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OVERSIGHT HEARING ON THE LISTING DECISION FOR THE POLAR BEAR UNDER THE ENDANGERED SPECIES ACT

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

APRIL 2, 2008

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ONE HUNDRED TENTH CONGRESS
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C O N T E N T S

OVERSIGHT HEARING ON THE LISTING DECISION FOR THE POLAR BEAR UNDER THE ENDANGERED SPECIES ACT

WEDNESDAY, APRIL 2, 2008

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The full committee met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Office Building, Hon. Barbara Boxer (chairman of the full committee) presiding.

Present: Senators Boxer, Inhofe, Warner, Craig, Whitehouse and Barrasso.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. The hearing will come to order. I want to welcome everybody.

Today, the Committee will conduct an oversight hearing on the Bush administration's delay of the listing of the polar bear. This listing is months overdue in violation of the Endangered Species Act.

I also note that the Department only proposed the polar bear for listing after it was required to under a settlement agreement which triggered the statutory obligation that a final listing decision be made on January 9th, 2008.

Conducting oversight is one of Congress's most important duties. Oversight is especially warranted when a Government agency has failed to perform its obligations under the law. The fact that the Department of Interior is in litigation over its failure to act is all the more reason to conduct an oversight hearing. Agencies in litigation frequently appear before oversight committees as they should, or we can't do our job.

By failing to finalize its decision with respect to the polar bear within the statutory time limits, the Bush administration is violating the law, and that is why we are here today.

One of the world's most spectacular animals, the estimated 20,000 to 25,000 polar bears, are in danger of losing their habitat and becoming extinct over the next 50 years. Indeed, scientists around the world are greatly concerned about the polar bear's future due to global warming and melting sea ice which polar bears depend upon to hunt and den.

Two months ago, this Committee heard testimony from legal and scientific experts about the consequences of melting polar sea ice

on the polar bear. These pictures should help demonstrate just what is at stake for the bear, particularly the one where you can see the bear clinging to the ice.

Sadly, despite the peer-reviewed scientific evidence, despite the opinions of scientists in our own Government, despite the fact that we have a strong successful law to protect imperiled species, the Endangered Species Act, the Bush administration continues to break the law by failing to make a final decision to list the polar bear. That is the law's requirement and they are not doing it.

During the January hearing, Fish and Wildlife Service Director Dale Hall stated plainly that his agency had no legal excuse for the delay. Director Hall also restated that his agency needed 30 days from January 8th to complete its work. That day passed almost 2 months ago. The Bush administration does not have the right or the discretion to decide not to carry out the law. I guess may be I am old fashioned, but I always learned that when laws are passed by Congress and signed by the President, they must be obeyed, but that is not what is happening here.

Let's not forget that the Endangered Species Act was designed to save species that are in danger of extinction. These species do not have an indefinite period of time to be saved. That is why there are strict timeframes for listing decisions. Those timeframes are written right into the law, and the Bush administration cannot simply waive them. There is no waiver authority in these laws. Again, no such legal justification has been given.

While I am deeply concerned by the Bush administration's foot-dragging on the final listing decision for the polar bear, I am further troubled that the Administration charged full speed ahead to allow new oil and gas drilling activities in nearly 30 million acres of the Chukchi Sea, where about 20 percent of the world's polar bears live. In other words, they went ahead with the drilling even though they didn't finish the science, but they couldn't wait. That is one in five polar bears in the world, and it is half of the U.S. polar bear population that lives up there. You can see the ice melt in September 2007 compared to where it was in 1980. It has gone from eight million to about four million kilometers.

I will take an additional 2 minutes and I will give an additional 2 minutes to Senator Inhofe.

Had the polar bear been listed on the date the Fish and Wildlife Service was required to decide, the Minerals Management Service would have been required to formally consult with Fish and Wildlife under the Endangered Species Act. The Section 7 consultation requirements are the heart of the protections of the ESA. Indeed, it is standard among the most successful of any wildlife law in the world.

By requiring the agencies to work with the Fish and Wildlife Service to ensure that an agency's actions do not jeopardize the existence of a species or destroy the habitat, the Act's consultation requirements provide a critical layer of protection that other environmental reviews simply cannot match. But the Administration went ahead and accepted bids, even though oil and gas activities may disturb the polar bear making their dens, and even though an oil spill could pose big risks to the polar bear population.

Any claim by the Administration that the polar bear is not threatened or endangered by these oil and gas activities has not gone through the analysis for threatened or endangered species required by the Endangered Species Act. I am profoundly troubled by these events, but I suppose I shouldn't be surprised. Indeed, the Administration did not even begin to act on the polar bear listing process until it was sued by conservation groups.

More important, there is a consistent pattern in the Bush administration of failure to list species under the Endangered Species Act. As of today, it has been 693 days since the Department of Interior has listed a single domestic species under the Act. Not a single domestic species has been listed since Mr. Kempthorne became Secretary of the Interior. Fewer species have been listed per year under the Bush administration than under any other President in the history of the Endangered Species Act. Under President Clinton, an average of 65 species were listed per year. Under the current President Bush, only eight have been listed per year. Republican Presidents Reagan and the first George Bush had substantially better records than that, with an average of 32 and 58 listing per year respectively.

Given that according to the Intergovernmental Panel on Climate Change as many as one-third of the world's species are at risk of extinction if global temperatures exceed 1.5 degrees to 2.5 degrees Celsius above present-day levels, we need to be redoubling our efforts, not curtailing them. We have to redouble our efforts to protect species. I sat here and heard the scientists tell us that 40 percent of the species are at risk in uncontrolled global warming.

This polar bear listing decision is months overdue. Time is running out for the polar bear, and time has run out for this decision to be made. The Bush administration has its legal obligation to finalize its decision on the polar bear, and we all have a moral obligation to see that they do it. We owe it to our grandchildren who will inherit this world.

I might say we got a letter from Secretary Kempthorne. I ask unanimous consent to place it into the record. Without objection, we will do that.

[The referenced document follows:]

Dear Madam Chairman

As a former United States Senator and a former member of the Committee on Environment and Public Works (EPW). I have the utmost respect for the mission of the Committee and its oversight responsibilities. Therefore. I appreciated our conversion several days ago on this oversight responsibility and how it relates to the issue of the polar bear.

It was during my tenure on the EPW Committee that the members approved my bill, supported on a bipartisan basis. supported by Senators Larry Reid, Max Baucus, Jim Inhofe, John Warner, and others, to improve the Endangered Species Act (ESA). I also want to acknowledge the considerable contributions to the ESA and Safe Drinking Water Act made by the late John Chafee. who led the Committee during my tenure. It was the Committee that unanimously approved, with your support, my legislation to improve the Safe Drinking Water Act that today is still the law of the land.

