

Habitat Conservation Plans and Climate Change: Recommendations for Policy

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I. Introduction

The first habitat conservation plan (“HCP”) – the San Bruno Mountain HCP – was approved by the U.S. Fish and Wildlife Service in 1986 and covered 3,500 acres. Since 1986, approximately 670 HCPs have been approved by the Fish and Wildlife Service and the National Marine Fisheries Service (“Services”).¹ They cover almost 47 million acres of land with diverse habitats, including Florida scrub, long leaf pine, limestone karst, Southwest desert, and old growth timber. The vast majority of HCPs have been approved since January 1998, a reflection of the success of policies developed during the Clinton Administration and refined during the Bush Administration that were designed to provide incentives for landowners to protect rare habitats. The Services published their “Habitat Conservation Planning and Incidental Take Permit Processing Handbook” (“Handbook”) in 1996 and an addendum to the Handbook in 2000. The Handbook provides guidance to the Services on the processing of HCPs and the public when preparing HCPs and navigating through the regulatory process.

Climate change is not mentioned in the Endangered Species Act, its implementing regulations, or the HCP Handbook. The impact of climate change on threatened and endangered species and their habitats was not considered by Congress when the Endangered Species Act (the “Act” or “ESA”) was passed, or by the Services when the regulations and Handbook were written. But it is apparent today that climate change is having an impact on fish and wildlife and, even if aggressive mitigation strategies are implemented in the near term, will continue to affect natural systems for decades to come. The Services recognize this and have announced a Climate Action Plan that includes a series of implementation measures, including a commitment to identify which species are most at risk from climate change and to revise Service policies to take climate change into account.²

This paper briefly sketches the challenges that climate change poses for successful habitat conservation planning, highlights key policy issues, and makes recommendations at several levels. First, we identify significant overarching complexities associated with addressing climate change in HCPs and recommend steps to address them. Second, at a detailed level, we identify key provisions in the Services’ regulations and the Handbook that seem to be at odds, some requiring that climate change be taken into account while others complicate that task, and recommend revisions to facilitate consideration of climate change impacts on species. Improving the use of adaptive management in HCPs is critical. Finally, we suggest that effective conservation planning in the face of climate change requires that habitat conservation planning be considered in the larger geographic and policy context, and coordinated with other conservation practices. Many, though perhaps not all, of our recommendations may be considered as “best practices” for habitat conservation planning, irrespective of the existence of climate change as an additional stressor.

¹ Environmental Conservation Online System (ECOS):
http://ecos.fws.gov/conserv_plans/servlet/gov.doi.hcp.servlets.PlanReport

² The Climate Action Plan is available on the web at
<http://www.fws.gov/home/climatechange/pdf/CCDraftActionPlan92209.pdf>.

II. The Legal Background for Habitat Conservation Planning

Section 9 of the Endangered Species Act prohibits the “take” of any species of fish or wildlife that has been listed as endangered by the Services.³ “Take” is defined broadly in the act as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”⁴ Joint Service regulations further define “harm” as “an act which actually kills or injures wildlife,” including “significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.”⁵ The U.S. Supreme Court upheld that regulatory definition in Babbitt v. Sweet Home Chapter of Communities for a Great Oregon.⁶

So-called “incidental take” -- take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity -- may be authorized by the Services pursuant to ESA Section 10(a)(1)(B) (for non-federal actors). Created by Congress in 1982, the incidental take provision requires that a permit applicant submit a conservation plan specifying the impacts that will result from the taking, steps the applicant will take to minimize and mitigate those impacts, alternative actions that the applicant considered, and any other measures the Services deem necessary and appropriate.⁷ The Service must issue the permit if it finds that the taking is incidental, the applicant will minimize and mitigate the impacts of the taking to the maximum extent practicable (the “MEP standard”), the applicant will ensure adequate funding for the conservation plan, and the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.⁸

In addition, Section 7 of the ESA requires all federal agencies to consult with the Services to ensure that “any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification” of critical habitat.⁹ In the context of the approval of an HCP, the Service must carry out an intra-agency consultation to ensure that issuance of the incidental take permit will not result in jeopardy to a listed species.¹⁰ It is Service policy to integrate the Section 7 review process with the development of the HCP pursuant to Section 10, to avoid unnecessary delays to the permit applicant.¹¹ That integration makes sense because the Section 7 “no jeopardy” standard is nearly identical to the finding required under Section 10 that the taking “will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.” In fact, that language in Section 10 was

³ 16 U.S.C. § 1538(a)(1)(C). The take prohibition has been extended by the Services to almost all listed threatened fish and wildlife species pursuant to regulation. The authority to regulate to conserve threatened species is found at 16 U.S.C. § 1533(d).

⁴ 16 U.S.C. § 1532(19).

⁵ 50 C.F.R. § 17.3 (2009).

⁶ 515 U.S. 687 (1995).

⁷ 16 U.S.C. § 1538(a)(2)(A); 50 C.F.R. §§ 17.22(b)(1), 17.32(b)(1) and 222.22.

⁸ *Id.* § 1538(a)(2)(B).

⁹ 16 U.S.C. § 1536(a)(2).

¹⁰ U.S. FWS & NMFS, HABITAT CONSERVATION PLANNING HANDBOOK (1996). (Hereinafter “HCP Handbook”) at 3-15.

¹¹ *Id.* at 3-16.

borrowed directly from the regulatory definition of jeopardy.¹² Destruction or adverse modification of critical habitat is defined as “a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species.”¹³

The Services seem to regard the Section 7 standard as identifying the allowable increment of take for any species, and allocate that element among competing uses through consultation. Whether a proposed action will cause jeopardy or adverse modification is evaluated by considering the action’s effects when added to the environmental baseline. “The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process.”¹⁴ The first projects in line for consultation have first claim on the available increment.

