The methods often encompass the entire project area, and even beyond, if possible. Because each of the HCPs reviewed in this study has a distinct list of threatened or endangered species and consequently different habitat types to protect, they present a variety of mitigation and minimization methods.

The conservation strategy of the *East Contra Costa HCP* was developed to meet the regulatory requirements of the: (1) ESA, (2) Natural Community Conservation Plan (NCCP), (3) Clean Water Act Sections 401 and 404, (4) the Porter-Cologne Water Quality Control Act, and (5) Section 1602 of the California Fish and Game Code (see Habitat Conservation Plan Scope). Mitigation measures developed were for impacts on covered species and were determined based on species and habitat needs. A conservation strategy was created involving 33 biological goals and 91 biological objectives. This strategy was developed primarily to mitigate the impacts to covered species and to aid in their recovery. The strategy also provides mitigation for impacts on jurisdictional wetlands and waters. To achieve no net loss of wetlands and waters, the HCP requires restoration and not just preservation of certain land cover types such as wetlands, riparian woodlands, and oak savanna, at the ratio of 1:1 to 2:1 depending on the land cover type. A Preserve System has been designed and is linked to existing protected areas. The creation of this Preserve System is an important part of the conservation strategy of the East Contra Costa HCP, based on the idea of creating a new system of interconnected preserve lands outside the area of urban growth. This system will connect and preserve major habitat types. Habitats will be managed to enhance populations of the covered species and to maintain ecosystem processes. Habitat losses will be compensated by restoration or by the creation of additional habitat.

The conservation strategy of this plan is to be implemented at three ecological scales: landscape, habitat, and species. Landscape-level measures are applied on a geographically broad scale to achieve multiple goals and objectives. They relate to the overall design and assembly of the Preserve System and are designed to preserve location, size, composition, and connectivity of the major habitats, as well as to maintain the present ecological processes. These measures are determined by the spatial needs of vegetation communities and associated species, and the management activities needed to maintain a well-functioning Preserve System.

Habitat or community-level measures apply to each natural community and include such parameters as vegetation management, habitat restoration, enhancement of ecosystem function, control of exotics, and increasing prey abundance. The measures adopted at this level conserve the majority of covered species indirectly through conservation of habitats.

The species-level measures provide additional conservation measures tailored specifically to each covered species. At this level, the measures address the remaining needs of the covered species. For example, to maintain and increase populations of Townsend's western big-eared bat, the preservation of bat hibernation sites and the enhancement of roosting habitat by protecting mines and caves and creating artificial hibernacula would be undertaken. Some species that require more direct species management are conserved through population augmentation and

population management measures. The species-level measures were developed only when landscape and community-level measures did not adequately address the conservation needs of the individual species.

To meet the permit standards for the Natural Community Conservation Plan (NCCP), which is the state-required plan that allows for the incidental take of state-listed species and habitat, the conservation strategy contributes to species recovery and hopes to prevent the listing of non-listed species through protection, restoration, and enhancement of necessary habitats. The conservation guidelines are all based on the best available scientific data. In most cases, these measures prescribe general techniques to be used, because specificity will be based on the final configuration, location, and site conditions of the preserves. For example, enhancing grassland habitat may require seasonal livestock grazing in one area or a combination of prescribed burning and livestock grazing in another area, depending on the density of the exotic grasses and herbs and the depth of dead plant material. Conservation measures have been provided to allow flexibility for land managers to implement techniques that best suit the site conditions.

Biological goals and objectives are set up to establish conservation goals for each natural community and species to be included in the plan. These goals and objectives are organized by natural community type and scale. The covered species are grouped according to the natural community with which they are best associated.

As with the East Contra Costa HCP, the *Pima County HCP* relies on the creation of a Conservation Land System (CLS) of preserves to mitigate the effects of the covered activities. The CLS is meant to protect the biodiversity within the plan area and to provide conservation guidelines consistent with California's Sonoran Desert Conservation Plan (see Section 2).

The CLS provides comprehensive conservation of vulnerable species, adjacency, and proximity of habitat blocks. It also preserves contiguity of habitat at the landscape level and provides connectivity between reserves. This creates a CLS system that fully represents the physical and environmental conditions of the region, preserves a functional ecosystem, and minimizes fragmentation. The STAT developed seven conservation land categories and created conservation guideline policies for each category. These categories are: (1) important riparian areas, (2) biological core management areas, (3) scientific research areas, (4) multiple-use management areas, (5) agricultural holdings, (6) special species management areas, and (7) critical landscape connections. The seven CLS conservation land categories reflect the relative values of biodiversity for various lands across this landscape.

