

**Written Testimony of  
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**Hearing on  
Managing Ocean and Wildlife Resources in a Dynamic Environment:  
Priorities for the New Administration and the 111<sup>th</sup> Congress**

**Before the  
Committee on Natural Resources  
Subcommittee on Insular Affairs, Oceans, and Wildlife  
U.S. House of Representatives**

**March 3, 2009**

Madam Chairwoman and Members of the Committee, thank you for inviting me to testify before you today on this important subject. My name is Barton Thompson. I am one of the two directors of Stanford University's Woods Institute for the Environment, which brings together over 300 faculty members at the university to help develop practical solutions to sustainability challenges. I am also a professor of law at Stanford University and have extensive experience with many of the laws under your jurisdiction. I serve on the board of several land trusts and foundations supporting land and marine conservation. I am testifying today in my individual capacity.

My testimony will focus on the institutional needs for protecting ocean and wildlife resources in the face of climate change and other emerging challenges. In particular, what types of governmental institutions, programs, and processes will be needed for effective protection?

The good news is that current Congressional legislation already provides many of the management tools and much of the authority and discretion that the government will need to address climate change and other emerging challenges in the coming decades. Many key federal agencies, moreover, have already begun to use their authority to develop programs and strategies for addressing the challenges. The United States Geological Survey, for example, has created the National Global Warming and Wildlife Science Center to project climate impacts, help federal agencies develop effective adaptation strategies, and collaborate in developing new tools. The U.S. Fish & Wildlife Service has developed a draft Climate Change Strategic Plan for the 21<sup>st</sup> Century, in which it commits to developing a National Fish and Wildlife Adaptation Strategy.

To provide effective protection, however, the federal government will need to (1) adopt new management approaches focused on creating effective networks of land and ocean reserves and on adapting over time to climate change; (2) collect, analyze, and use information regarding the state of, and trends in, land and marine species and ecosystems

in the face of climate change; and (3) coordinate and collaborate more actively among themselves and with state managers, conservation organizations, private landowners, and other local stakeholders. Resource managers may also need to establish priorities in attempting to conserve species, recognizing that some species will be more difficult than others to protect in the future. These additional steps may require new authorizing and guiding legislation and almost certainly will require new resources. Given the increased conservation effort that is likely to be required in the future, all levels of government will want to look for new ways of reducing the cost of conservation efforts (e.g., by finding ways of conserving species on farms, ranches, and other “working landscapes” that also produce an economic profit) and identify new potential funding sources (e.g., by turning to those who benefit from the ecosystem services often provided by effective conservation).

## **I. Emerging Challenges**

In prior sessions of Congress, the Subcommittee has already heard testimony on the emerging challenges to protection of fish and wildlife resources and ecological services. A quick overview of these challenges is important, however, because they form the basis for determining what institutional changes may be necessary.

The potential pressures from climate change head the list of challenges. No matter what mitigation measures the United States chooses to adopt, the effects of greenhouse gases in the atmosphere have substantial lag time and are predicted to impact fish and wildlife for decades to come through changes in temperature, water availability, wildfires, sea level, ocean acidification, and pests. Scientists predict that, in North America, temperature rise will shift the range of many species northward and to higher altitudes. A growing number of studies indicate that recent temperature rises have already begun to affect the ranges and migration patterns of species in the United States and globally. Scientific studies also suggest that ocean fish populations will be affected both by continuing increases in water temperature and decreases in recovery periods as extreme events occur more frequently.

One of the most troubling aspects of climate change for managers of fish and wildlife is the high level of uncertainty involved. Uncertainty regarding the level of climate change that will occur is compounded by uncertainty regarding the impact of that change on ecosystems and the fish and wildlife that inhabit them. Many scientists believe that the nation is facing a “no analog” future for fish and wildlife: current ecosystems will disassemble as species try to adjust to climate change, and then reform into new assemblies.

Land and ocean ecosystems also face new competing interests. Important efforts at energy development, in particular, may create new pressures on fish and wildlife. Both the new administration and the 111<sup>th</sup> Congress have announced that alternative energy development will be a priority. Land managers will need to coordinate projects to develop solar, wind, geothermal, and other energy sources with potentially conflicting conservation objectives. Ocean managers will need to coordinate protection of fish and

ocean ecosystems with increased interest in liquefied natural gas facilities, renewable energy projects involving wave and tidal energy, and coastal aquaculture, as well as potentially with new oil and gas operations.