A. The relationship between jeopardy and adverse modification and recovery.

The relationship between jeopardy and recovery is somewhat murky. The Services’ Joint Regulations define jeopardy by reference to both impacts on the species survival *and* recovery, in the conjunctive. Recovery, which implies reaching a level of population size and security sufficient that the species no longer requires ESA listing, is a higher standard than mere survival. Under the Joint Regulations, since a jeopardy finding requires a determination that *both* survival *and* recovery will be impaired, it would appear that impacts on recovery alone will never justify such a finding. However, interfering with recovery when the species is already badly reduced may itself put survival at risk, failing the jeopardy standard.¹⁵

Similar confusion surrounds the “destruction or adverse modification of critical habitat” prong. As with jeopardy, the Joint Regulations define adverse modification as an impact which appreciably diminishes the value of critical habitat for both survival and recovery. However, two federal circuit courts have struck down that definition, concluding that adverse modification must include changes that diminish the likelihood of recovery alone,¹⁶ and two others appear to agree.¹⁷

As the above discussion makes clear, there is in general some confusion about precisely what must be shown in order to determine that a federal action is consistent with the substantive standards of Section 7(a)(2). The same can be said with respect to the standard for issuing an incidental take permit under Section 10.

¹² H.R. Conf. Rep. 835, 97th Cong., 2d Sess., *reprinted in* 1982 U.S. Code Cong. & Admin. 2860, 2870.

¹³ 50 C.F.R. § 402.02.

¹⁴ *Id.*

¹⁵ National Marine Fisheries Service, *The Habitat Approach: Implementation of Section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids* (1999).

¹⁶ *Gifford Pinchot Task Force v. U.S. Fish & Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004); *Sierra Club v. U.S. Fish & Wildlife Service*, 245 F.3d 434 (5th Cir. 2001).

¹⁷ *New Mexico Cattle Growers Ass’n v. U.S. Fish & Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001), *Miccosukee Tribe of Indians v. U.S.*, 566 F.3d 1257 (11th Cir. 2009).

Congress created the incidental take program to accommodate a proposal to combine development and conservation at San Bruno Mountain in California, home to two listed butterfly species.¹⁸ The San Bruno Mountain plan, which was the model for the program,¹⁹ affirmatively contributed to recovery by providing a net benefit to the species.²⁰ Nonetheless, the language of Section 10 does not explicitly require that HCPs provide an affirmative benefit to the species, and the Services have consistently interpreted the law not to impose such a requirement. The only court to directly consider the issue has endorsed the Services' position.²¹ While they do not believe HCPs must promote recovery, the Services' have said that the biological goals of HCPs should be "consistent with" recovery, and that "applicants should be encouraged to develop HCPs that produce a net positive effect on a species."²²

B. No Surprises

The incidental take program languished in obscurity from 1982 to 1994, with few HCP approvals, or even applications. Then Interior Secretary Bruce Babbitt revived interest in the program, in large part by issuing the No Surprises policy, which assures permittees that they can rely on the deal they make with the Services. Since 1994, most of the HCPs approved by the Services have included No Surprises assurances with respect to all species that are "adequately covered" by the HCP.²³

The No Surprises policy rests on evidence that Congress intended the incidental take program to result in deals binding on the government as well as the permittee. The original HCP agreement for San Bruno Mountain development included a promise by the Services that no additional mitigation beyond that specified in the agreement would be required.²⁴ According to several commentators, that promise was essential to the developers' agreement.²⁵ Indeed, the Conference Report specifically explained that:

The Committee intends that the Secretary may utilize this provision to approve conservation plans which provide long-term commitments regarding the conservation of listed as well as unlisted species and long-term assurance to the proponent of the plan that the terms of the plan will be adhered to and that further

¹⁸ Robert D. Thornton, *Searching for Consensus and Predictability: Habitat Conservation Planning Under the Endangered Species Act of 1973*, 21 ENVTL. L. 605, 621 (1991).

¹⁹ H.R. Conf. Rep. 835, 97th Cong., 2d Sess., reprinted in 1982 U.S. Code Cong. & Admin. News 2860, 2871-72.

²⁰ See Craig Anthony (Tony) Arnold, *Conserving Habitats and Building Habitats: The Emerging Impact of the Endangered Species Act on Land Use Development*, 10 Stan. Env'tl. L. J. 1, 20-21 (1991) (reporting that biological study of San Bruno Mountain found that development would affect the habitat of listed butterflies, but "even if no development occurred, the butterflies' grassland habitat eventually would be lost because of encroaching brush and illegal off-road vehicular activity.").

²¹ *Spirit of the Sage Council v. Kempthorne*, 511 F. Supp. 2d 31, 42-43 (D.D.C. 2007).

²² Notice of Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. 35242, 35243 (June 1, 2000).

²³ "Adequately covered" means species addressed in an HCP which has satisfied the issuance criteria in section 10(a)(2)(B) of the ESA. 16 U.S.C. § 1538(a)(2)(B). See HCP Handbook at 3-30.

²⁴ The relevant provision is quoted in full in Donald C. Baur and Karen L. Donovan, *The No Surprises Policy: Contracts 101 Meets the Endangered Species Act*, 27 ENVTL. L. 767, 773 n. 30(1997).