The policies developed for these areas are related to land use and activities which are under the jurisdiction of Pima County and the Pima County Flood Control District. When more than one category is indicated for a given land unit, the most protective CLS category will take precedence. Pima County will acquire about 53,300 acres during the first ten-year period of the plan implementation through the acquisition of fee titles or conservation easements.

In 1999, Pima County established rules for prioritizing acquisitions through the Pima County Conservation Acquisition Commission to ensure adequate conservation of all covered species. These acquisitions are based on a "Habitat Priorities" map and serve to mitigate projects that occur outside the CLS, as well as those projects inside the CLS that are not subject to the requirements for CLS conservation guidelines.

The proximity of urban development to conservation areas often results in the inadvertent introduction of non-native species. These species often become invasive in nature, frequently out-competing native vegetation and native wildlife for resources. The Pima County Board of Supervisors therefore established a program for the control of invasive species. The Pima County MSHCP has recovery plans for several covered species (lesser long-nosed bat, cactus ferruginous owl, southwestern willow flycatcher, desert pupfish, Gila topminnow, and Chiriahua leopard frog). These recovery plans have been used as the basis for identifying and developing minimization and mitigation measures. A Riparian and Aquatic Species Management Plan was also developed to achieve recovery for native fish species, amphibians, and other aquatic species.

The *Indian River County Emergency Armoring* HCP incorporates several minimization measures to deal with impacts related to emergency shoreline activities. The county developed a public awareness brochure to be distributed to all current and potential beachfront property owners within the plan area to apprise them of the potential for erosion on Indian River County beaches, identify areas of critical erosion, and provide them with a synopsis of the county's Beach Management Plan. This was a proactive move based on the premise that reducing the need for emergency shoreline protection would minimize the potential for impacts to turtles. The county plans to encourage owners of potentially vulnerable beachfront structures to take appropriate action to protect their properties in advance of major storms. Indian River County will also implement a turtle monitoring program that includes detailed assessments and monitoring of turtle nests, taking necessary precautions during the implementation of emergency measures, protecting nests, data collection of relevant sea turtle data, and assessing impacts on nests that have been relocated. Sea turtle data and ancillary data will be collected to facilitate assessments of natural as well as anthropogenic impacts to sea turtles. The direct and indirect effects of emergency shoreline protection activities would be quantified, and the results of this study will be used to make adjustments to the long-term monitoring program for sea turtles. In addition, there will be land acquisition for conservation programs, and Indian River County will expand their monitoring program over the period of the permit, adopt lighting management ordinances, and implement predator control programs. The purpose of this HCP is to greatly expedite the issuing of ITPs subsequent to the impact of major cyclonic storms. The responsible staff will be fully trained about potential impacts of emergency construction on turtles and turtle habitats. This staff will be responsible for deciding whether or not to authorize emergency activities in light of the potential for take of marine turtles. It is expected that this staff will have the familiarity with the range of post-storm construction activities that are likely to be proposed, the take hazards associated with each of these activities, and the natural conditions and requirements of the turtle habitat. Given this level of preparation, it is expected that reasonable conservation-oriented decisions will be made, while allowing rapid construction responses where warranted.

The *Etowah HCP* – This plan serves to manage an entire watershed to minimize take throughout its stream system. Accordingly, it is focused on those elements of watershed management that control the physical stability of the streams and their water quality. It outlines mandatory avoidance, minimization, and mitigation policies to address six key issues: (1) stormwater management; (2) erosion and sedimentation control; (3) stream buffers; (4) road crossings of streams; (5) utility crossing of streams; and (6) water supply planning. Most of these policies are based on existing state and local regulations.

Stormwater policies are usually set at both the state and county level. The Etowah HCP currently extends over four counties and nine cities, a condition that calls for a uniform policy across the

plan area. The stormwater policy is based on a series of ordinances developed by the Metropolitan North Georgia Water Planning District (Metro District). These ordinances include performance standards for water quality protection, stream channel protection, and flood protection.