Government agencies and private conservation organizations, moreover, will need to protect ocean and wildlife resources in the face of more limited resources. State managers are already facing reduced conservation budgets both because of reduced tax revenues and a fall-off in new bond measures that have historically supported conservation efforts in many states. Private conservation organizations are affected not only by these same revenue declines, but also by a reduction in private donations.

## **II. Ensuring that Institutions Are Up to the Challenges**

Existing laws and institutions designed to protect fish and wildlife will remain central to addressing the challenges outlined above. One of the most important steps in helping species adapt to climate change, for example, will be to reduce the other stresses that the species face – e.g., habitat loss and fragmentation, over-utilization, pollution, and invasive species. Reducing these other stresses can increase natural resistance and resilience to climate change. A limited number of studies also suggest that climate change can exacerbate other stresses. Changes in water flows, for example, might worsen the impact of water pollution. To the degree that current programs to address non-climate stresses are successful, therefore, the affected species are more likely to survive climate change. And because many of these stresses are local and discrete, they will often be easier to address than climate change.

In looking beyond current programs, however, eight considerations are important in designing new institutions, programs, and tools. It is important to emphasize that, because the need to adapt to climate change is a new challenge, there is little experience upon which to directly draw in divining best practices for ocean and wildlife management. Scientific studies of how species respond to climate impacts and experience with similar challenges, however, can provide useful initial guidance.

### **1. Proactively Incorporate Climate Considerations into Management Programs and Plans**

First, government conservation managers should use the best information available regarding the potential future impacts of climate change on ecosystems and species to proactively seek to protect those ecosystems and species. Many of the nation's current laws are focused on "crisis management," protecting species that are already in trouble from immediate threats, rather than anticipating and avoiding future problems. Where management takes place in a crisis setting, management agencies generally have only limited options, and conflicts with various stakeholders are more likely. To the extent the government can identify at an early stage climate-vulnerable species, the habitat that they may need to survive, and steps that can reduce the impact of climate change on the species, the government is likely to be more effective in protecting the

species and to avoid the need either to ultimately list the species under the Endangered Species Act (ESA) or engage in other forms of crisis management.

Once a species is listed under the ESA, the Act appears to give the Fish & Wildlife Service and the National Oceanic and Atmospheric Administration (NOAA) significant authority to proactively address climate-related threats to the species. Section 4(a)(ii), for example, appears to allow these agencies to designate as “critical habitat” areas that will be essential future habitat for the species in light of climate change, even though the areas are not currently occupied by the species. Under the recent decision in *NRDC v. Kempthorne*, 506 F.Supp.2d 322 (E.D.Cal. 2007), the agencies must also consider the effects of climate change in jeopardy consultations (at least where the effects are “reasonably certain to occur” and “reasonably expected” to jeopardize the relevant species). In evaluating the adequacy of habitat conservation plans (HCPs) under section 10, the agencies would appear to be authorized to require that the HCPs address “reasonably foreseeable” risks from climate change.

The regulatory provisions of the ESA, however, were not designed to address uncertain future threats such as climate change and therefore are not sufficient to provide the type of proactive management that is likely to be needed. First, the ESA covers only species that are already endangered or threatened (i.e., are already at a crisis stage). Second, many provisions of the Act can be used only awkwardly, at best, to provide proactive management. Section 9, for example, applies only to land modifications that pose proximate and foreseeable harm to endangered species, making it very difficult to regulate land uses that pose threats to likely future habitat or to important corridors. Finally, even where the ESA permits some degree of proactive management as described above, the level of uncertainty involved in predicting the future range and needs of listed species may frequently make it impossible to meet the Act’s standards.

Although federal laws would appear to provide the Fish & Wildlife Service and NOAA with the authority to proactively manage federal areas under their jurisdiction for the risks of climate change, neither agency has historically engaged in such planning. The National Wildlife Refuge System, for example, lacks a system-level proactive planning program for climate change. The management of federal marine reserves also does not currently incorporate projected impacts from climate change. Both agencies, however, have begun to consider how to incorporate climate change into their missions.