²⁵ *Id.*; Thornton, *supra*. Note 18 at 625.

mitigation requirements will only be imposed in accordance with the terms of the plan.²⁶

As currently codified in Service regulations, the No Surprises rule distinguishes between “changed circumstances” and “unforeseen circumstances.” An HCP may specify that additional mitigation measures will be required of the applicant under changed circumstances.²⁷ However, if circumstances that were unforeseen during negotiation of the agreement later require additional conservation measures, the Services have only limited authority to require changes in the conservation plan. They cannot require additional financial commitments or impose new restrictions on land or resource use unless the permittee agrees.²⁸

Pursuant to the Services’ No Surprises policy and regulations, the permit holder is guaranteed that, provided she is in good faith carrying out the terms and conditions of the HCP, the Service will not seek any additional mitigation through the HCP, even if unforeseen circumstances occur that threaten the species covered by the permit.²⁹ This means that the Services will not require additional land, restrictions on land use, or additional funds from permittees who are implementing an approved HCP. If additional mitigation measures are deemed necessary after the permit has been issued, the obligation to provide those measures rests not with the permit holder, but must be borne by the Federal government or others.³⁰ The only exception to No Surprises is in the case of “extraordinary circumstances;” however, the exception is a narrow one. The Services have the burden in all instances of demonstrating that extraordinary circumstances exist. If the Services meet that burden, any additional mitigation measures imposed on the permit holder must be limited to modifications of already conserved habitat areas, lands already protected by the HCP, or to the operating provisions of the HCP. Additional payments of funds for conservation or commitments of land will not be required unless the permittee consents.³¹

III. Accounting for Climate Change in HCPs

Climate change poses serious difficulties for conservation planning, difficulties that must be addressed on both publicly-owned lands and privately-managed preserves. When designing an HCP, it is important to evaluate the potential future impacts to the covered species and their habitats that will result from climate change, just as impacts from fragmentation, disease, predation, and other threats must be considered. In some instances, changes in temperature and precipitation patterns will simply exacerbate existing threats to endangered species, and make worse the impacts of habitat loss and fragmentation, invasive species, disease, changes in habitat quality, water scarcity, and the frequency of extreme events, such as floods, droughts, and wild fires. But because of climate change, there is the real possibility that preserves set aside today for endangered species may no longer be suitable habitat for those species within the next few decades. In the context of HCPs, there are two distinct challenges: (1) accounting for climate

²⁶ H.R. Conf. Rep. 385, 97th Cong., 2d Sess., at 30, *reprinted in* 1982 U.S.C.C.A.N. at 2871.

²⁷ 50 C.F.R. 17.22(b)(5); 50 C.F.R. 17.32(b)(5).

²⁸ *Id.*

²⁹ 50 C.F.R. § 17.22; 63 Fed. Reg. 8859 (Feb. 23, 1998).

³⁰ *See* HCP Handbook at 3-29 and 3-30.

³¹ *Id.* at 3-30 and 3-31.

change appropriately in future HCPs; and (2) ensuring the survival of species that are covered by conservation plans that have already been approved. The question of who should bear the cost of conservation when climate change is a principal stressor is intertwined with these issues.

HCPs must take climate change into account in several ways, which we outline below. First, using the best available scientific evidence, federal agencies must consider the effects of climate change when determining whether a proposed action is consistent with the substantive requirements of Section 7(a)(2). Climate change is an element of the “baseline” conditions in light of which the effects of the proposed action should be evaluated.³² If available models and other evidence suggest that climate change is likely to make a species more vulnerable to habitat loss or other impacts, the jeopardy threshold should be adjusted accordingly. In other words, in some cases the existence of climate change impacts will affect the level of take that can be authorized through an incidental take permit. Where the effects are merely speculative, however, the Ninth Circuit has held that they need not be considered.³³

In addition to factoring in the impacts of climate change when establishing the jeopardy baseline for the species, the Services should consider climate change in HCPs when addressing scientific uncertainty, evaluating proposed preserve designs, evaluating adaptive management plans, and assessing the plan in the context of the affected ecosystem as a whole. Below we briefly describe several of the HCPs that have incorporated climate change in some way to date, and then we make recommendations for taking climate change into account in new and existing HCPs.

IV. A Snapshot of Regional HCPs

The HCPs that have been approved by the Services to date cover a broad range of activities. Some are small in scale and scope, encompassing a small amount of habitat for a single species. Others cover much larger areas, occasionally the entire range of the covered species, and include multiple participants and complicated structures for participation, monitoring, and oversight. Much of the total acreage encompassed by HCPs is concentrated in a relatively small number of regional HCPs (“RHCPs”): 96% of the acreage covered by HCPs is in just 32 regional plans. For a number of years, the Services have encouraged the creation of regional plans because of their potential to simplify the administrative burden of compliance with the ESA and the opportunity that they present to conserve large blocks of habitat on a scale that is impossible with numerous individual HCPs spread across the landscape.³⁴ Particularly for listed species that occur primarily on private land, RHCPs are a critical conservation tool, because of the opportunity to protect or restore relatively unfragmented blocks of habitat. For species whose chances for survival will be further undermined by climate change, RHCPs could provide an important safety net, especially when developed in conjunction with other conservation efforts such as safe harbor agreements, mitigation banks, and conservation on public lands.

³² NRDC v. Kempthorne, 506 F. Supp. 2d 322, 369 (E.D. Cal. 2007); Pacific Coast Federation of Fishermens Associations v. Gutierrez, 606 F. Supp. 2d 112 (E.D. Cal. 2008).

³³ Center for Biological Diversity v. Kempthorne, 588 F.3d 701 (9th Cir. 2009) (interpreting the Marine Mammal Protection Act).

³⁴ See, HCP Handbook at 1-14 and 1-15.

We recently analyzed the 18 largest RHCPs and 14 other large HCPs that altogether encompass approximately 20 million acres of land. We selected a representative sample of plans that have been approved in a variety of ecosystems for a range of species. We chose plans that have been established in both urban and rural settings, in disparate political environments, with different types of entities holding the permits. Many of the large urban HCPs are administered by county and/or local government agencies. Plans that cover forest practices and timber operations across broad landscapes are administered by timber companies in some cases and state regulatory agencies in others. We reviewed the plans to determine (1) whether they address climate change explicitly and, if so how they address it; and (2) how the plans incorporate adaptive management. We conducted telephone interviews with Service staff, state regulatory personnel, and others involved with implementation of the plans. We asked about monitoring results, whether adaptive management is being carried out, and whether climate change impacts have been observed in the HCPs' preserves.