Both on the phone and in writing. I have committed to appear before the Environment and Public Works Committee once a mutually agreeable date is found and a final determination on the polar bear has been made. I have directed Matt Eames. Director of the Office of Congressional and Legislative Affairs, to work with your staff to find such a date once a decision is made.

Since a final determination has not been made. I must respectfully decline at this time the opportunity to appear at an April 2, 2008, hearing that was set without

my prior agreement. I am, in my official capacity, one of the named defendants in litigation on the matter that is the subject of the hearing. In fact, one of the other witnesses at the hearing is a representative of one of the plaintiffs in that case. Again. I will appear before the Committee at a mutually acceptable time once a decision has been made.

As you know. on January 9, 2007, the U.S. Fish and Wildlife Service (FWS) proposed to list the polar bear as a threatened species throughout its range after a scientific review of the polar bear found that populations may be threatened by decreasing sea ice extent and converge and inadequate regulatory mechanisms to address sea ice recession. In January 2007, I directed the U.S. Geological Survey (USGS) to perform new research aimed at providing additional analysis to assist our process of moving from a proposed rule to a decision. I also directed the FWS to work with the public and pertinent sectors of the scientific community to broaden our understanding of the factors affecting the species and to gather additional information to inform the final decision.

In September 2007. USGS scientists provided the results of their new research to the FWS. This research included an evaluation of polar bears occupying similar physiographic ecoregions and a determination of how the observed and projected changes in sea ice translate into changes in polar bear habitat availability and status. The research updated population information on polar bears of the Southern Beaufort Sea of Alaska and provided new information on the status of two other polar bear populations (Northern Beaufort Sea and Southern Hudson Bay). The USGS studies also provided additional data on arctic climate and sea ice trends and modeled probabilities of change to polar bear numbers throughout the species' range over various time periods.

As a result of the new USGS research findings, the FWS reopened and later extended a second comment period to allow the public time to review and respond to the USGS findings. At the time the decision was made to reopen and extend the comment period, Director Dale Hall informed me that the FWS would likely need extra time to adequately evaluate and incorporate results from the comments received. The FWS received over 670,000 comments on the proposed listing. The review of the science involved in determining whether the polar bear should be listed has been extensive and has involved Director Hall and USGS Director Mark Myers.

It is important to recognize that there are occasionally tensions between the ESA's time deadlines and the ability of the Department to render a thorough and defensible decision. As one example, former Secretary of the Interior Bruce Babbitt and former FWS Director Jamie Rappaport Clark, were unable to meet the listing deadline for the lynx. I believe Secretary Babbitt wanted to make sure his decision was well-founded, though the necessary deliberations meant missing deadlines. I believe Secretary Babbitt recognized, as I do, that these decisions must be sound and defensible, based on the law and the best available science. I experienced his interest in the ESA when I was developing my Senate ESA reform bill. I worked closely with Secretary Babbitt and Director Clark on the drafting of provisions to improve ESA implementation. '

Your March 21 letter referenced the Department's duty to protect the polar bear from the threat of extinction. The Department does have the duty to determine whether the polar bear should be listed under the ESA and currently protects the bear under the stringent provisions of the Marine Mammal Protection Act. You also have questioned why I did not delay approval of the Chukchi Sea oil and gas lease sale. The threat to the polar bear identified by the Department's scientists is receding sea ice. The January 2007 proposed listing of the polar bear as threatened included the following with respect to oil and gas activities:

> *However, based on mitigation measures in place now and likely to be used in the future, historical information on the level of oil and gas development activities occurring within polar bear habitat within the Arctic, the lack of direct quantifiable impacts to polar bear habitat from these activities noted to date, and because of the localized nature of the development activities, or possible events such as oil spills, they do not threaten the species throughout all or a significant portion of its range.*

Moreover, should the polar bear ultimately be listed, any oil and gas exploration and development activities would be subject to the ESA, the Marine Mammal Protection Act, the National Environmental Policy Act, and other relevant laws. The timing of the lease sale does not affect these requirements.

I have a duty under the ESA to examine the factors for listing a species and making a determination based on science and the requirements of the law. My decision will be based solely on these requirements.

I repeat my commitment to appear before the Committee once a decision is made and a mutually agreed upon time is reached. Careful deliberation will not imperil the survival of the polar bear; it will better ensure that the decision is legally sound and based upon the best available science and the requirements of the law.

Senator BOXER. Essentially what the Interior Secretary said in the letter is he would not come before us, even though I have tried to get a day that would work for him, because he is being sued in relation to this. He also said that there were other Secretaries of Interior that missed the deadline on endangered species. He also said that he would come here after the decision is made. He also said that he believes there is no adverse impact to the polar bear in the Chukchi Sea.

I wanted in fairness to State what he said. The letter will be available for the record. I am extremely disappointed that he is not here.

In closing, I just always like to remind myself of some of the ancient writings about the environment. One of them was written in 500 AD. This was written of God's creation: "See my handiwork, how beautiful and choice they are. Be careful not to ruin and destroy my world, for if you do ruin it, there is no one to repair it after you." That is from Genesis, a commentary on Genesis around 500 AD. "Be careful not to ruin it and destroy my world, for if you ruin it, there is no one to repair it after you."

Once they are gone, they are gone. So missing these deadlines is not something that should pass this body. And Mr. Kempthorne's not being here I believe is a slap at this Committee, and it is a slap at the American people who care about this.

Thank you very much. We will add 4 minutes to your time and give you 9 minutes.

[The prepared statement of Senator Boxer follows:]

STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Today, the Committee will conduct an oversight hearing on the Bush administration's delay of the listing of the polar bear. This listing is months overdue, in violation of the Endangered Species Act.

I also note that the Department only proposed the polar bear for listing after it was required to act under a settlement agreement which triggered the statutory obligation that a final listing decision be made by January 9, 2008.

Conducting Oversight is one of Congress most important duties. Oversight is especially warranted when a government agency has failed to perform its obligations under the law.

The fact that the Department of the Interior is in litigation over its failure to act is all the more reason to conduct an oversight hearing. Agencies in litigation frequently appear before oversight committees—as they should.

By failing to finalize its decision with respect to the polar bear within the statutory time limits, the Bush administration is violating the law—that is why we are here today.

One of the world most spectacular animals, the estimated 20,000–25,000 polar bears are in danger of losing their habitat and becoming extinct over the next 50 years.

Indeed, scientists around the world are greatly concerned about the polar bear's future, due to global warming and melting sea ice, which polar bears depend on to hunt and den.

Two months ago, this Committee heard testimony from legal and scientific experts about the consequences of melting polar sea ice on the polar bear—these pictures

help demonstrate just what is at stake for the bear if we continue to ignore the problem.

