

Conservation Connections

NEWSLETTER OF THE NATIONAL HABITAT CONSERVATION PLAN COALITION

MISSION

To further the use and effectiveness of, and support for, large scale Habitat Conservation Plans (HCPs) as local solutions to facilitate economic development and the conservation of threatened and endangered species and their habitats.



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President's Message

Hello and thank you for reading the first edition of the *Coalition Connection*, the newsletter of the National Habitat Conservation Plan Coalition (NHCCPC)! We are very excited to present this information and hope that you find it helpful. For those that may be new to the NHCCPC or are considering becoming a member, my name is Valerie Covey, Williamson County, TX Commissioner, and I am privileged to serve as the chair for this collaborative organization. I, like many of you, returned home from the USFWS National Conference Center in West Virginia, energized from our Annual Conference in November 2019. It was a wonderfully informative conference and a great opportunity to learn about and discuss various issues regarding HCPs from across the country. We also appreciated the time we had to visit with our partners from the US Fish & Wildlife Service.

Due to COVID-19, instead of meeting in Austin, TX for the 2020 NHCCPC Annual Conference, as originally planned, our committee has decided that the event will be a two day virtual experience that we are working hard to make beneficial and educational. **Please save the dates of November 17-18, 2020.**

I am also excited to announce that the 2021 NHCCPC Annual Conference will be held October 4-8, 2021 in Austin, Texas. Not only will we hear from knowledgeable speakers, get legislative updates and have an opportunity to learn about various HCPs, but we've also allocated conference time to observe local species and HCPs in action. Be sure to save the date and join us in Texas for the 2021 Annual Conference; I promise you won't want to miss it!

It is my hope that this newsletter allows you to share this coalition's goals and purpose with those around you. Please refer this newsletter and our website <https://www.nhccpccoalition.org/> to other HCPs or those looking to create an HCP so that we can continue to collaborate and execute our Coalition's mission.

Sincerely, *Valerie Covey*



Williamson County Conservation Foundation, Texas. For more, see <https://youtu.be/SvMKBzukeE>.

The 2020 NHCCPC Annual Meeting will be virtual this year. The Coalition is working to finalize details, dates and speakers and will provide updates via the NHCCPC website and email. We look forward to having you join us at the virtual meeting this year, and in Austin, Texas, in 2021.

Coalition Basics: Introducing the National HCP Coalition



The Coalition, founded in November 2015, consists of a variety of entities involved in large scale Habitat Conservation Plans (HCPs) to mitigate impacts to rare species by development projects in accordance with Section 10 of the federal Endangered Species Act. These include public and private organizations implementing or preparing HCPs, consulting companies, stakeholders, scientists and others active in HCPs or HCP policy issues. Staff of the U.S. Fish and Wildlife Service (the Service) attend annual meetings and are ad hoc members of some of our committees. The Service provides information and advice but is not a member of the coalition.

The goals of the Coalition are to:

- * Promote the use of large scale HCPs, from county or watershed scales to multi-state plans.
- * Increase the understanding of the value of HCPs, including effective biological conservation and streamlining the permitting of economic activities.
- * Reduce the need to list additional species as under the federal Endangered Species Act through pro-active conservation measures.
- * Ensure adequate funding and staffing for the preparation, permitting and implementation of HCPs.
- * Determine and promote steps to increase the speed of HCP preparation.
- * Promote integrated permitting, such as Section 7 Incidental Take authorization of the federal Endangered Species Act and permitting under Section 404 of the Clean Water Act.
- * Promote actions that improve the effectiveness of HCP implementation.
- * Share HCP lessons learned and success stories.

How We Function

The Coalition works through a number of Committees, holds a 2-3 day Annual Meeting in the fall, makes a spring trip to Washington D.C. for meetings with administrative and legislative individuals, and hosts a web site. It also provides comments on proposed changes to relevant federal regulations and policies.