We grouped RHCPs in two broad categories. "Forest HCPs" are the largest in geographic scope, covering forest practices across large areas. For example, the Washington State Forest Practices Habitat Conservation Plan covers forest practices on most of the forest land in the State of Washington, approximately 9.3 million acres.³⁵ Plum Creek Timber Company holds HCPs that authorize take associated with its operations in Montana (1.3 million acres), Arkansas, Louisiana, Washington, Wisconsin, and Georgia. The forest HCPs are almost all multi-species plans and contain best management practices designed to minimize take and, sometimes, restore habitat for the covered species. Though some of the forest HCPs include areas in which timber harvest is restricted, generally speaking they do not create preserves for endangered species. Rather, they define a set of best management practices designed to enable endangered species to coexist with timber management.

The second category of RHCPs is the "urban HCP," most of which have been developed in urbanizing areas in California and Texas. The usual model for an urban HCP is the establishment of a preserve area (or series of preserves) for the covered species within a defined "permit area" in return for authorization to take the species in the remainder of the permit area. In some RHCPs, the preserve area is rather small relative to the permit area (for example, the Balcones Canyonlands Conservation Plan in Austin, Texas requires protection of approximately 30,000 acres in a permit area that exceeds 640,000 acres). The preserves are sometimes established on private lands and sometimes on a mixture of public and private land (the Coachella Valley MSMCP includes over 550,000 acres of federal, state, and non-profit conserved land in its "core" preserve area and 166,380 acres of privately-owned "complimentary" preserve land).

Of the 32 plans we reviewed, eleven mention or address climate change in some way. The Williamson County, Texas plan lists climate change as a "changed circumstance," but states that there is insufficient knowledge about the impacts of climate change on the covered species to

³⁵ Washington State DNR, Forest Practices Habitat Conservation Plan (FPHCP) (2005). Available at http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesHCP/Pages/fp_hcp.aspx.

design conservation measures to respond.³⁶ At the other end of the spectrum, the Coachella Valley Multi-Species HCP, which was approved in 2008 and covers 1.2 million acres, provides that a stated goal of the plan is to “manage the system adaptively to be responsive to short-term and long-term environmental change, including climate change.”³⁷ The Coachella Valley plan includes a detailed monitoring and adaptive management program. In addition, the reserve design includes “biological corridors” that are intended to give the covered species “the opportunity for . . . adaptation in response to potential climate change.”³⁸ The Washington State FPHCP “acknowledges that the effects of global climate change may have an effect on riparian and aquatic resources, including covered species and their habitat, over the life of the FPHCP.”³⁹ The plan states that the potential effects of climate change – changes in stream temperature and hydrology and riparian habitat – will be monitored for and addressed through the plan’s adaptive management program.⁴⁰

In the course of interviewing Service staff and others involved in implementation of the plans, we learned that, while the plans acknowledge climate change as a significant threat to the covered species, the staff involved have not yet observed impacts that they attribute to climate change. Rather, they regard climate change as an additional stressor on the habitat and the species, potentially even the most significant threat over the long term, but one for which the effects are difficult to single out. The HCPs that contain the most detailed provisions related to climate change are very new, so it is likely too soon to evaluate how effective they will be over the life of the permit in achieving the HCP’s conservation goals. It is also possible that the monitoring programs established by the plans will detect the changes to habitat and other potential impacts, regardless of whether their cause is climate change or the activities covered by the incidental take permit. Provided the monitoring plan is comprehensive enough, it may matter little what the cause of the observed changes is. More important will be the adaptive management response.

V. Recommendations for Responding to the Climate Change Challenge

A. Filling the Information Gap

The ESA requires that the Services use “the best scientific and commercial data available” when insuring that the approval of an HCP will not jeopardize the continued existence of the covered species.⁴¹ Over the years, a persistent criticism of the HCP program has been that conservation plans often contain inadequate performance measures and goals, and may be based on limited science.⁴² Limited information is a problem for the Service when implementing the

³⁶ Williamson County Regional Habitat Conservation Plan (2008), p. 10-5, available at http://www.wilco.org/Portals/0/Departments/Conservation_Foundation/WilCo_RHCP_08-08-08_Opt.pdf.

³⁷ Final Recirculated Coachella Valley Multi-Species Habitat Conservation Plan and Natural Community Conservation Plan (2007), p. 3-1, available at http://www.cvmshcp.org/Plan_Documents.htm#plan.

³⁸ *Id.* at ES-5.

³⁹ Washington State FPHCP at 1-11.

⁴⁰ *Id.*, Appendix H.

⁴¹ 16 U.S.C. § 1536(a)(2).

⁴² *See, e.g., Hood, Laura C. Frayed Safety Nets: Conservation Planning Under the Endangered Species Act.* (Defenders of Wildlife 1998) and National Center for Ecological Analysis and Synthesis, “Using Science in Habitat

HCP program as well as other conservation programs for listed species. There is often insufficient biological data available about species' life cycles, habitat requirements, and responses to stressors like habitat fragmentation and invasive species.

With respect to climate change, the challenges associated with designing effective conservation strategies based on sound science are particularly acute. Perhaps the most serious problem is the uncertainty and relatively coarse resolution of the regional climate change models. Regional models, which are intended to predict changes in temperature, precipitation, humidity, and other factors at a regional scale, are usually downscaled from global climate models. Generally, a regional model's resolution should not exceed about one twelfth of the global climate model feeding into it.⁴³ Because the resolution of global climate models is limited by computational capacity, the format resolution is at best 100-200 square kilometers.⁴⁴ The actual resolution is closer to 1000 square kilometers⁴⁵, a scale that is larger than that at which the Services often work. Certain techniques, such as statistical downscaling, can be used to downscale models to a watershed or landscape scale, but the techniques are not always reliable. In addition, the available models may disagree sharply regarding particular variables in particular places. Given the uncertainty of regional models, Service staff report that they are uncomfortable predicting impacts or incorporating mitigation strategies in HCPs that are specifically designed to climate change.