And sadly, despite the peer-reviewed scientific evidence; despite the opinions of scientists in our own government; despite the fact that we have a strong, successful law to protect imperiled species—the Endangered Species Act—the Bush Administration continues to break the law by failing to make a final decision to list the polar bear.

During the January hearing, Fish and Wildlife Service Director Dale Hall stated plainly that his agency had no legal excuse for the delay. Director Hall also restated that his agency needed about an additional 30 days from January 8 to complete its work—that day passed almost 2 months ago.

The Bush administration does not have the right or the discretion to decide to not carry out the law. I guess maybe I'm old-fashioned, but I always learned that when laws are passed by Congress, and signed by the President, they must be obeyed. But that's not what's happening here.

Let us not forget that the Endangered Species Act was designed to save species that are in danger of extinction. These species do not have an indefinite period of time to be saved. This is why there are strict timeframes for listing decisions written right into the law and the Bush administration cannot simply waive them. Again, no such legal justification has been given.

While I am deeply concerned by the Bush administration—foot-dragging on the final listing decision for the polar bear, I am further troubled that the Administration charged full speed ahead to allow new oil and gas drilling activities in nearly 30 million acres of the Chukchi Sea, where about 20 percent of the world's polar bears live. That's one in five polar bears in the world.

Had the polar bear been listed on the date the Fish and Wildlife Service was required to decide, the Minerals Management Service would have been required to formally consult with the Fish and Wildlife Service under the Endangered Species Act.

The Section 7 consultation requirements are the heart of the protections of the Endangered Species Act. Indeed, its standard is among the most successful of any wildlife law in the world. By requiring the agencies to work with the Fish and Wildlife

Service to insure that an agency's actions do not jeopardize the existence of a species or adversely change or destroy its habitat, the Act's consultation requirement provides a critical layer of protection that other environmental reviews simply cannot match.

But the Administration went ahead and accepted bids, even though oil and gas activities may disturb polar bears making their dens, and even though an oil spill could pose big risks to the polar bear population. Any claim by the Administration that the polar bear is not threatened or endangered by these oil and gas activities has not gone through the analysis for a threatened or endangered species required by the Endangered Species Act.

I am profoundly troubled by these events. But I suppose I should not be surprised. Indeed, the Administration did not even begin to act on the polar bear listing process until after it was sued by conservation groups. More important, there is a consistent pattern in the Bush Administration of failure to list species under the Endangered Species Act.

As of today, it has been 693 days since the Department of the interior has listed a single domestic species under the Act. And not a single domestic species has been listed since Mr. Kempthorne became Secretary of the Interior in May 2006. Fewer species have been listed per year under the Bush Administration than under any other president in the history of the Endangered Species Act.

Under President Clinton, an average of 65 species were listed per year; under the current President Bush only 8 have been listed per year. Republican Presidents Reagan and the first George Bush had substantially better records than that, at an average of 32 and 58 listings per year, respectively.

Given that according to the Intergovernmental Panel on Climate Change, as many as one-third of the world's species are at risk of extinction if global temperatures exceed 1.5–2.5 degrees Celsius above present day levels, we need to be redoubling our efforts to protect species from extinction—not curtailing them. And more species will be threatened if temperatures go higher.

This polar bear listing decision is now months overdue. Time is running out for the polar bear and time has run out for this decision to be made.

The Bush Administration has its legal obligation to finalize its decision on the polar bear more important, all of us have a moral obligation. We owe it to our grandchildren who will inherit this world. A Rabbi wrote of God's creation in 500 AD:

"See my handiwork, how beautiful and choice they are. . . Be careful not to ruin and destroy my world, for if you do ruin it, there is no one to repair it after you."

OPENING STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Thank you, Madam Chairman.

This is our second hearing in 3 months on the polar bear. The focus of this hearing is on the Department of Interior's failure to meet its court-ordered and statutory deadlines for making a listing decision in a subsequent lawsuit brought by environmental groups.

The decision is overdue by 90 days, and many of my Democratic colleagues are outraged by this delay. I firmly believe that statutory and court-ordered deadlines should be met. However, this is not the first time that the Fish and Wildlife Service has missed one of these deadlines. For example, in July 1998, the Clinton administration proposed to list the Canadian lynx as threatened under the ESA. The final rule was published in March 2000, exceeding the statutory 1-year deadline by more than 250 days. It is my understanding that from 1998 to 2000, the prior Administration had a 10 percent success rate in getting listing decisions made within the 1-year statutory window. So this is not an unprecedented occurrence nor is it unique to the Bush administration.

It is very telling that my Democratic colleagues have chosen this missed deadline over which to get upset. The fact that we have had two hearings on a single listing decision reinforces my belief that the listing of the polar bear is not about protecting the bear, but about using the ESA to achieve global warming policy that special interest groups cannot otherwise achieve through the legislative process.

Worldwide polar bear population numbers are at a near all-time high, especially in comparison to 40 and 50 years ago. They are about four times the population that they were at that time. A majority of populations are considered stable. Interestingly, I worry that we have spent and will continue to spend too much time and money examining a healthy species, and manufacturing ways to predict its demise, when there are hundreds of species legitimately on the list that need these scarce department resources.

The ESA is simply not equipped to regulate economy-wide greenhouse gases, nor does the Fish and Wildlife Service have the expertise to be a pollution control agency. The regulatory tools of the ESA function best when at-risk species are faced with local, tangible threats. Greenhouse gas emissions are not local. Without objection, I would like to enter into the record a law review article written by Florida State Law School Professor J.B. Ruhl entitled Climate Change and the Endangered Species Act.

Senator BOXER. Without objection, so ordered.

[The referenced document follows:]

ARTICLES

CLIMATE CHANGE AND THE ENDANGERED SPECIES ACT: BUILDING BRIDGES TO THE NO-ANALOG FUTURE

J.B. RUHL*

* Matthews & Hawkins Professor of Property, The Florida State University College of Law, Tallahassee, Florida. I am thankful to Michael Bean, Robin Kundis Craig, Holly Doremus, Don Elliott, Alex Klass, David Policansky, and Katrina Wyman for input on earlier versions of this work, to participants in workshops at Florida State, Georgetown, Virginia, the Department of the Interior, and Defenders of Wildlife for their helpful comments, to my research assistants Nino Chiarello and Lucinda Lagomasino, and to the FSU College of Law for financial and other support. Please direct any questions or comments to jruhl@fsu.edu.