The federal government might consider several proactive steps in addressing climate change. First, in establishing new land or ocean reserves, the government could consider what areas will be most important in light of likely climate impacts. New refuges might focus on what scientists often refer to as “refugia,” which are areas that will probably be less affected by climate change and therefore safe havens for climate-sensitive migrants or sources of “seeds” that can be transplanted elsewhere. For example, marine protected areas might focus on areas where upwelling reduces thermal stress. New refuges might also focus on establishing current or future havens for species that are likely to be most vulnerable in other locations to climate change impacts.

Second, governmental agencies could incorporate climate change projections into their management plans for existing reserves. As mentioned earlier, the Fish & Wildlife Service has already begun to examine this option. Finally, the national government could develop new incentive systems and other programs to encourage the conservation of private lands that are likely to be essential for the future survival of species in the face of climate change, either as refugia or as the destination of migrating species.

## **2. Consider “Resilience,” “Replication,” and “Connectivity.” in the Creation and Management of Reserves**

A related goal in establishing new reserves or conservation programs, and in managing existing ones, should be to maximize the probability that the reserves will protect species over the long run in the face of climate change. In discussing what types of reserve system are likely to do so, scientists often talk in terms of “resilience,” “replication,” and “connectivity.” Resilience refers to the ability of an ecosystem or species to resist shocks or surprises and to revitalize or repair itself if damaged. Scientists believe that ecosystems with high biodiversity will more easily recover from climate impacts. As mentioned earlier, reserves that are not under other stresses are also likely to be more resilient to climate change. Replication emphasizes the importance of creating a reserve system that includes multiple examples of key species or ecosystem so that, if species die out in one area, the species might still survive in another and provide a long-term source for recolonization. Finally, “connectivity” emphasizes the importance of providing connections between reserves both so that species can move from one reserve to another in response to climate change and so that species that survive in one area can naturally recolonize another.

A variety of governmental agencies and private conservation groups around the world are already utilizing these concepts to design reserve systems that are more likely to resist or recover from climate impacts. In the Florida Keys, for example, The Nature Conservancy (TNC) has created a Florida Reef Resilience Program to try to enhance the probability that coral reefs will survive climate change and other impacts. TNC is growing multiple coral genotypes at different locations along the reef and studying their survival. This in-place experiment will provide important knowledge about the genetic and geographic determinants of reef resilience and provide the basis for the selection, creation, and management of more resilient reserves in the face of climate change. The Australian government has adopted a Climate Change Action Plan for the Great Barrier Reef Marine Park that also focuses on protecting those areas with high resilience (as determined by such factors as water quality, coral cover, community composition, larval supply, recruitment success). In their work in the Australian Central Desert, TNC and the Australian Wildlife Conservancy are focused on creating connections between protected lands in order to maximize the probability of successful migration of species when necessary for survival.

These experiences, along with scientific studies, suggest again a number of considerations for improving the effectiveness of conservation laws and practice in the United States. First, focus on the creation of networks of effective protected areas, rather

than on the creation of a portfolio of separate sites. The nation's current system of wildlife refuges, for example, largely consists of a number of separate sites that are often small, located in altered landscapes (and thus subject to significant external stresses), and incompletely representing imperiled species. The system would likely be more effective in the face of climate change if it consisted of a network of interrelated, resilient reserves. To the degree possible, the network would replicate critical ecosystems and species and would be connected by corridors permitting species to migrate northward or upward in response to climate change. Where possible, the network would include reserves along climate gradients, in order to ensure effective migration in response to climate change.

Creation of a network of marine protected areas would also be valuable in protecting the oceans against the impacts of climate change. In an ideal world, the network would protect a full range of habitat and community types, and include areas of apparent resilience (e.g., reefs that still have high coral cover). The network would also ensure that the individual reserves were connected by taking into account currents, larval dispersal, and the movement of adults. Much like a diverse stock portfolio can reduce financial risk in normal economic conditions (albeit not today), such a network would also reduce risk to marine ecosystems and species from climate change.

A number of governments have created or are developing effective systems of marine reserves. The Australian government has created a network of marine reserves as part of its Great Barrier Reef Marine Park. In the United States, California is currently developing a system of marine reserves in an even larger geographic areas, the state's entire coastline, under its Marine Life Protection Act (MLPA).