Even assuming that techniques such as statistical downscaling can be used to project accurately climate impacts at the landscape level, the ecological responses of affected species, habitats, and ecosystems to climate impacts are often unknown. It is therefore difficult to design a conservation strategy for an HCP that planners can feel confident will remain viable in the future when climate change impacts become apparent.

Given the significant unknowns associated with climate change at the regional scale and associated impacts on listed species, it is critical that the Services expand their capacity to develop, review, and use models that will be useful to them in designing HCPs and implementing other conservation programs. The Services should develop a coherent scientific model geared to their particular mission. We applaud the Services' partnership with the U.S. Geological Survey's (USGS) National Climate Change and Wildlife Science Center, which is designed to increase the capacity to refine and forecast climate change at multiple scales, and encourage the Services to increase the resources devoted to collaboration with other agencies and academic researchers to amplify this effort. In addition to partnerships and collaborations, we recommend that the Services:

- Hire their own climatologists and modelers, to enhance their capacity to assimilate the latest modeling information into their programs as it becomes available, and

Conservation Planning.” (1999); Watchman, Laura, Martha Groom & John Perrine, “Science and Uncertainty in Habitat Conservation Planning,” *American Scientist*, vol. 89, no. 4 (2001).

⁴³ Rummukainen, Markku. *State of the Art with Regional Climate Change Models*, *Wires Climate Change*, vol. 1 (2010).

⁴⁴ *Id.*

⁴⁵ *Id.*

- Expand their capacity to synthesize the best available science on climate change, especially with regard to ecological impacts, so that the information can be accessed by Service staff and incorporated into HCPs and other Service conservation programs more effectively.

B. New HCPs: Planning to Address Uncertainty

1. Scenario Evaluation Can Highlight Key Uncertainties

Even in the absence of perfect information about the impacts of climate change on local landscapes and species, it is possible to make some predictions that are useful in conservation planning. The Intergovernmental Panel on Climate Change (IPCC) predicts with a “high degree of certainty” that global temperatures will rise 2 – 11 degrees F by 2100, depending on the extent and success of strategies to reduce emissions of greenhouse gases.⁴⁶ The precise regional effects are uncertain, but it is extremely likely, according to the IPCC, that there will be regional changes in the water cycle and an increase in extreme events. Other changes are also expected, including sea level rise in coastal areas, acidification of the oceans, and altered seasons, which in turn leads to changes in the timing of migrations and the availability of food and forage habitat. These likely effects can and should be considered by the Services in the context of new HCPs.

We recognize that it will often be difficult or impossible to downscale climate models with confidence to the geographic scale relevant for HCPs. Even in those circumstances, though, there are still several steps the Services could take to address possible climate impacts. We recommend that the Services:

- Require detailed baseline inventories (species and habitat baselines) for HCPs that cover species likely to be affected by climate change. The baseline information should include all of the known important drivers of the species’ status (prey, susceptibility to pathogens and disease, water requirements, sensitivity to disturbance, etc.). Detailed baseline information would make it easier to evaluate changes that occur during the life of the permit. The changes may be the result of the activities covered by the permit, the impacts of climate change, or some combination. Baseline data would also make it easier to evaluate the success of adaptive management techniques during the plan’s implementation.
- Develop guidance on what constitutes “take” in the context of a changing climate. The guidance should recognize the fact that stressors will interact, so that impacts from “conventional” stressors may decrease resilience to climate change. Take caused by a proposed development activity today is likely to go beyond the immediate impacts of the activity, if it affects areas that are likely to be important to the species in the future, for example. Where that sort of interaction can be foreseen, developers should bear at least a share of the responsibility for increased future harm.
- Use the best available climate models to develop scenarios that would anticipate a range of baseline shifts attributable to climate change. For example, the Service

⁴⁶Intergovernmental Panel on Climate Change, *Fourth Assessment Report, Climate Change 2007* (IPCC 4th Assessment) available at <https://www.ipcc-wg1.unibe.ch/publications/wg1-ar4/wg1-ar4.html> .

could develop a “high,” “medium,” and “low” scenario linked to the projected changes in temperature, changes in levels of precipitation and timing of precipitation, and similar factors. The scenarios would be factored into the Service’s evaluation of the possible impacts of the actions that will be covered by the permit and into the design of the mitigation plan and the adaptive management program.

- Design the monitoring plan for the HCP to detect key changes to the species’ baseline conditions that might be harmful to the species in question and could indicate which of multiple possible scenarios is unfolding.

Where models indicate uncertainty about key variables such as precipitation or habitat shifts, the permit could require that activities be staged so that take does not outrun effective conservation measures, and the data accumulated from monitoring could be incorporated into an evolving conservation plan. For certain species, the Services should encourage the creation of reserves that, consistent with the biology of the covered species, span latitudinal gradients and elevational gradients and are linked by corridors. In some cases, it may be necessary or appropriate to create reserves in areas not occupied by the covered species at the time the plan is developed.