This Article examines the challenges global climate change presents for the Endangered Species Act (ESA) and its primary administrative agency, the U.S. Fish and Wildlife Service (FWS). Climate change will reshuffle ecological systems in ways that will defy prediction using existing knowledge and models, posing threats to species through primary and secondary ecological effects and the effects of human adaptation to climate change. Even assuming global-wide regulation of greenhouse gas emissions eventually yields a more stable climate variation regime, it will differ from the recent historical regime and many species will not survive the transition regardless of human interventions using the ESA. Yet many other species can survive with the assistance offered through a focused application of the ESA.

This Article proposes a policy approach aimed toward that objective. It begins by introducing the climate change challenge facing the FWS and explains why, after the Supreme Court's decision in Massachusetts v. EPA, *the agency must develop a response. Part I examines the likely ecological consequences of climate change, for which we have no analog, and develops a typology of threats species will experience. Part II explores the pressures climate change will place on the FWS's policy decisions as an escalating number of species faces increasingly more serious imperilment as a result of climate change. Part III methodically probes the relevant provisions of the ESA to identify the range of policy discretion the FWS has in making those decisions. Part IV then lays out a plan for the FWS to use the ESA to build bridges for climate-threatened species across the climate change transition and into the no-analog future. Most significantly, I propose that the ESA should not be used to regulate greenhouse gas emissions, but rather that it should be focused on establishing protective measures for species that have a chance of surviving the climate change transition and establishing a viable population in the future climate regime. In particular, the ESA can help ensure that human adaptation to climate change does not prevent other species from adapting as well.*

INTRODUCTION

The pika is toast. More specifically, the American pika (*Ochotona princeps*) is running out of places to live,[1] and global climate change appears to be the primary cause of its decline.[2] This tiny rabbit-like species has the

[1] The background on the pika in this paragraph is derived from Donald K. Grayson, *A Brief History of Great Basin Pikas*, 32 J. BIOGEOGRAPHY 2103 (2005), and Erik A. Beever et al., *Patterns of Apparent Extirpation Among Isolated Populations of Pikas (Ochotona princeps) in the Great Basin*, 84 J. MAMMALOGY 37 (2003). For numerous images of pikas in their montane habitat, enter "pika" in Google Images.

[2] In this Article, I unapologetically adopt the premise that global climate change is occurring at anomalously rapid rates compared to historical trends, and that anthropogenic (human-induced) sources of greenhouse gases (primarily carbon dioxide) are a significant

unfortunate trait of being remarkably well-adapted to the cold, high-altitude, montane habitat of the Sierra Nevada and Rocky Mountain ranges in the North American Great Basin. Indeed, it is considered one of the iconic species to

causal factor. I do not endeavor here to convince anyone of this. The Intergovernmental Panel on Climate Change (IPCC), an international scientific project representing hundreds of scientists, has produced a series of reports, including a comprehensive set in 2007, synthesizing scientific information on climate change and its effects on ecological conditions, all of which support the premises adopted herein. *See, e.g.*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SUMMARY FOR POLICYMAKERS, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 2-5 (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf [hereinafter PHYSICAL SCIENCE BASIS SUMMARY]; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SUMMARY FOR POLICYMAKERS, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY, CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 8-10 (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf [hereinafter CLIMATE CHANGE IMPACTS SUMMARY]; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SUMMARY FOR POLICYMAKERS, CLIMATE CHANGE 2007: MITIGATION, CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE *passim* (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-spm.pdf [hereinafter MITIGATION SUMMARY]; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE AND BIODIVERSITY, IPCC TECHNICAL PAPER V, at 1 (2002), *available at* http://www.ipcc.ch/pdf/technical-papers/climate-changes-biodiversity-en.pdf [hereinafter CLIMATE CHANGE AND BIODIVERSITY]. The IPCC recently summarized its work to date in INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007 SYNTHESIS REPORT: SUMMARY FOR POLICY MAKERS (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf [hereinafter 2007 SYNTHESIS REPORT SUMMARY].

To be sure, the IPCC reports recognize a substantial degree of uncertainty about climate change cause and effect in many respects, which I cover where relevant *infra*. There are also many sources of commentary about climate change taking positions contrary to those adopted in the IPCC reports and in this Article, suggesting that climate change is not occurring, or that if it is occurring, it is a natural and temporary cycle of climate variation. *See, e.g.*, C.D. IDSO & K.E. IDSO, CTR. FOR THE STUDY OF CARBON DIOXIDE & GLOBAL CHANGE, CARBON DIOXIDE AND GLOBAL WARMING: WHERE WE STAND ON THE ISSUE (1998), *available at* http://www.co2science.org/scripts/CO2ScienceB2C/about/position/globalwarming.jsp. On the other hand, there are also many scientists who believe the IPCC has been too cautious in communicating the potential severity of climate change and its effects. *See* Chris Huntingford & Jason Lowe, *"Overshoot" Scenarios and Climate Change*, 316 SCIENCE 829, 830 (2007); Richard A. Kerr, *Pushing the Scary Side of Climate Change*, 316 SCIENCE 1412, 1412 (2007). Being the product of international consensus, moreover, it is widely regarded that the assessments in the IPCC reports were "watered down." *What the Climate Panel Didn't Say*, ENVTL. F., May-June 2007, at 20, 20. Ongoing research that the federal government's Climate Change Science Program (CCSP) conducts, as well as U.S. government involvement in the IPCC project, is covered at http://www.climatescience.gov (last visited Nov. 14, 2007).

people who enjoy climbing in high elevations – it even has its own fan club.[3] The pika's problem is that as global climate change causes surface temperatures to rise, the altitude above which pikas can find suitable conditions for survival also is rising. In Yosemite National Park, for example, researchers have determined that the minimum average altitude for pika populations has risen from 7800 feet to 9500 feet in the past 90 years. Of course, if you think of a mountainous topography, you can quickly appreciate the pika's problem – most remaining pika populations are now stranded on scattered high mountain peaks in ranges separated by low-lying deserts, meaning they are stuck on mountaintop islands and the water is rising, so to speak. Seven of the twenty-five historically described pika populations in the Great Basin have gone extinct, and those remaining are in decline.[4]

The pika's recent decline and gloomy future call to mind the protective capacity of the Endangered Species Act (ESA).[5] Often referred to as the "pit bull" of environmental laws,[6] the ESA erects a powerful framework for the identification and conservation of endangered and threatened species.[7] The United States Fish & Wildlife Service (FWS), which administers the ESA for

[3] *See* Enthusiasts Mailing List at Pika Works, http://www.pikaworks.com/services/enthusiasts.html (last visited Nov. 14, 2007).

[4] *See* Grayson, *supra* note 1, at 2103.