Current laws in the United States would appear to provide adequate authority for the creation of such reserves. In practice, however, absent legislative directive, most reserves have been established on an individual basis rather than as part of a more comprehensive and strategic network. California's creation of a network of marine reserves has been advanced by (1) explicit legislation calling for the creation of such reserves (the MLPA), (2) the establishment of deadlines for the creation of such reserves, and (3) the creation of an institutional structure, including science advisory teams and regional stakeholder groups, to advise in the design and selection of the reserves.

Second, to the extent possible, reserves should minimize stresses on protected species from outside activities. Where practical, wildlife reserves should be surrounded by buffer zones that minimize stress from adjacent land uses. Wildlife refuges should also have adequate water supplies. Many refuges today have only limited jurisdiction or authority over needed water. For this reason, the Fish & Wildlife Service's draft strategic plan emphasizes the need to work with other governmental agencies and water users to ensure water resources of adequate quantity and quality. Marine reserves also can benefit from buffer areas. Australia's Great Barrier Reef Marine Park provides for buffering, and a new proposal in California would "zone" the coastal waters in part to ensure that uses adjacent to marine protected areas are compatible with the protection.

### **3. Provide for Flexibility and Adaptation**

The uncertainty surrounding the impact of climate change on oceans and wildlife calls for flexibility and adaptive management in response to climate change over time. The Great Barrier Reef Marine Park is effective in part, for example, because the flexibility of its management plans have permitted adjustments in the face of new information. The marine park has established a variety of tools to which it can turn as soon as new information becomes available showing the need for the tools, ensuring that managers can respond rapidly and responsively to ongoing changes.

Many of the existing conservation laws in the United States would seem to allow for, or in some cases explicitly call for, flexibility and adaptive management in the face of climate change. Section 7 of the ESA, for example, provides that agencies must reinitiate consultations if “new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered.” The laws governing the National Wildlife Refuge System would appear to give the Fish and Wildlife Service substantial latitude to manage the system adaptively.

In practice, however, adaptive management is only infrequently utilized. In some situations, the law does not provide adequate flexibility. Some wildlife refuges established by presidential proclamation, for example, have very specific purposes that limit flexibility. Section 7 of the ESA provides for reinitiations of consultation only where the affected federal agency has retained discretion over the covered action. In the case of private land trusts, federal tax laws require the creation of perpetual conservation easements that may be difficult to modify in response to climate change. In other cases, both the flexibility and authority needed to engage in adaptive management might exist but there is no requirement that it be utilized. Even where section 7 of the ESA provides for the reinitiation of consultations in the face of relevant new information, for example, there is no affirmative obligation to seek out new information.

A number of practical considerations often discourage the use of adaptive management where it is not required. First, the flexibility of adaptive management can conflict with the degree of certainty that is often demanded both (1) by private landowners and other commercial interests whose actions may be affected by management changes, and (2) by conservationists seeking to ensure protection. As a result, property owners and other commercial stakeholders often oppose the use of adaptive management and have no incentive to provide new information that might lead to the adoption of new management measures. As illustrated by the recent decision in *NRDC v. Kempthorne*, courts may worry that adaptive management measures are too open ended and insufficiently certain to provide effective management. Efforts such as the Fish & Wildlife Service’s “no surprises” policy can reduce uncertainty for property owners but, in the view of some environmental organizations, only at the cost of threatening to undermine the agency’s use of its adaptive discretion. Second, the legal focus on “final agency action” may also indirectly discourage agencies from engaging in adaptive management. NEPA, the Administrative Procedure Act, and specific conservation laws all emphasize finality, and the process required to develop a final agency action may tend to lock such actions into place.

Limited resources also restrict the use of adaptive management. Most conservation agencies have little funding and other resources available to engage in monitoring and the development of iterative actions. Management agencies also often lack the metrics needed to implement adaptive management.

The effective use of adaptive management to address climate change may therefore require explicit Congressional directive and support. New incentive systems may also need to be created to reduce stakeholder opposition to climate change. Some studies, for example, have urged the creation of economic incentives to encourage permittees under section 10 of the ESA to provide information regarding species on their property that could call for adaptive measures.

#### **4. Develop & Use Adequate Information & Science**

In order to implement the above approaches, governmental agencies need significant new science and information, including:

- Models that can predict, at regional and local levels, the likely impacts of climate change on fish and wildlife. Such models are critical to proactive management, the creation of effective reserve networks, and identifying adaptive measures.
- Baseline data on current ranges and distributions of species. This data is again important in all of the approaches described above.
- Monitoring of ecosystems and species over time. Important data can include ranges, distributions, abundance, changes in phenology, arrival and departure times of migrants, flowering dates for plants, and emergence dates for insects. Such monitoring data is critical to effective adaptive management and to determining what management approaches are likely to work in the future. Such data can also be used to help inform the public and relevant stakeholders about the impacts that climate change is having on oceans and wildlife.