Our web site [www.nhpccoalition.org] has a variety of materials including our adopted policies, successes stories, lessons learned, and a discussion forum. Policies are developed by the Board, then discussed, approved or rejected at the Business Session of the Annual Meeting. The Coalition is a membership organization, based primarily on organizations rather than individuals. For information on member benefits and how to join, [visit the Join/Donate link.](#)

Coalition Committees

The Coalition is managed by an elected Board of Directors that meets monthly. The Board develops program ideas and new policies, as well as overseeing Coalition finances and membership. For additional information, please contact the Board's Executive Secretary, Gary Boyd, at gboyd@wilco.org.

The Government Relations Committee tracks federal government views, proposals, and actions as they pertain to HCP policy and funding in Washington D.C. and communicates needs for existing and future HCPs to the Service and other federal permitting entities. The Committee also comments on proposed regulations and policies relevant to HCPs and promotes funding for the Cooperative Endangered Species Conservation Program. In addition, it organizes an annual trip to Washington D.C. to support face to face meetings between Coalition members and elected officials to promote policies and actions beneficial to HCP. For information, contact the Committee Secretary, John Hopkins, at john4ieh@gmail.com.

The HCP Improvement Committee develops ideas and solutions to improve the efficiency of HCP preparation and the effectiveness of HCP implementation. The Committee has a Mentoring Program to help applicants that are preparing new HCPs or implementing HCPs obtain guidance and expertise. Contact the Committee Chair, Paola Bernazzini, at paola.bernazzini@icf.com.

The Program Committee develops Annual Meeting agendas and provides other meeting support as needed. Contact the Committee Chair, Abigail Fatement, at abigail.fatement@dcd.cccounty.us

Annual Meetings

Our Annual Meetings provide an excellent opportunity to learn through extensive presentations, discussions, and networking among the wide variety of Coalition participants. Presentations focus on current issues, case studies, and solutions developed by HCPs from across the country. A summary of the 2019 annual meeting is included on Page 3. Because of the Covid-19 pandemic, the 2020 annual meeting will be held in a virtual format.

Coalition Web Site

Our web site, www.nhpccoalition.org, includes various materials such as lessons learned and examples of successful HCPs. In addition, a forum is being developed to host solution sharing between HCP practitioners. We welcome additional items for the library; for questions or to contribute, please contact the Coalition Coordinator, John Hopkins, at john4ieh@gmail.com.

2019 Annual Meeting Summary

By Terah Donovan, Principal Conservation Biologist at Environmental Science Associates

Our Annual Meeting took place at the U.S. Fish and Wildlife Service's National Conservation Training Center in Shepherdstown, West Virginia, November 13-15, 2019.

Nearly 120 attendees from 20 states representing 40 HCPs attended. This once-a-year gathering of our community of practice enjoyed 33 technical, policy, and interactive presentations over the two-and-a-half day conference. Meeting attendees included individuals affiliated with private, non-profit, and public sectors –all working to develop, implement, and/or advocating for the use of HCPs as landscape-level solutions for endangered species conservation and economic development. As always, the Annual Meeting provided a unique opportunity for HCP applicants and permittees to meet with state and federal wildlife agencies both during daytime sessions and evening fireside chats. The business session allowed for members and potential members to inform Coalition priorities for 2020.

Highlights include the following:

The **HCPs and Climate Change** presentation provided strategies and tools for HCP planning and implementation. Presenters and panelists from Texas and California provided examples of how climate change was or was not incorporated into the HCP planning process and affects of climate change on HCP implementation. The Coalition released a white paper in January 2020 summarizing research on this topic by Dr. Jodi McGraw and Dr. Nicole Heller. The white paper is available online [here](#).

Wildlife Connectivity presentations from California and Florida looked at how HCP preserves and green infrastructure contribute to habitat corridors for HCP species. Presenters highlighted the effectiveness of methods such as photographs to communicate the importance of corridors to politicians and the public.

The **Data and Tools for Refining At-Risk Species Distributions** presentation highlighted work by Dr. Healy Hamilton at NatureServe using Natural Heritage program elemental occurrence data to develop species distribution models and refine range information for 2000 at-risk species in the continental United States.