The most important water quality parameters to regulate are nutrients (nitrogen and phosphorous). These come mainly from non-point sources that are difficult to regulate. As an indirect control, the Etowah HCP ordinance includes a performance standard that limits the volume of run-off in areas that are most critical to the survival of the covered species of fish. Priority areas are defined based on the type of fish species that they support. Priority Area 1 supports the most sensitive species and has the most restrictive standards (i.e. the volume of run-off from small storms must be the same as if the site were in a forested condition). Priority Area 2 applies to reaches that support the less sensitive fish species; and the volume of run-off from this area cannot exceed that of an area that was 95% forested. Those areas that do not provide much habitat to the imperiled fish species are categorized as Priority Area 3. Within these priority areas are designated "development nodes" where additional runoff (above pre-development forested conditions) is permitted. These are areas for commercial development. The number of development nodes is required to be limited to ensure that the impacts to the imperiled species are not too severe. Selecting the development nodes is a jurisdiction by jurisdiction process. To locate the development nodes, the Technical Committee started with local comprehensive plans, which showed where the high density development currently exists and is expected to occur in the future. They ran numerical models to predict the imperiled species' response to that planned development, particularly to impervious surfaces. If the models showed that the species would not have a negative response, the committee had little more to do. If the models showed that there would be a negative impact on the species, the committee developed alternatives. These alternatives included reducing the overall area for impervious surfaces or relocating the areas for high density development and high levels of impervious surface. The models were run again for the alternatives to see how species would fare. This process was continued until they found a model that was acceptable to local government and was also protective of the imperiled species.

The goal of the Erosion and Sedimentation Control program is to minimize sediment input to the streams. Most jurisdictions had already adopted an ordinance that is very similar to the state-sponsored model. The Etowah HCP identified the best management practices for implementing and enforcing this ordinance and developed a new standard operating procedure for all participating jurisdictions. It also includes a five-step approach for developing grading plans. It was determined that a buffer width of at least 50 feet would be required between the roads and the streams.

The Road Crossing Guidelines were based on design guidelines from the Washington Department of Fish and Wildlife. This ordinance has six standards and elements. Bridges are required for all stream crossings. During construction of bridges, best management practices will be followed. Variances can be issued if the alternative proposed does not have a greater impact than what was already proposed. A bonding mechanism is required for all stream crossings built by private entities. The plan also requires stream culvert discharges to be monitored annually.

To protect the imperiled fish species and to reduce sedimentation and in-stream habitat destruction, ten standards were adopted for all Utility Stream Crossings. These consist of: (1) use directional boring whenever possible; (2) if directional boring is not feasible, isolation crossing may be used, but it should not create excessive velocities and should not dewater downstream reaches; (3)

wet trenching is prohibited except where no other method is feasible; (4) no wet open trenching during fish spawning periods and immediately afterwards; (5) heavy equipment must be at least 25 feet away from the stream except during active construction; (6) by-products of construction must be properly disposed of; (7) stream buffers must be maintained; (8) the amount of time conducting in-stream activities should be minimized; (9) appropriate erosion and sedimentation controls must be maintained and hydrologic characteristics must be restored; and (10) justification must be provided when methods other than directional boring are used.

The mitigation plan for the *West Mojave HCP* is a conservation strategy that allows both the CESA and the FESA to fulfill their mandates to recover listed species, their habitats, and other natural communities. In addition, it allows for the expansion of the Fort Irwin Army Base. Four Task Groups were appointed to address the following issues: conservation strategy, motorized vehicle access network, regulatory network, and plan implementation. These groups were responsible for interagency collaboration and for developing mitigation and minimization strategies for the plan. The plan will be implemented in a collaborative manner by participating local governments and state and federal agencies. Measurable biological goals were developed for each of the species addressed by the West Mojave HCP in accordance with HCP requirements established by USFWS. For some species not included in the HCP for permit coverage, goals are presented for BLM management. The biological goals are intended to be the broad guiding principles for the HCP's conservation program, and are applicable to all alternatives, though application of the goals to land ownership and to species may differ with each alternative. In addition to the biological goals, biological objectives were developed for the more complex strategies proposed for the desert tortoise, the Mohave ground squirrel, and for 49 other species. Biological objectives are the measurable components needed to achieve the biological goal, such as preserving sufficient habitat, managing the habitat to meet certain criteria, or ensuring the persistence of a specific minimum number of individuals. Goals and objectives can be either habitat or species-based and are consistent with conservation actions needed to minimize and mitigate impacts to the covered species. The goals were determined to promote effective monitoring and to help determine the focus of an adaptive management strategy.