Governmental agencies and other conservation groups also can benefit from more robust and comprehensive exchanges of information regarding the effectiveness of various measures to address climate change.

Significant work is still needed on all of these fronts. The National Research Council, for example, has concluded that climate change predictions are still relatively poor at both the regional and local scales. Few conservation agencies have either substantial baseline data or monitoring programs. Studies of HCPs, for example, have concluded that few HCPs have well-developed and statistically-valid monitoring programs. (Due to cost and for the reasons discussed in the last section, moreover, land owners oppose significant monitoring requirements.) Although the National Wildlife Refuge System Administration Act requires the Fish & Wildlife Service to monitor the status and trends of fish, wildlife, and plants in each refuge, the service's budget has not kept up with the needed work. While a large percentage of refuges have presence information regarding relevant bird species, for example, many have no information regarding seasonal presence or abundance.



Effective management in the face of climate change could therefore benefit from support for several new scientific efforts. First is the development of new models of regional and local impacts from climate change that could aid in the development of simulation maps and other tools for predicting ecological changes in response to climate change. Second is an inventory of the existing ranges and abundances of at-risk species in order to establish a baseline against which management actions can be planned and evaluated. Third are nationally coordinated monitoring systems that can be used by management agencies to gauge the success of management measures and decide on needed adaptive measures. The Fish & Wildlife Service in its draft strategic plan calls explicitly for a National Biological Inventory and Monitoring Partnership. The final effort is a national interagency climate-change information network that can exchange information on successful and unsuccessful management efforts.

Efforts to collect new information can build off of existing efforts, such as NOAA's Coral Reef Ecosystem Integrated Observing System (CREIOS) and the USGS's National Phenology Network. In many cases, efforts to inventory and monitor species may be able to enlist community volunteers. A privately-supported example is the Reef Check program that uses community volunteers to collect coral reef monitoring data to supplement scientific and governmental data.

## **5. Integrate Across Institutions & Geographic Areas**

Climate change and other emerging challenges to the effective management of oceans and wildlife are likely to require greater management integration across geographic areas and management institutions. As discussed earlier, addressing climate change may require large networks of protected areas, including corridors for moving between areas. Existing governmental reserves tend to be relatively small and, on land, embedded in a matrix of private land ownership. Such fragmentation restricts the ability of the government to address changing dynamics. Even if we started from scratch to create reserve networks, moreover, no single agency or private conservation group would be likely by itself to be able to create an optimal network. And today coordination among agencies may be more practical and efficient than significant expansion of individual reserve systems. Other groups also frequently have control over potential external stresses. Water supplies for national wildlife refuges, for example, are often under the control of water agencies such as the Army Corps of Engineers or the Bureau of Reclamation, rather than the Fish & Wildlife Service.

A number of groups, ranging from the Fish & Wildlife Service to the Western Governors' Association, have therefore called for national and regional task forces or partnerships to help bring together national, state, and local agencies, as well as private conservation groups and landowners, to address climate change on a more comprehensive basis. Although agencies and other groups probably have the authority to enter into such partnerships already, Congress might be able to help promote and speed the formation of such partnerships through explicit legislation and funding. Conservation partnerships could have multiple purposes, including coordinating conservation actions, building essential connectivity among reserves, reducing local stresses, and protecting needed

water resources. Such partnerships can build on existing partnership or funding programs (such as the Partners for Fish and Wildlife Program or the State Wildlife Grants program), although Congress might wish to rationalize these programs into a more integrated system rather than simply building haphazardly on top of existing programs.

Greater integration among agencies can also help in addressing the increasing conflicts between energy and conservation uses both on land and in the oceans. Different agencies have authority over various commercial uses of land and oceans and over conservation efforts. These differing agencies also tend to have conflicting missions, policies, and programs, and they are used to having sole responsibility over the activities under their jurisdiction. Effective coordination of activities is therefore often exceptionally difficult.