[5] Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended at 7 U.S.C. § 136 (2000), 16 U.S.C. §§ 1531-1544 (2000), and in other scattered sections of 16 U.S.C.). The pika is not currently protected under the ESA. In October 2007, the Center for Biological Diversity petitioned the federal government to extend ESA protection to the pika on the basis of climate change impacts. *See* Petition to List the American Pika (*Ochotona Princeps*) as Threatened or Endangered Under the Endangered Species Act, at 1 (Oct. 1, 2007), *available at* http://www.biologicaldiversity.org/species/mammals/American_pika/pdfs/American-pika-federal-petition-10-01-2007.pdf.

[6] *See, e.g.*, Steven P. Quarles, *The Pit Bull Goes to School*, ENVTL. F., Sep.-Oct. 1998, at 55, 55 (discussing the origins of this reputation). For additional historical context highlighting the Act's "overbearing statutory certainty," see generally Steven P. Quarles & Thomas R. Lundquist, *The Pronounced Presence and Insistent Issues of the ESA*, NAT. RESOURCES & ENV'T, Fall 2001, at 59.

[7] This Article is not intended to provide a comprehensive overview of the ESA. Rather, it focuses on the manner in which global climate change will influence administration of the ESA. For comprehensive treatments of the ESA, several of which are referred to frequently *infra*, see generally MICHAEL J. BEAN & MELANIE J. ROWLAND, THE EVOLUTION OF NATIONAL WILDLIFE LAW (3d ed. 1997); ENDANGERED SPECIES ACT: LAW, POLICY, AND PERSPECTIVES (Donald C. Baur & Wm. Robert Irvin eds., 2002) [hereinafter LAW, POLICY, AND PERSPECTIVES]; LAWRENCE R. LIEBESMAN & RAFE PETERSEN, ENDANGERED SPECIES DESKBOOK (2003); STANFORD ENVTL. LAW SOC'Y, THE ENDANGERED SPECIES ACT (2001); TONY A. SULLINS, ESA: ENDANGERED SPECIES ACT (2001); THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE: VOLUME I (Dale D. Goble et al. eds., 2006) [hereinafter THE ENDANGERED SPECIES ACT AT THIRTY].

terrestrial and freshwater species,[8] has identified over 1250 animal and plant species in the United States for protection and has exercised its regulatory authority throughout the nation to fulfill the statute's goal of conserving imperiled species.[9] While few species brought under the ESA's protection have recovered to full health, the ESA is credited with preventing the ultimate extinction of the vast majority of protected species.[10]

Given the threat climate change poses to the pika and potentially many other species – one preeminent ecologist describes climate change as "a major threat to the survival of species and integrity of ecosystems world-wide"[11] – it seems an appropriate target for the ESA. Indeed, although clearly not enthusiastic about the prospect, the FWS appears ready to carry the ESA into the climate change era, having recently proposed to extend ESA protection to the polar bear because of the diminishing ice habitat that the species depends upon for survival.[12] The agency is getting strong nudges from the outside as well, as members of Congress have urged the agency to evaluate the effects of climate change on species generally,[13] environmental advocacy groups have petitioned

[8] The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) (also known as NOAA-Fisheries) administers the ESA for most marine species and anadromous fish. My principal focus is on the FWS and terrestrial and freshwater species. What is observed in this Article about the ESA, however, applies equally to administration of the statute by the NMFS.

[9] *See* U.S. Fish & Wildlife Serv., http://www.fws.gov/endangered/ (last visited Feb. 20, 2008) (describing the Endangered Species Program).

[10] *See* J. Michael Scott et al., *By the Numbers*, *in* THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 7, at 16, 29-32.

[11] Philip E. Hulme, *Adapting to Climate Change: Is There Scope for Ecological Management in the Face of a Global Threat?*, 42 J. APPLIED ECOLOGY 784, 784 (2005). In its 2007 Synthesis Report, the IPCC predicts that "[t]here is *medium confidence* that approximately 20-30% of species assessed so far are *likely* to be at increased risk of extinction if increases in global average warming exceed 1.5-2.5°C," and that if warming "exceeds about 3.5°C, model projections suggest significant extinctions (40-70% species assessed) around the globe." 2007 SYNTHESIS REPORT SUMMARY, *supra* note 2, at 13. For extensive discussion of the basis of this assessment, see *infra* Part I.

[12] *See* Endangered and Threatened Wildlife and Plants; 12-Month Petition Finding and Proposed Rule To List the Polar Bear (*Ursus maritimus*) as Threatened Throughout Its Range, 72 Fed. Reg. 1064 (proposed Jan. 9, 2007) (to be codified at 50 C.F.R. pt. 17). The agency proposed the rule based on a citizen petition for rulemaking. Also acting on a petition, the FWS recently initiated a status review of ten species of penguins based on threats, including climate change impacts. *See* Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition To List 12 Penguin Species as Threatened or Endangered Under the Endangered Species Act, 72 Fed. Reg. 37,695 (July 11, 2007). NMFS has identified several coral species for ESA protection based in part on the effects of global climate change. *See* Endangered and Threatened Species: Final Listing Determinations for Elkhorn Coral and Staghorn Coral, 71 Fed. Reg. 26,852 (May 9, 2006).

[13] *See Appropriators Urge Interior to Deepen Review of How Global Warming is Affecting Species*, 38 Env't Rep. (BNA) 1015, 1015 (2007).

the agency to promulgate rules to address climate change,[14] and one court has admonished the agency for failing to take climate change into account in its regulatory programs.[15]

Practically speaking, however, what can the ESA do for the pika or the polar bear? The ESA takes a species-specific approach that has proven effective when employed to address discrete human-induced threats that have straightforward causal connections to a species, such as clearing of occupied habitat for development or damming of a river.[16] That is not the pika's or the polar bear's situation. Rather, *all* anthropogenic sources of greenhouse gases throughout the planet, from a small farm to a sprawling refinery, are contributing to the demise of the pika and polar bear, and the species' decline in both cases is gradual and largely invisible to human perception. The causal chain is less direct than, say, a salmon that finds a dam in its way. Pikas and polar bears will not drop dead because of exposure to greenhouse gas emissions – the species will just fade away as their habitats transform below their feet. The ESA has proven to be unwieldy when applied on large working landscape levels,[17] so is there reason to believe it will be any more effective when applied on global levels to this kind of creeping oblivion?

The pika and polar bear thus serve as examples of the tension global climate change will create in the administration of the ESA and other environmental laws. On the one hand, the case for bringing these and other climate-

[14] Center for Biological Diversity, Petition for Rulemaking To Amend Federal Regulations To Enhance the Recovery of Endangered Species and Address the Growing Impacts of Global Warming on Imperiled Species, at 3 (Feb. 1, 2007), *available at* http://www.biologicaldiversity.org/swcbd/programs/bdes/gw-es/apa-petition.pdf [hereinafter Petition for Rulemaking]; *see also Environmental Groups Seek Federal Action with Rules on Effects of Global Warming*, 38 Env't Rep. (BNA) 308, 308 (2007) (announcing the filing of the Center for Biological Diversity's petition).