Conservation areas and conservation strategies were identified for minimizing the take of both the desert tortoise and the Mojave ground squirrel on private lands. For the tortoise, these included the creation of DWMAs to be managed as Areas of Critical Environmental Concern (ACEC) specifically for desert tortoise conservation, and implementation of specific controls over uses such as off-highway vehicles, grazing, and commercial activities to ensure that management goals are achieved for the desert tortoise. Four main goals and objectives were identified for desert tortoise conservation by the USFWS and the CDFG during the biological evaluations. The goals for tortoise conservation are as follows: to protect sufficient habitat to ensure the long-term survival of the species, to establish an upward or stationary trend in the population of the species, to ensure genetic connectivity among the desert tortoise populations within the West Mojave Unit and the other recovery units, and to reduce tortoise mortality from interspecific (raven predation) and intraspecific (disease) conflicts. Each of these goals has a series of objectives associated with it.

Conservation strategies for the Mojave ground squirrel included the creation of the Mojave ground squirrel Wildlife Habitat Management Area and implementation of specific controls over uses such as off-highway vehicles, grazing, and commercial activities to ensure long-term protection of the Mojave ground squirrel habitat throughout the region and to ensure the long-term viability of the species throughout its range. As before, each goal has a series of objectives

that need to be evaluated within the context of the goal. For all of the other species covered by the plan, the acreage of habitat conserved and the acreage available for incidental take are addressed in the HCP. The various alternatives explored for this plan were evaluated against each of the goals assigned for the species.

For the other sensitive species covered under the plan, conservation strategies to minimize take were developed as guidelines to prevent future listing of these species, and recovery plans would be created for those populations on public land. A motorized vehicle access network was created to allow use by commercial, recreational, and other types of vehicles in a manner that still permits species conservation. Conservation strategies were developed for the BLM lands that were proposed for transfer to Fort Irwin. Lastly, detailed rangeland standards were compiled using best management practices for administering lands for domestic livestock use. A single mitigation fee is established as compensation for habitat disturbance within the West Mojave planning area. The fee applies to new ground-disturbing activities located on public and private lands under the jurisdiction of agencies participating in the HCP. This mitigation fee is based on the average value of an acre of the private lands to be acquired for the implementation of this plan.

There are three levels of compensation: (1) within the Habitat Conservation Area the fee is based on a compensation ratio of 5:1 (five times the average value of an acre of land within the HCA); (2) outside of the HCA on lands delineated as disturbed habitat, the mitigation fee is based on a compensation ratio of 0.5:1; and (3) within all other areas outside of the HCA, the mitigation fee is based on a 1:1 compensation ratio. The mitigation fee is applicable to development and/or loss of habitat on both private and BLM administered public lands, and is considered to be the complete compensation for loss of habitat. On private lands, the mitigation fee applies to all new land-disturbing development subject to a grading and/or building permit and is collected by the local jurisdiction at the time of permit issuance. On BLM lands, the mitigation fee applies to all new land-disturbing projects subject to federal permits, and is collected by the BLM at the time of permit issuance. The mitigation fee is not additive where multiple species exist on a site, or where conservation areas for species overlap.

As mentioned before, the *NiSource HCP* is in its planning phase, and no information is currently available regarding the mitigation measures being adopted in this HCP.

All HCPs are required to have an adaptive management plan. This is a management tool that incorporates flexibility into the plan. As new information is obtained, policies can be amended to ensure that the goals of the plan are being met. It therefore addresses the uncertainties within HCPs, as well as the effectiveness of the mitigation measures adopted in the HCP. Therefore, the purpose of the adaptive management plan is to improve conservation actions included in an HCP.