A recent study of conflicts in the use of California's territorial waters examined a variety of options for resolving such conflicts among state agencies and creating an effective system for managing competing ocean activities. (See Deborah A. Sivas & Margaret R. Caldwell, *A New Vision for California Ocean Governance: Comprehensive Ecosystem-Based Marine Zoning*, 27 *Stan. Envtl. L.J.* 209 (2008).) The least radical option was to legislatively create a common set of management principles that all agencies would need to consider and follow in carrying out their management responsibilities. At the more radical end of the spectrum, the legislature could create a master management plan to be implemented by a single agency. Intermediate options would allow existing agencies to maintain their current management jurisdictions but subject them to varying levels of oversight and review by a "master agency." The study ultimately concluded that a balance was needed between protection of existing jurisdictions (given the significant expertise that existing agencies have developed over time) and the need for establishing a coordinated management regime among the agencies.

## **6. Be Willing to Consider the Necessity of Triage**

Scientific discussions have begun to suggest that triage might be needed in protecting oceans and wildlife in an age of climate change. Some species may not be able to adjust to climate change. For example, species such as the Devil's Hole pupfish, which lives in a single cave in Ash Meadows National Wildlife Refuge in Nevada, may not be able to adjust to change. Climate change, moreover, may quickly overburden the abilities of conservation agencies to respond.

Some governmental agencies have already begun to prioritize actions based on the chances of success. In a recent report, for example, the Tahoe National Forest stated that it has decided not to engage in some projects that might not succeed due to climate change – e.g., trying to restore salmon in rivers that are not likely to provide suitable future habitat.

Most conservation laws, however, including the ESA, appear to demand action in the face of jeopardy and do not appear to allow for consideration of feasibility. Agencies,

moreover, have little experience with explicit tradeoffs. Congress, therefore, may need to provide guidance to federal agencies on how to deal with species that cannot be effectively protected or protected only with great difficulty in a time of limited resources. Should resources be spent, for example, under the ESA in developing recovery plans for non-recoverable species? One policy option for dealing with this issue would be to focus attention on ecosystem-based management rather than on single species and seek to support long-term species diversity.

## **7. Seek Methods for Reducing Costs**

Given the sizable task of trying to protect oceans and wildlife in the face of climate change, governmental agencies at all level will need to find methods of reducing the costs of conservation measures. Land conservation managers, for example, might where possible consider the feasibility of carrying out management measures (such as the creation of corridors) on farms, ranches, and other working landscapes before seeking to establish non-use reserves. Allowing the use of land while promoting conservation can reduce the costs of the conservation. Conservation agencies might similarly look to relatively liberal easements (with consequently lower price tags) where appropriate before considering fee acquisitions of property. In all of these cases, federal agencies would seem to have the general authority to consider lower cost options, although agency culture or specific Congressional mandates might present an obstacle.

## **8. Look for New Funding Sources**

Finally, governmental agencies at all levels, as well as private conservation organizations, could obviously benefit from new funding sources. As earlier discussion suggests, conservation in the face of climate change is likely to be expensive. One potential source of funding could be ecosystem service markets in which the beneficiaries of ecosystem services help pay for conservation measures that protect those services. Existing ecosystem service markets tend to be relatively small and localized (with the exception of the emerging carbon sequestration market), and the degree to which more significant markets will arise is questionable.

Efforts to quantify and value ecosystem service markets, however, can be helpful here. The Natural Capital Project (a collaboration among Stanford, The Nature Conservancy, and WWF) is one of several groups developing tools that can help in this quantification and valuation. Congress can help facilitate such markets through provisions such as section 2709 of the Food, Conservation, and Energy Act of 2008, which has led to the creation of the government-wide Conservation and Land Management Environmental Services Board. Even where markets for ecosystem services do not arise, the ability to quantify and value the services flowing from conservation may help local and state governments justify continued financial support of critical conservation measures.

**DISCLOSURE REQUIREMENT**  
**Required by House Rule XI, clause 2(g)**  
**and Rules of the Committee on Resources**

1. Name: Barton H. Thompson, Jr.
2. Business Address: Stanford Law School, Crown Quadrangle, Room 320, Stanford, California, 94305
3. Business Phone Number: 650-723-2518
4. Organization you are representing: I'm appearing in my individual capacity
5. Any training or educational certificates, diplomas or degrees or other educational experiences which add to your qualifications to testify on or knowledge of the subject matter of the hearing:

See attached CV.