[15] *See* Natural Res. Def. Council v. Kempthorne, 506 F. Supp. 2d 322, 370 (E.D. Cal. 2007) ("FWS acted arbitrarily and capriciously by failing to address the issue of climate change . . . ."). For further discussion, see *infra* text accompanying notes 228-29.

[16] *See* Barton H. Thompson Jr., *Managing the Working Landscape*, *in* THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 7, at 101, 104 ("[ESA enforcement] has had the greatest impact on active changes in species habitat (e.g., the construction of new subdivisions, timber harvesting, and water diversions) . . . ."). The seminal ESA case, and icon of preservationism in American environmental law, involved a dam. Tenn. Valley Auth. v. Hill, 437 U.S. 153, 157 (1978). In that case the Court halted the construction of a nearly completed, federally financed dam project because the federal agencies involved had not complied with the ESA. *Id.* at 172-73. When asked to refuse to enjoin the construction as a matter of equity and common sense, the Court found that the ESA "admits of no exception" and "indicates beyond doubt that Congress intended endangered species to be afforded the highest of priorities." *Id.* at 173-74. The Court refused to "make such fine utilitarian calculations" given that "Congress viewed the value of endangered species as 'incalculable.'" *Id.* at 187.

[17] *See* A. Dan Tarlock, *The Dynamic Urban Landscape*, *in* THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 7, at 127, 127-32; Thompson, *supra* note 16, at 104-26.

threatened species under the ESA's protective wings seems as unequivocal as they come, regardless of whether greenhouse gas emissions contribute to the climate change effects. On the other hand, given the reasonably anticipated trajectory of global climate change and its effects on ecosystems, there soon may be no practical way to administer the ESA in its present form for those species. As the authors of one environmental law casebook described the dilemma:

> Are the ESA's rationales dwarfed by the current reality of global climate change? If it were possible to show that over the next century as many as half of all endangered species were likely to be rendered extinct by global warming, a condition that appears to be human-augmented but quite impervious to legal liability, would the ESA become an obsolete footnote or continue to be a practicable tool, a worthwhile declaration of principle, and a utilitarian canary in a coal mine? [18]

If what threatens the pika's survival also threatens the ESA's usefulness, these questions are not just for academic discourse. A "worthwhile declaration of principle" that has no practicable means of implementation would present quite a predicament for the FWS. And yet it is not a situation the agency can easily avoid, as the ESA contains a citizen petition procedure requiring the agency to consider species for protection,[19] and a citizen suit provision allowing private attorney general actions to enforce the statute.[20] If past experience is any indication, the stream of petitions to protect species based on global climate change effects will flow stronger, citizen suits will push harder on the agency to use the ESA's regulatory power to attack greenhouse gas emissions, and other suits will be filed to object if the agency attempts to do either.[21]

The ESA is by no means unique in finding itself between a rock and a hard place due to climate change. For example, the Environmental Protection Agency (EPA) recently denied a citizen rulemaking petition asking the agency to regulate greenhouse gas emissions from motor vehicles as an air pollutant under the Clean Air Act.[22] The agency dismissed the petition on the basis that global climate change is so complicated either Congress did not provide for greenhouse gas emissions to be subject matter for the Clean Air Act or, if

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[18] ZYGMUNT J.B. PLATER ET AL., ENVIRONMENTAL LAW AND POLICY: NATURE, LAW, AND SOCIETY 783 (3d ed. 2004).

[19] 16 U.S.C. § 1533(b)(3) (2000).

[20] *Id.* § 1540(g).

[21] For example, citizen petitions, frequently followed by citizen suits, have been a major force behind the identification of species for ESA protection. *See* D. Noah Greenwald et al., *The Listing Record*, *in* THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 7, at 51, 54-63.

[22] *See* Control of Emissions from New Highway Vehicles and Engines, 68 Fed. Reg. 52,922, 52,922 (Sept. 8, 2003).

Congress did so provide, the agency properly identified conflicting policy concerns as a basis for deciding not to regulate emissions.[23]

Indeed, the EPA's reasoning might have been attractive to the FWS and other regulatory agencies hoping to avoid the myriad of difficult policy issues surrounding climate change: Congress could not have meant for them to incorporate the ubiquitous, complex dynamics of global climate change into each and every discrete regulatory program, and even if Congress did have that in mind, the broad discretion agencies usually enjoy under regulatory statutes provides enough wiggle room to dodge the bullet. The agencies are off the hook. The pika can fend for itself.

But the Supreme Court has nipped this kind of reasoning in the bud. In *Massachusetts v. EPA*,[24] a majority of the Court found that the EPA erred in denying the rulemaking petition, making clear the principle that simply because Congress did not have climate change on its mind when it drafted a law does not mean thirty or however many years later the agency responsible for implementing the law can ignore the effects of climate change.[25] Like any other phenomenon that comes along after a statute is enacted, if global climate change becomes relevant to the statutory text and policy, it is fair game, if not *mandatory* fodder, for incorporation into the regulatory program. Hence, the Court concluded, greenhouse gas emissions, because they are linked to climate

[23] *See id.* at 52,929-31.

[24] 127 S. Ct. 1438 (2007).

[25] *See id.* at 1462-63. For a concise yet thorough summary of the rulemaking petition, the EPA's decision, lower court proceedings, the Supreme Court's majority and dissenting opinions, and the likely impact of the case, see generally Arnold W. Reitze Jr., *Controlling Greenhouse Gas Emissions From Mobile Sources* – Massachusetts v. EPA, 37 Envtl. L. Rep. (Envtl. Law Inst.) 10,535 (2007). For additional background, see generally Michael Sugar, Case Comment, Massachusetts v. Environmental Protection Agency, 31 HARV. ENVTL. L. REV. 531 (2007).

change and its numerous anticipated ill effects,[26] fit the Clean Air Act's broad definition of an air pollutant.[27] As the Court put it:

> While the Congresses that drafted [the Clean Air Act] might not have appreciated the possibility that burning fossil fuels could lead to global warming, they did understand that without regulatory flexibility, changing circumstances and scientific developments would soon render the Clean Air Act obsolete. The broad language [of the statute] reflects an intentional effort to confer the flexibility necessary to forestall such obsolescence.[28]