The goal of the *East Contra Costa HCP* adaptive management plan is the creation of a Preserve System and the restoration and creation of habitat within this system, as well as the management and monitoring of this system. Land acquisition for this Preserve System occurs over the 30-year course of the permit. Therefore, the adaptive management program grows as the Preserve System grows. The species-habitat models that were developed as part of this HCP form an important component of this plan, as do all the GIS analyses. Uncertainties in the models or gaps in GIS information have been identified as information needs. As new data are obtained through monitoring, these information needs can be met and improvements can be made to the management and monitoring plans. Since this HCP takes an ecosystem approach to conservation, the adaptive management plan is based on six broadly defined natural communities (wetland, grassland, oak woodland, chaparral/scrub, and stream and riparian woodland/scrub). The functional integrity of these natural communities is evaluated at three primary levels: landscape, community, and species. Ecosystem function and the status of covered species are also monitored. The initial monitoring is conducted within five years after the implementation of the HCP. Inventories are conducted, data compiled, and priorities reevaluated. In addition, an inventory is conducted whenever new land is acquired for the Preserve System.

A newly formed organization is responsible for overseeing the operation of the Preserve System and is also responsible for compliance with all aspects of the terms and permits of the HCP. Funding for the plan comes from a series of fees on covered activities such as mitigation fees (development), impact fees, etc. Funding also comes from non-fee funding sources (state, local, and federal). Non-fee funding can only be used for species recovery plans and not for mitigation. Long-term monitoring is conducted in phases over the course of the permit in order to continue to evaluate and modify protocols, as necessary.

In general, the conservation strategy of the *Pima County HCP* is goal-oriented rather than mitigation oriented. The creation of the CLS is considered the first step in achieving the Desired Future Condition (DFC) of the plan area. Twenty-six percent of the CLS is prioritized for conservation. This includes approximately 525,000 acres of biological core, important riparian areas, special species management areas, and special landscape elements. Future losses and fragmentation are avoided by the land acquisition and conservation programs. Restoration and recovery of natural landscapes are achieved over the life of the plan. Management plans are developed and implemented for the CLS. The county plans to develop and distribute educational materials regarding the detriment to wildlife from the release of unwanted pets in natural locations. The release of pets and domestic animals is detrimental to wildlife. In addition, landscaping with non-native plants in areas proximal to natural areas is also detrimental to the native plant species found in the desert.

Funding for the mitigation and monitoring programs is solely from the 2004 Open Space Bond Fund which will be used to initiate the first ten year phase acquisitions. These bonds give Arizona counties statutory authority to spend monies on the acquisition of open space, conservation easements and the purchase of developmental rights. Future Open Space Bonds and

additional funding sources will be identified by Pima County for administration of the program, land management and monitoring.

Both Compliance Monitoring and Effectiveness Monitoring will be initiated in Pima County to evaluate the effectiveness of the plan. Compliance Monitoring will be used to verify that the permittees are carrying out the terms of the permit, while Effectiveness Monitoring will be used to assess the achievement of biological goals and objectives of the plan. This monitoring then provides direction for the adaptive management program of the plan. The monitoring measures provide detail and specificity sufficient to detect anticipated effects. The monitoring program builds on the county-wide GIS database developed for the MSHCP and the county's CLUP. The database will be updated periodically and will provide comprehensive information that can be used for both compliance and effectiveness monitoring. The Science Conservation Commission (SCC) is the entity responsible for compliance monitoring, with Pima County taking the primary responsibility for achieving compliance.

As part of the mitigation and adaptive monitoring plan, *Indian River County* was required to initiate a sea turtle monitoring program. The County has the sole responsibility for meeting the terms and conditions set forth in the ITP, which includes the allocation of personnel and resources for effective implementation of the ITP. The related conservation programs are managed and coordinated by the HCP Coordinator and a coastal engineer, both of whom are hired by the county. The HCP Coordinator administers the ITP, develops and implements a standardized sea turtle monitoring program for the county, documents impacts to sea turtles related to shoreline protection measures initiated under the County's emergency authorization, and manages and analyzes sea turtle data through a county-wide database. This information is used to assess the effectiveness of the HCP in achieving its biological goals. The coastal engineer is responsible for coordinating the county's Emergency Management Department following the Declaration of Local Emergency, including processing emergency permits, conducting site-specific assessments following requests for emergency permits, and other actions relating to the issuance and management of emergency permits. This person is also responsible for keeping the HCP Coordinator apprised of current information relating to erosion patterns and planned beach projects as they relate to the turtle monitoring program. Annual reports providing data summaries of the monitoring program and an evaluation of the HCP program are provided to the USFWS for review. To assure a stable, long-term source of funding for the HCP, the County uses funds generated from its Beach Preservation Fund (the Fund). The Fund is a dedicated 1½-cent tourist development tax established in 1994 to provide funding for beach nourishment and other shoreline protection projects. HCP funding is authorized on an annual basis from the Fund.