6. Any professional licenses, certifications, or affiliations held which are relevant to your qualifications to testify on or knowledge of the subject matter of the hearing:

See attached CV.

7. Any employment, occupation, ownership in a firm or business, or work-related experiences which relate to your qualifications to testify on or knowledge of the subject matter of the hearing:

See attached CV.

8. Any offices, elected positions, or representational capacity held in the organization on whose behalf you are testifying:

Not applicable. I am testifying in my individual capacity.

9. Any federal grants or contracts (including subgrants or subcontracts) from the Department of the Interior or Department of Commerce (and /or other agencies invited) which **you** have received in the last three years, including the source and the amount of each grant or contract:

I have not received any federal grants or contracts from the Department of the Interior or the Department of Commerce within the last three years.

10. Any federal grants or contracts (including subgrants or subcontracts) the Department of the Interior or the Department of Commerce (and /or other agencies invited) which

were received in the last three years by the **organization(s) which you represent** at this hearing, including the source and amount of each grant or contract:

I am appearing in my individual capacity.

11. Any other information you wish to convey which might aid the members of the Committee to better understand the context of your testimony:

No other information.

January 11, 2010 (9:18AM) - non governmental witness

**Barton H. Thompson, Jr.**  
**Short Curriculum Vitae**

**Professional Background**

Stanford Law School

*Robert E. Paradise Professor of Natural Resources Law*

*Vice Dean (1999-2004)*

*Director, Environmental and Natural Resources Law & Policy Program*

Principal subjects: environment, natural resources, and property

Woods Institute for the Environment at Stanford University

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Hoover Institution for War, Revolution, and Peace, Stanford University

*Visiting Fellow (Spring 1999)*

O'Melveny & Myers, Los Angeles

*Partner (1984-1986)*

*Associate (1978-1983)*

University of California at Los Angeles

*Instructor, Law School (1980-1983: water resources)*

United States Supreme Court (1977-1978)

*Law Clerk to Justice William H. Rehnquist*

United States Court of Appeals, San Francisco (1976-1977)

*Law Clerk to Judge Joseph T. Sneed*

**Educational Background**

Stanford Law School, J.D. 1976

Stanford Business School, M.B.A. 1976

Stanford University, A.B. 1972 (economics)

**Books**

ENVIRONMENTAL LAW & POLICY: CONCEPTS AND INSIGHTS (2d ed. 2006) (Foundation Press) (with James Salzman)

LEGAL CONTROL OF WATER RESOURCES (4th ed. 2006) (West Group) (with Joseph Sax, John Leshy, and Robert Abrams)

PROPERTY LAW: OWNERSHIP, USE, AND CONSERVATION (2006) (Foundation Press) (with Paul Goldstein)

### **Selected Articles**

[\*Watershed Protection: Capturing the Benefits of Nature's Water Supply Services\*, 29 Natural Resources Forum 98 \(2005\)](#)

[\*Answering Lord Perry's Question: Dissecting Regulatory Overfishing\*, 46 Ocean and Coastal Management 649-680 \(2003\).](#)

[\*Tragically Difficult: The Obstacles to Governing the Commons\*, 30 Environmental Law 241-278 \(2000\)](#)

[\*People or Prairie Chickens: The Uncertain Search for Optimal Biodiversity\*, 51 Stanford Law Review 1127-1185 \(1999\)](#)

[\*The Endangered Species Act: A Case Study in Takings & Incentives\*, 49 Stanford Law Review 305-80 \(1997\)](#)

[\*Institutional Perspectives on Water Policy and Markets\*, 81 California Law Review 671-764 \(1993\)](#)

[\*Judicial Takings\*, 76 Virginia Law Review 1449 \(1990\)](#)

### **Governmental Service**

United States Environmental Protection Agency, Science Advisory Board

### **Organizations & Associations**

The Nature Conservancy (California Trustee)

The American Farmland Trust (Board Member; Chair, Strategic Planning Committee)

Resources Legacy Fund (Chair, Board of Directors)

Resources Legacy Fund Foundation (Chair, Board of Directors)

Natural Heritage Institute (Board Member)

California Bar

### **Honors and Awards**

Distinguished Lecturer, Florida State University School of Law

Distinguished Visitor, Northwestern School of Law of Lewis & Clark College

Hurlburt Award for Excellence in Teaching