2. Preserve design should accommodate potential climate-driven changes

As noted above, climate change may exacerbate other, better understood threats to endangered species like habitat fragmentation, exotic species and disease. Many conservation strategies, such as controlling exotics and increasing connectivity, are appropriate for HCPs regardless of whether climate change poses an additional threat to the covered species. For HCPs that cover species likely to be at additional risk because of climate change, we recommend that the Services consider:

- Approving preserve designs that optimize the covered species’ ability to shift spatially if/when existing habitat becomes unsuitable. For example, an HCP might include an elongated preserve design to make it possible for the species to shift to a higher elevation or more northern latitude if conditions change in the future. In some cases, this will involve protecting currently unoccupied habitat, if the best available data indicate that covered species are likely to shift into those areas.
- Establishing preserves in areas remote from the permit area of urban plans, in order to avoid creating a “donut” preserve that will become unsuitable in the future. This, too, may involve protecting currently unoccupied habitat that, according to the best available data, is likely to become suitable in the future. In evaluating whether to approve this approach, it will be critical to ensure that sufficient current habitat is protected through the plan, as well, so that the species does not lose too much current habitat before it shifts to a new area. It will require a delicate balancing act to develop a long-term conservation strategy for species that occur in rapidly urbanizing areas.
- Using other conservation programs, such as conservation banking and safe harbor agreements, to protect currently unoccupied habitat. Under some circumstances,

this could mean allowing developers and others to mitigate for impacts to current habitat through the protection of likely future habitat protected in conservation banks. Conservation banks and safe harbor agreements could also be used to augment publicly-owned preserve lands in the HCP's permit area, if models suggest that the ranges of covered species are shifting away from the area, or to provide additional "buffers" for the preserves

- Establishing a shifting preserve system for species whose range is predicted to move across the landscape. This could be done through the creative use of term easements and options, and safe harbor agreements with private landowners to protect areas not yet occupied, but which could become important to the long-term conservation of the species. Any shifting preserve system should be linked closely to the plan's monitoring plan.
- Requiring significant buffers for preserves established in urban plans to reduce the likelihood of catastrophic loss caused by extreme climate events and to address "edge" impacts. This would be a way to build in a "margin of error" for species likely to be vulnerable to climate change.
- Giving the "benefit of the doubt" to the species when evaluating proposed preserve designs. For those species that are vulnerable to climate change, it will be critical to protect more habitat, in more locations, at more elevations and latitudes than would be the case without climate change. The Services should recognize this fact and adjust its expectations for habitat protection in RHCPs accordingly.

3. Adaptive Management Should Be Used Appropriately

Meaningful adaptive management plans will be essential to HCPs that cover species likely to be affected by climate change. Adaptive management is the only mechanism through which it will be possible to make corrections to the plans' approved management techniques. Our review of HCPs revealed a considerable range of adaptive management approaches and a good number of plans without any adaptive management provisions at all. The approaches built into HCPs ranged from very detailed plans overseen by a panel of scientists (e.g., the Orange County Southern Subregion NCCP/HCP) to vague commitments to adjust management practices "as warranted." We learned that many permit holders are monitoring to demonstrate compliance with the provisions of the HCP, but are not doing biological monitoring to evaluate the extent to which the plan is achieving its ecological objectives. Without such monitoring, it is difficult, if not impossible, to do meaningful adaptive management. We identified no plans in which habitat management techniques have been adjusted in response to monitoring data.

Adaptive management would appear to be a critical component of any HCP that covers species that may be affected by climate change, because of the inherent uncertainty of predicted impacts. We therefore recommend that the Services require that new HCPs include a rigorous adaptive management plan with the following components, which are drawn from the scientific literature⁴⁷:

⁴⁷ Wilhere, George F. *Adaptive Management in Habitat Conservation Plans*, 16 *Cons. Bio* 20 (2002); Holly Doremus et al., *Making Good Use of Adaptive Management*, Center for Progressive Reform White Paper #1104 (April 2011), available at http://progressivereform.org/articles/Adaptive_Management_1104.pdf.

1. Clearly articulated biological goals for the HCP that are based on the threats to the species covered by the plan. Included in the biological goals should be land management goals for preserves established by the plan.
2. Measurable objectives that can be used to evaluate progress toward the biological goals at specific intervals.
3. A monitoring plan covering not only implementation of the steps outlined in the HCP but also the status of covered species and their habitats. The monitoring plan should be geared to resolving key uncertainties over time.
4. Feedback processes for delivering information generated through monitoring to the permit holder and the Services.
5. Clear decision-making process for evaluating the information and deciding whether to continue, modify, or stop actions, refine objectives, or alter the monitoring process.⁴⁸
6. The plan must include “triggers,” specified conditions whose occurrence will mandate changes in management or mitigation measures. The response to each trigger must also be specified in as much detail as possible.⁴⁹
7. Sufficient funding must be provided to support monitoring and data analysis for the term of the plan.⁵⁰

Adaptive management must not be used as an excuse to issue a permit when it cannot be assured that the permitted activities are not likely to cause jeopardy or adverse modification of critical habitat, however.⁵¹ Because climate change will increase the stresses on many listed species, some permits may have to be denied.

There is an inherent tension in HCPs between the principles of adaptive management which dictate evolving management practices that respond to monitoring data and the desire for economic certainty on the part of permittees. As George Wilhere has written, it may be necessary to include economic incentives for permittees in HCPs that incorporate adaptive management provisions, to ensure that the programs get off the ground.⁵² For example, federal funding or technical assistance for biological monitoring or restoration practices may be appropriate in some cases.

4. Consider Ecosystems, Not Just Species

Congress intended that HCPs be ecosystem-focused, rather than species-focused, conservation tools. The legislature also envisioned HCPs as addressing conservation goals broadly, rather than as simply satisfying the regulatory requirements of the ESA. As the House Conference Report on the amendments that created the incidental take program explained:

⁴⁸ The Plum Creek HCP established a committee to evaluate the monitoring data and devise appropriate management responses.

⁴⁹ NRDC v. Kempthorne, *supra*, note 32; Doremus et al., *supra* note 47, at 11.

⁵⁰ Doremus et al., *supra* note 47, at 13.

⁵¹ Doremus et al., *supra* note 47, at 6.

⁵² Wilhere, *supra*.note 48, at 26.