The *Etowah HCP* predicts that the most likely change to the plan would be associated with the development nodes. The predictive models will be used to estimate the changes required. Regular updates to the models will be completed as additional data become available. As monitoring data are collected, population thresholds might need to be revised. This will be done every five years. The Steering Committee approved 36 potential adaptive management measures in addition to the changes to the development nodes and predictive models. Most of the actions are triggered when necessary. All of the policies included in the management measures have a potential action called "minor changes to procedural requirements." This action permits a policy to be corrected if its provisions are found to be unnecessary or contradictory. Biological monitoring will track the status and trends of the fish species included in the plan. These data will be used to update the models and provide an indication of whether the goals of the plan are

being met. All monitoring data will be reviewed by the staff of the Etowah Aquatic HCP Implementation Organization. This organization assists local governments in implementing and administering the policies of the HCP. This organization consists of paid staff that is overseen by the Etowah Aquatic HCP Board consisting of one member from each of the participating jurisdictions, as well as representatives from the Georgia Department of Natural Resources and the USFWS. Final decisions regarding changes to management plans will be made by the Steering Committee.

The *Mojave Desert HCP* does not include an adaptive management plan. Since it is an amendment of an already existing BLM conservation plan, several best management practices documents are already in place that provide guidelines for the management of the various landscape types and species covered in this plan. These include surveys, fencing, and recreational vehicle driving guidelines; guidelines for grazing and livestock use of the desert; identification of new areas of critical concern; incorporating multiple-use considerations; and adjusting boundaries, among others. The HCP allows for appropriate resource use, as well as community expansion. The West Mojave HCP includes a regional strategy for conserving sensitive wildlife species that will be implemented in a collaborative manner by local governments and state and federal agencies. The plan will be implemented on public lands through the amendment of the BLM's CDCA Plan, and on private lands through the issuance of programmatic incidental take permits to local cities and counties by the CDFG and the USFWS.

As mentioned previously, no information is currently available regarding the *NiSource HCP* adaptive management plans.

Insight into the process of plan development was gained from researching and reviewing the HCPs included in this study. Pertinent sections that must be a part of the completed document were identified. The Indian River County Emergency Armoring HCP provides useful information related to the steps involved in emergency shoreline protection procedures for beaches in Florida. It provided an in-depth account of sea turtle issues and monitoring programs. The Etowah HCP was the most streamlined and easy to follow document reviewed. The benefits of using university resources (students and faculty) are evident in this HCP. The groundwork that went into the initial planning phases of this HCP was extremely thorough.

The Mojave Desert HCP, the largest HCP in the country with regards to land area, highlighted the drawbacks of not involving the public and stakeholder groups in the planning process. This plan has taken an inordinately long time to put together. There have been many sources of conflict from the numerous interest groups involved. In 2006, the USFWS finalized its Biological Opinion for the federal (BLM) portion of the West Mojave HCP. After 15 years of planning effort, on March 13, 2006, the BLM signed the Record of Decision for the Final Version of its Plan. Subsequently, in August of 2006, a coalition of conservation groups filed suit in federal court to overturn the BLM's West Mojave Plan and the USFWS' Biological Opinion. The groups mention the failure of the plans to "protect private property, conservation lands and endangered wildlife from off-road vehicles across the California Desert Conservation Area in Imperial, Riverside, San Bernardino, Los Angeles, Kern and Inyo Counties." The groups are seeking full implementation of the conservation measures required to preserve and recover the desert tortoise as outlined in the 1994 Desert Tortoise (Mojave Population) Recovery Plan (USFWS, 1994).

The HCP component of the West Mojave HCP is still being formulated and is expected to take at least two more years. The California Department of Fish and Game is working with local and county jurisdictions to develop conservation measures that will be sufficient for the HCP to fulfill the "fully mitigated" requirement of the California Endangered Species Act.

A Memorandum of Agreement (MOA) is an important document that could help both public and private entities, as well as the applicant. It reduces some of the permitting workload of the federal agencies and assures the public that their interests will be considered during the interim planning period of HCP development. An MOA was written for both the West Mojave HCP and the Indian River County Emergency Armoring HCP.