U.S. Fish and Wildlife Service management provided updates to attendees on an additional \$7M in funding for USFWS staff dedicated to processing HCPs and the forthcoming federal Endangered Species Act Section 6 awards. The Notice of Funding Availability for Section 6 funds from FY20 is anticipated in March 2020. The backlog of \$143M of appropriated, unallocated Section 6 funding was also discussed, along with the associated lack of funding applications for grant program. Anyone interested in Section 6 planning grants was encouraged to apply with confidence that funds are available.

The **Highlighted HCPs** included nine plans covering forest management, renewable energy, water districts, and local governments. Presenters discussed the challenges and successes of their planning and implementation efforts.

The Federal Endangered Species Act **Section 7 and Section 10 Integration** presentation focused on the successes and challenges of permit integration and how practices vary state by state. Promoting streamlined Section 7 consultations for projects covered by HCPs is a priority for the Coalition.

The **Strategies to Facilitate Cooperation with Researchers** presentation provided details on state and federal agencies conducting research on issues related to HCP implementation. Resources, including grant funds, are available for collaboration with these researchers on topics such as monitoring methods and adaptive management.

The **Latest NEPA and SO 3355 Compliance News** presentation emphasized the importance of the pre-NEPA process and



NEPA timeline from the consultant, applicant, and USFWS perspective. Further guidance from USFWS is expected in 2020.

The **Key Elements for Successful HCP Planning** presentation included six recommended elements for successful HCP permitting, including (1) maintain momentum, (2) create positive relationships, (3) know the entire process (HCP Handbook is an excellent resource), (4) understand alternatives, (5) minimize complexity, and (6) go back to your stakeholders frequently and keep them engaged.

Setting 2020 Priorities was a brainstorming session that allowed all conference attendees to identify their HCP challenges that impede reaching their vision. Session outcomes will inform the work of the NHCP Improvement Committee in 2020 and beyond.

The **Unexpected in Reserves and Species Management** session looked at social and species conflicts that emerge during HCP development and implementation. Topics included homeless encampments, off-road vehicle use, the range increase of the barred owl into the northern spotted owl range, and how to assess recreation use and the need for enforcement.

The **Collaborative Regional-Scale Trend Monitoring** presentation looked at how regional monitoring informs HCP implementation, including species trends, monitoring methods, emerging threats, and management needs.

If you read this far, you can continue with the full presentations here: <https://www.nhcpcoalition.org/2019-annual-meeting/>

Highlighted HCP: The Auwahi Wind Project HCP, Hawai'i

By Marie VanZandt, American Electric Power, Renewables



The Hawaiian Islands are home to a remarkable array of endemic flora and fauna, yet it is often referred to as the endangered species capital of the world. At the same time, the isolated nature of these islands has led to a reliance on fossil fuels for energy production. In an attempt to reduce its dependence on imported fuels, Hawai'i established a Renewable Portfolio Standards (HRS Chapter 269-92) mandating 100 percent renewable energy by 2045 with a 4,300-gigawatt-hour reduction in electricity use by 2030. To achieve these goals, we needed to balance the island's new renewable energy infrastructure needs with the potential impacts to endangered species. The Auwahi Wind Project team selected an HCP approach to support of their Federal Incidental Take Permit (ITP) and State Incidental Take License (ITL) and deliver the desired project outcomes.

Auwahi Wind Project

- § 8 Siemens 3MW turbines and 11MW battery
- § Operational since December 2012

ITP/ITL issued for 25 years

- § HCP covered species include: the ʻōpeʻapeʻa or Hawaiian hoary bat (*Lasiurus cinereus semotus*), 'ua'u or Hawaiian petrel (*Pterodroma sandwichensis*), nēnē or Hawaiian goose (*Branta sandvicensis*), and the Blackburn's sphinx moth (*Manduca blackburni*).

The Auwahi Wind Project was only the second renewable energy facility to receive an ITP/ITL in Hawai'i, after an earlier project was permitted two years prior. Given this situation, the potential impacts to covered species were not fully understood. At the beginning of the project, the regulatory agencies shared significant concerns regarding potential impacts to Hawaiian petrels, including a nearby nesting colony on the summit of Haleakalā. Data were also lacking on the range of the Hawaiian hoary bat, leading to questions of whether the bat should even be included as a covered species.