Hence, the Clean Air Act charged the EPA with regulating greenhouse gas emissions from motor vehicles if in the EPA's "judgment [the emissions] cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare."[29] Noting that the Clean Air Act defines "welfare" to include "effects on . . . weather . . . and climate," the Court rejected the EPA's proffered bases for its judgment not to regulate greenhouse gas emissions.[30] The EPA had taken the position that, even if it had authority to treat greenhouse gas emissions as a pollutant, it would exercise its discretion not to do so in order to accommodate other priorities, such as facilitating the President's flexibility to negotiate with other nations on climate change.[31] These other priorities, however, were not within the scope of the agency's discretion under the Clean Air Act:

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[26] The majority opinion begins with the observation that "[a] well-documented rise in global temperatures has coincided with a significant increase in the concentration of carbon dioxide in the atmosphere. Respected scientists believe the two trends are related." *Massachusetts*, 127 S. Ct. at 1446. This basic factual assertion is accepted and extended throughout the opinion, leading one observer to suggest that "the broader cultural or symbolic significance of the decision" is that "[t]he Court has accepted – indeed has seemed to internalize – the beliefs, assumptions, and values that animate the environmentalists' views on climate change." Jonathan Z. Cannon, *The Significance of* Massachusetts v. EPA, 93 VA. L. REV. IN BRIEF 51, 59 (2007), http://www.virginialawreview.org/inbrief/2007/05/21/cannon.pdf. Indeed, the case is regarded as "[a] breathtaking result for environmentalists. The first time that environmentalists have both persuaded the Supreme Court to grant review over the federal government's opposition and then won on the merits." Richard Lazarus, *A Breathtaking Result for Greens*, ENVTL. F., May-June 2007, at 12, 12.

[27] *Massachusetts*, 127 S. Ct. at 1459-60. The Clean Air Act defines "air pollutant" in sweeping terms to include "any air pollution agent . . . including any physical, chemical [or] biological . . . substance or matter which is emitted into or otherwise enters the ambient air." 42 U.S.C. § 7602(g) (2000). The Court found that "greenhouse gases fit well within [this] capacious definition." *Massachusetts*, 127 S. Ct. at 1462.

[28] *Massachusetts*, 127 S. Ct. at 1462.

[29] 42 U.S.C. § 7521(a)(1) (2000).

[30] *See Massachusetts*, 127 S. Ct. at 1447 (quoting 42 U.S.C. § 7602(h)).

[31] *Id.* at 1462-63.

> Under the clear terms of the Clean Air Act, EPA can avoid taking further action [to regulate carbon emissions from motor vehicles] only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do. To the extent that this constrains agency discretion to pursue other priorities of the Administrator or the President, this is the congressional design.[32]

So too, pika lovers might argue, must the ESA be construed to require the FWS to integrate the changing circumstances and scientific developments surrounding climate change into administration of the statute. Indeed, after *Massachusetts v. EPA*, one can argue it is incumbent on *all* federal regulatory agencies to assess how global climate change is to be integrated into their respective regulatory programs.[33] There is no dodging the bullet – each agency must place the current knowledge of climate change and its reasonably anticipated trajectory next to its regulatory statute and ask how its knowledge and the statute fit together.

Yet in setting this inquiry in motion, the Court raised far more questions than it answered. It is one thing to say an agency must consider whether climate change triggers regulatory authority under a particular statute. It is quite another thing to decide what response the statute requires. Just as agencies are not immune from having to incorporate global climate change as regulatory subject matter, climate change as regulatory subject matter is not immune from agency discretion. Some statutes – perhaps the Clean Air Act is an example – will force an agency down a narrow road toward regulation of greenhouse gas emissions. Other statutes, however, will leave ample room for an agency to argue, depending on its agenda, that greenhouse gas emissions and climate change are not appropriate subjects for regulation. Evaluating the fit between a regulatory program and climate change will, thus, often boil

[32] *Id.* at 1462 (citation omitted). As its only example of a "reasonable explanation," the Court suggested that the EPA might find "the scientific uncertainty is so profound that it precludes EPA from making a reasoned judgment as to whether greenhouse gases contribute to global warming." *Massachusetts*, 127 S. Ct. at 1463. Yet, having previously observed that "respected scientists" believe greenhouse gases do contribute to climate change, the Court seems to have left EPA little wiggle room. *Massachusetts*, 127 S.Ct at 1446; *see* Cannon, *supra* note 26, at 57; Reitze, *supra* note 25, at 10,538.

[33] For example, the Ninth Circuit recently faulted the National Highway Traffic Safety Administration for failing to take climate change effects into account when promulgating fuel economy standards for light trucks and SUVs. Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin., No. 06-71891, 2007 WL 3378240, at *17-19 (9th Cir. Nov. 15, 2007). Also, several institutional investors recently petitioned the Securities and Exchange Commission to require companies to disclose more information and analysis of the financial risks they face from climate change effects and the regulation of greenhouse gas emissions. California Public Employees Retirement System et al., Petition for Interpretive Guidance on Climate Change Disclosure, at 2-3 (2007), *available at* http://www.sec.gov/rules/petitions/2007/petn4-547.pdf.

down to identifying the scope of an agency's discretion with respect to climate change and determining how the agency can legitimately exercise that discretion. The EPA knows now that it must make a decision about the effects of greenhouse gas emissions from motor vehicles and whether to regulate those emissions, but what is the scope of the agency's discretion in making that decision? That is the question the Court in *Massachusetts v. EPA* left for the EPA to answer under the Clean Air Act.[34]

This Article explores that question from the perspective of the ESA as presently constituted.[35] Part I of the Article describes the effects of climate change and different ways in which it is likely to exacerbate species endangerment, both in terms of number of species at risk and severity of their imperilment. As noted ecologist Jane Lubchenko has put it, "we've entered new territory."[36] Complex direct and indirect mechanisms are likely to be in play, usually in ways less obvious than the stranding of the pika or the melting away of the polar bear's ice. Many ecologists believe we face a no-analog future – one for which we have no experience on which to base projections of ecosystem change,[37] and for which models designed to allow active management decisions as climate change takes effect are presently rudimentary and imprecise.[38] It is not as if ecosystems will move intact as climate conditions shift; rather, they will disassemble as climate change rips apart existing hydrological, temperature, fire, flood, drought, wind, and pest regimes at local levels, with new assemblies forming in their place. And as humans adapt to climate change by moving away from coastal areas and shifting the locations of agricultural land uses, it is likely that we will disturb ecological systems with potentially dramatic effects on resident species. A taxonomy of climate change effects on species thus is useful for understanding the challenges the FWS will face in administering the ESA as the realities of climate change begin to take hold in ecosystems.[39]

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[34] *See Massachusetts*, 127 S. Ct. at 1463 ("We need not and do not reach the question whether on remand EPA must make an endangerment finding, or whether policy concerns can inform EPA's actions in the event that it makes such a finding.").