In enacting the Endangered Species Act, Congress recognized that individual species should not be viewed in isolation, but must be viewed in terms of their relationship to the ecosystem of which they form a constituent element. Although the regulatory mechanisms of the Act focus on species that are formally listed as endangered or threatened, the purposes and policies of the Act are far broader than simply providing for the conservation of individual species or individual members of listed species. This is consistent with the purposes of several other fish and wildlife statutes (e.g., Fish and Wildlife Act of 1956, Fish and Wildlife Coordination Act) which are intended to authorize the Secretary to cooperate with the states and private entities on matters regarding conservation of all fish and wildlife resources of this nation. The conservation plan will implement the broader purposes of all of those statutes and allow unlisted species to be addressed in the plan.⁵³

It has become common for HCPs to address unlisted as well as listed species, but the larger goals have remained largely unrealized. Climate change provides an opportunity to reframe HCPs as more generalized conservation tools. For example, the Services should consider providing additional incentives for plans that create preserves that will provide conservation value under climate change, even if their value for the covered listed species diminishes over time.

C. Existing HCPs: Addressing the Threat of Climate Change

From our review of RHCPs, it is apparent that the Services have little information about the extent to which climate change may be affecting the ecosystems and species covered by the plans. One reason for this is the difficulty of separating the impacts of climate change from the impacts of other stressors on the species. To assure that existing plans remain viable for the species they cover, it is critical that the Services assess the potential impact of climate change on the preserves that have been created by existing plans and the effectiveness of conservation strategies they include. We therefore recommend that the Services evaluate approved HCPs for vulnerability to climate change. The evaluation should be prioritized by focusing on: (1) HCPs that cover species that have been identified by the Services, the IUCN, or another credible body as being vulnerable to climate change; (2) HCPs that encompass a significant portion of the covered species' range; and (3) HCPs that cover species that occur exclusively on private lands, because publicly-owned conservation lands, managed by state and federal agencies, cannot be relied upon for protection of those species' habitats. The review should evaluate the extent to which the HCPs are achieving the biological goals and objectives articulated in the plans and whether the monitoring and reporting provisions have worked as intended. The review should also identify any impacts to the habitats and species covered by the plans that may be attributable to climate change.

If the review indicates that any of the HCPs are not functioning as expected, or that climate change seems to be impacting the viability of the plans, there may be consequences for the species' status, identification of critical habitat, consultations with federal agencies on federal projects, and the authorized take levels and mitigation strategies incorporated into future HCPs that cover the same species. The review may also indicate a need for a revised conservation

⁵³ H.R. 97-835, 1982 U.S.C.C.A.N. 2860, 2871.

strategy for the HCP. Given the fact that No Surprises assurances have been incorporated into most HCPs since 1996, it is likely that the Services would have to bear any additional costs associated with revised conservation strategies in the plans. It is important that these costs be assessed and documented sooner rather than later, so the Services can incorporate the costs into their budget planning.

5. The No Surprises Challenge

As discussed above, the No Surprises policy has proven to be a significant inducement for private entities to engage in conservation planning. For obvious reasons, permittees desire certainty with respect to their regulatory obligations and dislike open-ended commitments, so the No Surprises policy has been popular with them. No Surprises is problematic in the context of climate change, however, because of the substantial uncertainty of predicting regional climate change impacts in the future. A good deal of the problem can be addressed through detailed, effective adaptive management provisions. But we also recommend that the Services consider modifying their implementation of the No Surprises policy in two ways. First, the Services should negotiate “changed circumstances” provisions that take into account the prospects for climate change, requiring additional mitigation, replacement of preserves in a more suitable area, or even reduced development if climate change makes the conservation strategy in the plan less effective than anticipated. That sort of negotiation may be less problematic than the Services suspect. As a lawyer who represents developers explained early in the Babbitt HCP experiment, “Most HCP applicants are willing to agree at the outset to adjustments in their plans to meet new problems that may develop. What applicants will not accept is subsequent unilateral decision making by the federal government which imposes new conditions.”⁵⁴

Second, the level of regulatory assurances provided should be calibrated to the level of confidence about projected climate change impacts; the permittee’s willingness to make financial and other commitments to address climate change, should it become a problem for the covered species; or the extent to which the plan contributes to recovery rather than simply avoiding jeopardy. Stated another way, those permittees who are willing to pay more as a hedge against the uncertainty that climate change represents should be rewarded with greater certainty about the adequacy of their commitment than those who are not. Examples would be (1) agreement to pay for extensive monitoring and adaptive management; (2) agreement to provide “extra” buffers to the plan’s preserve areas; or (3) agreement to set aside an escrow fund that would be available for additional habitat protection during the term of the permit, should climate change cause a degradation of the habitat preserves established in the HCP.

VI. Existing Law: Barriers and Opportunities to Incorporating Climate Change into HCPs

We reviewed the Endangered Species Act, Joint regulations, and the HCP Handbook and Addendum to determine whether they contain provisions that will make it difficult for the Services to incorporate climate change into HCPs. Following is a list of provisions we identified that seem to limit the Services’ discretion and a list of sections that appear, on the other hand, to mandate the consideration of climate change impacts in HCPs.

⁵⁴ Baur & Donovan, *supra*. note 24, at 769.

A. Potential Barriers to Incorporating Climate Change in HCPs

Section 10(a)(2)(A) of the ESA – The applicant is required to specify impacts from the taking and steps that will be taken to mitigate those impacts. In practice, this has been interpreted narrowly; only the impacts associated with the proposed activity are considered in the incidental take statement. This approach makes it difficult for the Services to consider the temporal aspect of take; that is, the possibility mentioned above that an activity today may make the species more vulnerable to climate change in the future.