After the first few years of intensive post construction monitoring were collected, the data revealed actual impacts to HCP covered species. Within two years of monitoring, it became apparent the Project impacts to the Hawaiian petrel were much lower than expected. In contrast, impacts to the Hawaiian hoary bats were much higher than anticipated, resulting in voluntarily adaptive management of operations to limit impacts as much as possible. Even so, it was determined that a major HCP amendment was appropriate, and the major HCP amendment process that began in 2015 was finalized in 2019. The original mitigation for bats included a conservation easement with the Hawai'i Island Land Trust and a 130-acre reforestation project to promote bat roosting habitat. Additional mitigation for the bat increases the size of the conservation easement while creating and enhancing bat foraging habitat. In addition, the HCP amendment fully funded a Hawaiian hoary bat occupancy study on the leeward side of Haleakalā.

The Auwahi Wind HCP is now into its eighth year of implementation. Over the course of plan implementation, the Project has brought the local community together through regular engagement and outreach activities. The Auwahi HCP implementation team tirelessly ensures all of the mitigation obligations are met while actively participating in local conservation recovery projects like bird banding with the Maui Nui Seabird Recovery Project, out-planting with the Leeward Haleakalā Watershed Restoration Partnership, and restoration trips with the Kahoolawe Island Reserve Commission. In turn, the community has taken an interest in the restoration activities and joined in regular Friends & Ohana visits to the mitigation sites. The implementation of the Auwahi Wind HCP has been a success and demonstrated how community, conservation and renewable development can prosper together.

Species	Requested Authorization
Hawaiian petrel ('ua'u)	64 adults/ 23 chicks
Hawaiian goose (Nēnē)	5 adults/fledglings
Hawaiian hoary bat* ('ōpeʻapeʻa)	140 adults
Blackburn's sphinx moth	28 acres permanently disturbed

*Original ITP/ITL was for 21 adults, 2019 amendment increased to take to 140 adults over 25-yr permit term



Climate Change Adaptation Approaches for Habitat Conservation Plans

By Jodi McGraw, Ph.D., Jodi McGraw Consulting

From the Executive Summary of a 2020 report prepared for the National HCP Coalition. The full report is available at www.nhpccoalition.org/documents/coalition-documents/.

Human activities are estimated to have increased global temperatures 1.0 °C (1.8 °F) above pre-industrial levels (1901-2016) and the climate is expected to increase another 1.4 °C (2.5 °F) by the middle of the century, regardless of emissions reductions (Hayhoe et al. 2018). Due to direct and indirect effects of temperature increases, which include extreme rainfall, drought, sea level rise, and altered fire regimes (Jay et al. 2018), climate change has been ranked as the third leading driver of species extinction.

Habitat Conservation Plans (HCPs) and Natural Community Conservation Plans (NCCPs) can play an essential role in preventing species extinctions in the United States. For HCPs and NCCPs to be successful, they will need to address the threats posed by climate change, which has the potential to alter the effectiveness of HCP conservation strategies and exacerbate the detrimental effects of a plan's covered activities.

Recognizing the need for more information and guidance about how to address climate change in HCPs, members of the National HCP Coalition initiated this project to identify and address key climate adaptation approaches for HCPs based on a review of scientific literature, practitioners' guides, and other resources such as websites.

CLIMATE ADAPTATION APPROACHES

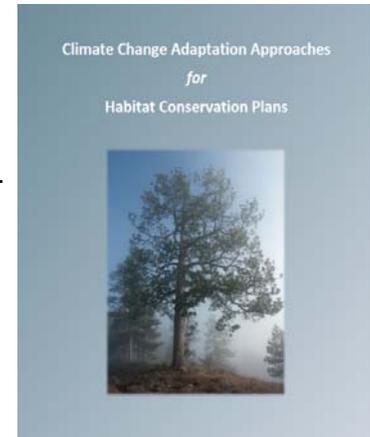
Six climate adaptation approaches were selected because they are anticipated to

be: 1) widely applicable across various HCPs; 2) impactful, in terms of facilitating ac-meaningful conservation goals for species as well as broader communities and ecosystems; and 3) robust to multiple climate change futures and/or able to be adapted to the context of specific HCPs by practitioners using straightforward methodologies.