Determining how many alternatives will be considered and their content is an important step in the planning process. Each of the alternatives needs to be fully evaluated. The economic effects of each of the alternative needs to be determined so as to understand the costs associated with each potential decision. Also, a biological assessment needs to be conducted for each alternative to understand fully the impacts and minimization and mitigation strategies that will be needed.

Developing monitoring plans and adaptive management planning is also integral to an HCP. This portion of the HCP needs to be strongly defined, with specific goals outlined and funding sources defined. The Pima County HCP (Sonoran Desert Plan) proponents are still working on this aspect of the HCP.

Regional habitat conservation planning is typically a proactive effort to combine the conservation of species and their habitats with land use planning for growth and development. The existing project-by-project permitting process typically remains an option within regional planning areas. There are advantages and disadvantages to the regional approach compared to the

project-by-project approach. Advantages include a greater flexibility in determining locations of conservation areas and a better integration with local land use planning processes. The completed plan adds predictability to the development process, and thereby helps expedite approval. However, developing an HCP is a complex process that requires significant knowledge, foresight, time, broad stakeholder participation and consensus, and strong, unbroken political support from elected officials. Disadvantages to this path include large up-front costs, with the benefits of the plan being unrealized for years because of the long time needed to develop the plan and process the permits.

In the long run, large-scale HCPs provide a very effective method for the conservation of species, habitat, natural communities, and ecosystem processes. There are lessons to be learned from all of the HCPs reviewed; however, the HCP process allows for such flexibility in design that no single plan can be used as a template for the development of the Florida Beaches HCP. Rather, we benefit from the information provided in this document to guide this process.

Clark, F., (USFWS). 2008. NiSource Habitat Conservation Plan. (Personal Communication).

FNAI. 2000. Florida Natural Areas Inventory.

Indian River County Public Works Department. 2002. Prepared By Ecological Associates, Inc. Habitat Conservation Plan: A Plan For The Protection Of Sea turtles On Eroding Beaches In Indian River County, Florida.

Jones and Stokes. 2006. East Contra Costa Habitat Conservation Plan and Natural Community Conservation Plan.

Malakar, S. B., and R. G. Dean. 1995. Erosion Due To High Frequency Storm Events (18 Selected Coastal Counties of Florida), User's Manual, Prepared for Florida Department of Environmental Protection, Office of Beaches and Coastal Systems, Tallahassee, Florida. November.

RECON Environmental Inc. 2006. Draft Pima County multi-species conservation plan. Report to the Pima County Board of Supervisors for the Sonoran Desert Conservation Plan, Tucson, AZ.

State of Florida. Department Of Environmental Protection. Division of Recreation and Parks. 1997. Avalon State Recreation Area Unit Management Plan.

State of Florida. Department Of Environmental Protection. Division of Recreation and Parks, 1998. Sebastian Inlet State Recreation Area Unit Management Plan.

U.S. Bureau of Land Management. 1980. California Desert Conservation Area Plan.

U.S. Bureau of Land Management. 1999. Current Management Situation of Special-Status Species in the West Mojave planning area. Emily Cohen (ed.). Report produced by West Mojave Team to assess current management and gaps in the protection for species covered by the Plan. Barstow, CA.

U.S. Department of the Interior, Bureau of Land Management, California Desert District. 2005. West Mojave Desert Habitat Conservation Plan.

United States Fish and Wildlife Service. 1991. Final Environmental Assessment and Land Protection Plan for the Proposed Expansion of Pelican Island National Wildlife Refuge.

United States Fish and Wildlife Service. 1994. Desert Tortoise (Mojave Population) Recovery Plan.

United States Fish and Wildlife Service. 1999. South Florida Multi-Species Recovery Plan. Atlanta, Georgia.

United States Fish and Wildlife Service and the National Marine Fisheries Service. 1996. Habitat Conservation Planning and Incidental Take Permit Processing Handbook.

University of Georgia. School of Ecology, River Basin Center. 2007. Etowah Habitat Conservation Plan.

Zheng, J., and Dean, R.G., 1997. "Comparison of Erosion Models for Storms at Ocean City, MD," Technical Report, Coastal Engineering, University of Florida, Gainesville, Florida.