- Similarly, the HCP Handbook (3-10) says that in the determination of proposed activities, the applicant must provide a description of all actions within the planning area that are likely to result in incidental take for which the applicant or landowner has some form of control.
- HCP Handbook (3-17): The consideration of indirect effects of the proposed action may be considered in the conservation plan only if they are likely to result in jeopardy and the effects are reasonably foreseeable and a proximate consequence of the activities proposed in the HCP. This provision also underscores the singular focus on the applicant's proposed activity, regardless of the existence of other stressors on the species, including climate change.
- HCP Handbook (3-19): Mitigation programs and standards should be commensurate with the impacts they are intended to address. This could limit the Services' discretion to incorporate mitigation measures that would provide some "insurance" against future impacts from climate change, such as large buffers between preserves and developed areas.
- Handbook (3-21): Generally, the location of replacement habitats should be as close as possible to the area of impact and must include similar habitat types and support the same species covered by the HCP. This provision could be a barrier to the establishment of preserves in locations remote from the area of impact or preserves designed to protect ecosystem function, rather than a single species.
- Handbook (3-30) & regulations: No Surprises policy. (discussed above)

B. Opportunities to Incorporate Climate Change

Section 7(a)(2) of the ESA: HCPs must be based on the best available scientific and commercial data. This information should include the best available information about climate change, including the regional climate models and existing data about how the species will be affected by climate change.

- HCP Handbook (1-15): Applicants should be encouraged to develop HCPs that produce a net positive effect on the covered species. It would be virtually

impossible to do this without taking into account potential climate change impacts to habitat.

Handbook (3-8): Population viability analyses should be used to develop HCPs, especially take authorization. PVAs should take into account stressors related to and/or exacerbated by climate change. Handbook (3-14): Determining anticipated incidental take levels. The authorized take level in the permit must comply with the issuance criteria in the statute (essentially the jeopardy standard): that it will not “appreciably reduce the likelihood of survival and recovery of the species in the wild”. As noted above, this analysis has focused on the take associated with the activity at issue in the permit. If climate change threatens the species by impacting the quality or quantity of its habitat in the future, for example, or increasing its vulnerability to pathogens or exotic species, that increased vulnerability should be taken into account by the Service when establishing the level of take to be authorized in the permit. In other words, the permit should acknowledge the existence of climate change by authorizing less take from the covered activity. Climate change may modify the baseline from which authorized take is calculated.

- Section 10(a)(2)(A)(iv) & Handbook 7-5: The HCP may include “such other measures that the Secretary may require as being necessary or appropriate for purposes of the plan.” This provision appears to give the Service the flexibility to incorporate various conservation strategies to address climate change, if warranted.
- Handbook (3-25): Adaptive Management. The Handbook and the Addendum to the Handbook recommend that adaptive management be incorporated into HCPs to address uncertainty in the conservation of a species covered by the plan.⁵⁵ The Addendum provides that an adaptive management strategy should (1) identify the uncertainty and questions to be addressed to resolve the uncertainty; (2) develop alternative strategies and determine which experimental strategies to implement; (3) integrate a monitoring program that is able to detect the necessary information for strategy evaluation; and (4) incorporate feedback loops to link implementation and monitoring to a decision-making process.⁵⁶

VII. Putting the HCP Program in the Larger Conservation Context

Climate change increases the need to see all the nation’s various conservation policies as an integrated whole. Rather than being evaluated and modified in isolation, the HCP program should be considered as one of many conservation programs within and beyond the scope of the ESA.

⁵⁵ 65 Fed. Reg. 35242, 35252 (June 1, 2000).

⁵⁶ *Id.*

Within the Endangered Species Program, the Services must consider impacts on recovery when they prepare biological opinions.⁵⁷ In order to do that effectively, they must consult the relevant recovery plans. Since consultation is a necessary step in the process of approving incidental take permits, the Services must take recovery plans into account when negotiating HCPs. They must also take into account other permitting and conservation efforts that will affect the same covered species. In the past, individual HCPs have sometimes been executed with little apparent regard even to other HCPs drafted nearly concurrently within the same region and dealing with the same species.⁵⁸ In a rapidly warming world, information must be effectively shared and considered. A centralized, readily searchable database of approved and in-process HCPs would be helpful, as would regular opportunities for staff involved in HCP negotiations at different field offices to interact and discuss applications and recent actions.

The HCP program could also be better coordinated with Section 6 funding of state conservation programs, with Candidate Conservation Agreements (CCA) used to forestall listing, and with Safe Harbor Agreements (SHA). CCAs and SHAs both have the potential to be useful tools for the Service to use when addressing the uncertainty inherent in HCPs' preserve design. SHAs with private landowners not covered by the HCP could be used to provide temporary protection of habitats that might in the future be folded into an HCP's preserve system, should the existing preserve become unsuitable or prove to be inadequate. Similarly, CCAs could be used to protect habitat for species that are likely to become listed due to climate change.

Beyond the ESA, HCP negotiations should be coordinated with public land management and acquisition programs. The effectiveness of preserves set aside in HCPs will be enhanced by proximity to other protected areas. Those protected areas can provide buffers and protection from edge impacts and fragmentation. For almost all species, bigger is better when it comes to conservation areas.

VII. Conclusion

Climate change poses new, difficult challenges for the Services as they carry out their conservation mission. Globally, 20-30% of plant and animal species are at an increased risk of extinction due to climate change.⁵⁹ But the complexities of the threats, and the uncertainty inherent in the climate models, make it difficult to address climate change effectively. In the context of HCPs, which authorize the take of listed species under certain circumstances, it is essential that the Services consider the impacts of climate change and insure that those impacts are taken into account in the plans' conservation strategies. The Services must do so with limited information, but pursuant to a structure that ensures new data will be taken into account as it becomes available, and the conservation plan adjusted as necessary. The species covered by HCPs cannot afford to wait for better information.

⁵⁷ *Wild Fish Conservancy v. Salazar*, 628 F.3d 513, 518 (9th Cir. 2010); *National Wildlife Fed'n v. NMFS*, 524 F.3d 917, 931 (9th Cir. 2008).

⁵⁸ See Holly Doremus, *Data Gaps in Natural Resource Management: Sniffing for Leaks Along the Information Pipeline*, 83 Ind. L. J. 407, 432 n. 128 (2008) (noting that two HCPs submitted for the Utah prairie dog by the same consultant in the same county on the same day did not mention each other).

⁵⁹ IPCC 4th Report, *supra*, note 47.