1) Assess Climate Change Threats and the Vulnerability of Species

A crucial strategy for climate-adapted HCPs is to identify the anticipated climate changes in the plan area, assess the vulnerability of the covered species and their habitats to the anticipated changes, and develop and implement strategies to increase resiliency of the species based on the results of the analysis. Projections should be based on the most recent, highest-resolution (downscaled) climate models available for the HCP plan area; multiple scenarios should be independently evaluated (rather than averaged) as they may predict disparate climate futures (e.g., hotter and drier vs. hotter and wetter).

Once the anticipated climate changes are known, conceptual ecological models, species distribution models, and vulnerability assessments can be used to identify their potential implications for covered species populations, distributions, and habitats. This information can inform all aspects of an HCP, including the conservation strategy as well as the covered species selection and changed circumstances analysis. In the Balcones Canyonlands Conservation Plan (TX), a local climate projection was commissioned and used to evaluate the vulnerability of the covered species to climate change; this vulnerability analysis, in turn, informed habitat protection and manage-



ment

activities that are being implemented as part of the conservation strategy

2) Conserve the Geophysical Stage

Although complex interactions between climate, ecosystems, and human systems make it difficult to predict the ultimate effects of climate change on a given species and its habitat, HCP reserve systems should protect and connect the geologic, soils, and hydrologic conditions that support a covered species; safeguarding these land facets across a range of abiotic gradients (e.g., latitude and topography) can help sustain species by providing migration opportunities to allow them to stay within their climate envelope.

Protecting a range of geophysical conditions within the plan area can also help protect the 'evolutionary stage' that drives diversification (Beier and Brost, 2010), thus sustaining the biodiversity that promotes ecosystem resiliency (Oliver et al., 2015). For example, the Santa Clara Valley Habitat Conservation Plan (CA) is working to conserve and manage system serpentine soils across a range of environmental gradients within its reserve, in order to capture the variable microclimates and promote persistence of the 10 covered species that inhabit these unique communities.

3) Protect Climate Change Refugia

Habitat conservation plans can conserve covered species by identifying,

Climate Change Adaptation Approaches for Habitat Conservation Plans (cont.)

protecting, restoring, and connecting areas that buffer species from climate changes; these include persistent refugia that can sustain populations as well as more transient refuges that can reduce an individual's exposure to climate change. Planners and implementers of HCPs can use climate projections, conceptual models, and climate change vulnerability assessments to identify refugia and refuges, which should be mapped to facilitate their conservation in the HCP conservation strategy including: 1) avoidance by covered activities, 2) inclusion in reserve systems, 3) active management, as needed to sustain their value and functions, and 4) connection within the landscape to support species access to them. General refugia from a warming climate, including north-facing slopes, wet areas, and areas where species can stay within their climate envelope with relative short-distance movements (i.e., areas of low climate velocity), can be protected to promote biodiversity conservation and resiliency of ecosystems (Oliver et al., 2015). In the Balcones Canyonlands plan, implementers used a local climate projection and vulnerability assessment to identify mesic forests and deeper caves as covered species climate refugia, which they are protecting, restoring, and managing.

4) Enhance Regional Connectivity

Habitat conservation plans can promote species adaptation to climate change by identifying and protecting broad landscape



linkages (2 km or 1.25 miles; Beier, 2019) to promote species migration in response to a changing climate. When compared to narrow wildlife corridors, such broad landscape linkages can: 1) support diverse habitat conditions that will be conducive to movement of multiple species as conditions change over time; 2) enable slower-moving species including plants to 'live in' the habitat and migrate over multiple generations; and 3) better buffer species against the influence of adjacent human activities and converted habitat. As with all corridors, broad landscape linkages should be located in areas that are most conducive to animal movement and the flow of other ecological processes. A variety of techniques have been developed to facilitate integration of climate change considerations into corridor design (Keeley et al., 2018).

Habitat conservation plans can also support species migration by facilitating wildlife movement through transportation infrastructure (i.e., road culverts, overpasses, or underpasses) or removing barriers such as fencing. Such measures to enhance permeability of the landscape were included in the Santa Clara Valley Habitat Plan, which also identifies a range of landscape linkages to be protected to promote migration in response to climate change.

5) Sustain Ecosystem Processes

Habitat conservation plans should include provisions to safeguard and restore ecosystem processes that sustain endangered species populations and promote native biodiversity, which can benefit rare species indirectly by promoting ecosystem functions and resiliency (Hooper et al. 2005, Oliver et al. 2015). Conceptual models can help illustrate the important ecological processes that can be driven by factors that occur away from covered species habitat. Mapping key drivers of ecosystem process in the landscape can help avoid altering them during implementation

of HCP covered activities; it can also help design the reserve system to protect and restore lands that are critical to maintaining important ecosystem processes.

Active habitat management within HCP reserves may be needed to address alterations of ecosystem processes, including those resulting from climate change. For example, where increased temperature, drought, and climatic water deficit increases fire frequency and severity, such as in the BCCP, vegetation management and other strategies can be used to reduce fire risk and conserve populations of fire intolerant species including those adapted to later-successional communities. Likewise, rare plant and animal populations can be sustained through livestock grazing to reduce competition from exotic plants, the growth of which may be promoted by climate change; such management is being used to promote rare serpentine species in the Santa Clara Valley Habitat Plan.

6) Employ the Climate-Smart Conservation Cycle

The long-term effectiveness of HCPs in a changing climate can be enhanced by integrating elements of the climate-smart conservation cycle—a framework for developing, implementing, monitoring, and adjusting conservation actions that is designed to enhance their effectiveness over time (Stein et al. 2014). Developed based on a more general adaptive management framework that has been recommended for HCPs (USFWS and NOAA Fisheries 2016), the climate-smart conservation cycle reflects important climate adaptation approaches including:

- An assessment of climate change impacts and vulnerabilities to ensure conservation actions specifically address the impacts of climate change in concert with other existing threats;

Climate Change Adaptation Approaches for Habitat Conservation Plans (cont.)

- Development of forward-looking goals and objectives that address decades to centuries; and
- Identifying multiple adaptation options based on a range of possible future conditions to account for uncertainties in future climatic conditions as well as ecological and human responses.

Robust monitoring in HCPs is essential to identify the need for modifications to conservation strategies as well as goals and objectives, in order to achieve the intent of the HCP conservation strategy.

RESILIENCY CONCEPTS

During the process of examining the climate adaptation approaches through the case studies, a number of additional concepts emerged for best practices to enhance resiliency of HCPs to climate change. They are organized under two main concepts: **bigger is better and flexibility and adaptation.**

1) Bigger is Better

Reflecting the widespread and pervasive nature of climate change and its impacts, the concept 'bigger is better' emerged often in evaluating methods to make HCPs more effective in a changing climate.

A. Bigger Reserves and Reserve Systems. Conservation areas for species should be as large as possible, all else being equal, to: 1) protect climate change refugia, 2) capture a diverse range of geophysical conditions needed to sustain species and promote biodiversity, 3) buffer habitat against the impacts of adjacent land uses, and 4) sustain larger populations of covered species, which are more resilient.

B. Bigger (Wider) Corridors. As discussed above, broad landscape linkages are better than narrow corridors as they provide 'live in' habitat that enable slower species (e.g., plants) to migrate over time; like larger reserves, broad

linkages capture more diverse conditions and buffer habitat against adjacent land uses.

C. Bigger Planning Area. HCPs will benefit from addressing a larger plan area, including areas that may be outside of the local land jurisdiction or land ownership. Working with willing partners in such a broader plan area will enable the conservation strategy to accommodate species distribution changes in response to climate, promote connectivity, and help sustain ecosystem processes within a larger, more holistic landscape.

D. Bigger (Longer) Timeframes. Longer permit terms for implementing aspects of the conservation strategy (if not the other covered activities) can promote its effectiveness by allowing more time to monitor and evaluate climate change effects on species and habitat, and to adapt the conservation strategy to address the observed changes.

E. Bigger Scope of Habitat Restoration and Management. Climate change is anticipated to exacerbate existing threats as well as result in new threats to species, necessitating more active habitat management. Habitat restoration can increase the area of suitable habitat thus promoting species' population persistence and resiliency to climate change.

F. Bigger (Better) Science. Scientific approaches will be needed to develop and implement robust conservation strategies in the face of climate change, including climate model projections, climate change effects analyses, and comprehensive monitoring of populations, communities, and ecosystems.

G. Bigger Tent. Partnering with research institutions can help facilitate efforts to

integrate science and scientific approaches into HCPs, which will also benefit from: 1) greater coordination with adjacent landowners, to facilitate more holistic landscape management, and 2) outreach to stakeholders and the broader community, to promote support for HCPs by communicating their benefits for multiple conservation values (e.g., water, cultural, and scenic resources) and climate change mitigation (i.e., protected habitat sequesters carbon).

2) Flexibility and Adaptation

Another key concept that emerged repeatedly during this project is the need for HCP conservation programs to be flexible to adapt to climate change.

A. Identify the Uncertainties and Develop a Flexible Conservation Program.

To be effective in the long-term, HCP conservation strategies should identify information gaps, which should be addressed through the adaptive management framework during implementation of the plan, including through long-term monitoring. Flexible conservation programs should include mechanisms to incorporate new scientific information, including the HCPs' monitoring results, and adapt to changes.

B. Flexible Reserve Systems. Because the suitability of land protected in HCP reserve systems for covered species



Climate Change Adaptation Approaches for Habitat Conservation Plans (cont.)

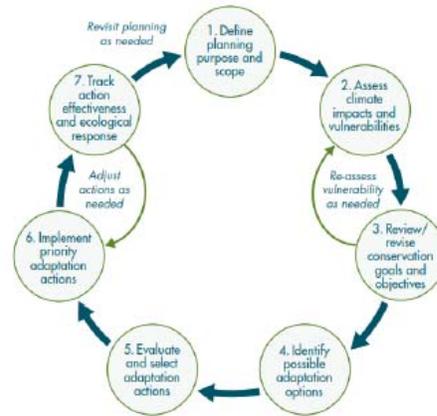
can change as a result of climate change, reserve systems created through HCPs should be flexible, if possible. Rather than providing for permanent protection of pre-identified lands, HCP reserve systems can be 1) assembled over time based on criteria for suitability, and 2) allow lands to change, including by using term easements (rather than permanent easements). These or other methods of ensuring that the land protected and managed through HCPs continues to support the species it is designed to benefit could be explored in a future project.

C. Flexible Restoration and Management Techniques. HCPs should identify restoration and management techniques that are anticipated to be successful, including based on multiple potential scenarios for the changing climate; they should also clearly identify (and analyze the effects of) alternative strategies that may be applied through the adaptive management framework (i.e., climate-smart conservation cycle).

D. Adaptive Funding. To meet the needs of an evolving conservation strategy, HCPs should feature adaptive funding including: 1) contingency funding for underestimated costs, 2) remedial funding to address issues encountered in implementing the plan and changed conditions, and 3) adaptive financial management, to adjust fees and funding over time based on actual needs. Surety/Performance Bonds and Escrow accounts may provide tools for HCPs that are not funded by participant fees and instead by landowners, who need financial assurances.

E. Enhance the Adaptive Nature and Flexibility of HCPs. HCPs should be written to build in adaptation, by identifying the uncertainties and describing how elements of the conservation strategy can evolve as they are addressed as part of the adaptive management framework.

More changes should be accommodated through adaptive management and/or the HCP amendment process should be streamlined, to avoid implementation of maladaptive plans 'at all costs'.



Climate-Smart Conservation Cycle
A General Framework for Adaptation Planning and Implementation
Figure 1: Climate-Smart Conservation Cycle (from Stein et al. 2014)

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