[35] This Article addresses the scope of agency discretion under existing statutory provisions. Although the Article examines potential rulemaking reforms within the scope of existing statutory authority, I neither suggest nor review proposed statutory reforms of the ESA or any other statute to respond to climate change.

[36] *Interplay of Climate and Currents Disrupts Marine Ecosystems*, SCIENCEDAILY, Feb. 28, 2007, http://www.sciencedaily.com/releases/2007/02/070218140507.htm.

[37] *See* Douglas Fox, *Back to the No-Analog Future?*, 316 SCIENCE 823, 823 (2007); Douglas Fox, *When Worlds Collide*, CONSERVATION, Jan.-Mar. 2007, at 28.

[38] *See* Peter Cox & David Stephenson, *A Changing Climate for Prediction*, 317 SCIENCE 207, 207 (2007). For more on these modeling difficulties, see *infra* Part I.A.

[39] It also provides an example of what regulatory programs dealing with *human* social and economic institutions can expect in a climate-change future. Like ecosystems, one can foresee human communities and economies responding in "reshuffling" patterns that defy extrapolation from historical trends and for which models are, at present, theoretical at best.

Yet the FWS, like most administrative agencies, has been implementing the ESA's regulatory programs for decades, so what is new about climate change? What is the challenge, other than there being more species at risk and many of them in more dire straits? Is it just a matter of degree, or is climate change a different kind of problem altogether? Part II of the Article engages these questions by exploring the types of challenges climate change will pose for the ESA. As many agencies must, the FWS often exercises its discretion by balancing the statute's primary purpose (protecting species), other mediating statutory criteria (e.g., economic impacts), and background social, legal, and economic contexts not registered directly in the statute but placing pressure on its implementation (e.g., property rights).[40] Global climate change does not fit into one of those boxes; rather, it engulfs all of them and shakes the regulatory system at its roots. The range of possible (but not necessarily permissible) policy responses an agency might devise in such a dynamic and uncertain context is thus quite broad, from doing absolutely nothing to incorporating global climate change into every nook and cranny of the regulatory program. The FWS will face these choices with respect to the emission of greenhouse gases, actions that harm species endangered because of climate change, and conservation efforts that may be impeded by climate change.

Of course, the choices are not all for the FWS to make. Part III of the Article methodically evaluates the permissible discretion Congress has defined for the agency's selection of climate change policies. Like many regulatory statutes, the ESA is a conglomerate of different regulatory tasks and programs, each with its own idiosyncratic discretionary context, and thus each presents a different fit with global climate change. The challenge for the FWS is that each species presents its own set of circumstances with respect to the effects of climate change, meaning the agency has potentially thousands of different scenarios to track through its statutory discretion analysis. Overall, the analysis shows that the agency has considerable flexibility in terms of how it uses (or doesn't use) global climate change as a driver of regulatory policy.

If, for example, climate change shifts agriculturally productive conditions northward from, say, Kansas, how likely is it that agricultural communities in Kansas will simply pick up and relocate northward fully intact? Consider, for example, the diaspora of New Orleanians that followed Hurricane Katrina. Of over 1.3 million applicants for federal assistance, eighty-six percent came from people who had relocated to Louisiana, Mississippi, Texas, and Alabama, but applications came from every state and from more than 35,000 families that had moved over 1000 miles from the Gulf. *See* Katrina's Diaspora, http://www.nytimes.com/imagepages/2005/10/02/national/nationalspecial/20051002diaspora_graphic.html (last visited Jan. 12, 2008) (showing the results of a New York Times investigation of the distribution of Hurricane Katrina victims). Over half of the applications were filed by people that had relocated over 100 miles from New Orleans. *See id.*

[40] The examples given define the history of ESA implementation. *See* J. Michael Scott et al., *Introduction* to THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 7, at 3, 3 (characterizing the ESA as a legislative attempt to "reconcile the preservation of nature with increasing human population and consumption").

Nevertheless, some choke points limit the agency's discretion and, if *Massachusetts v. EPA* is any indication, will force the FWS to confront difficult policy decisions.

Given that regulatory landscape, Part IV addresses the practical question of what the FWS should do in the absence of congressional action, either with respect to the ESA specifically or in more general ways that relieve pressure from the ESA. I propose a coherent game plan for the agency based on four assumptions: (1) even with swift and effective adoption of global-wide greenhouse gas emission mitigation measures, some residual climate change will continue to occur over the next fifty years;[41] (2) realistically, global-wide mitigation measures will not entirely reverse greenhouse gas emissions to 1990 levels; but (3) mitigation measures will stabilize emissions at a level which will allow global climate regimes to eventually settle into a "natural" pattern of variation; and (4) some species will not survive the transition from the present to that future no matter what actions the FWS takes under the ESA, but others can make it if we help them through the transition. Under these assumptions, I argue that the FWS should *not* attempt to use the ESA to combat greenhouse gas emissions or save all species threatened by climate change, but rather should use it as the bridge to the no-analog future for those species that can benefit from the ESA's helping hand. Part IV closes by elaborating on the policy choices the agency should make to implement this use of the ESA, including how to respond to the effects of human adaptations to climate change.[42]

Like most other existing regulatory statutes, the ESA was not enacted with global climate change in mind, and the ESA alone will not arrest the causes or effects of our planet's no-analog future. But for the foreseeable future, until Congress or the states adopt statutes responding directly and comprehensively to climate change, the ESA is the nation's principal species conservation program. Even if the ESA cannot reverse climate change, pressure will be brought to bear on the FWS, just as it was on the EPA, to use its regulatory powers to "whittle away" at the problem.[43] After *Massachusetts v. EPA* the

[41] *See* Richard A. Kerr, *How Urgent Is Climate Change?*, 318 SCIENCE 1230, 1230 (2007) ("The system has built in time lags. Ice sheets take centuries to melt after a warming. The atmosphere takes decades to be warmed by today's greenhouse gas emissions.").

[42] Until recently, legal scholarship on climate change has focused primarily on mitigation efforts – i.e., legal measures aimed at reducing greenhouse gas emissions. Given the reality that climate change will continue for some time even if stiff measures are taken globally to reduce greenhouse gas emissions over the next 25-50 years, attention is turning to the law of climate change adaptation – i.e., regulation and facilitation of human responses to climate change. For a sweeping overview of many of the environmental law issues relating to climate change adaptation (though not including the ESA issues in detail), see generally Matthew D. Zinn, *Adapting to Climate Change: Environmental Law in a Warmer World*, 34 ECOLOGY L.Q. 61 (2007).

[43] As the majority in *Massachusetts v. EPA* observed, "[a]gencies, like legislatures, do not generally resolve massive problems in one fell swoop, but instead whittle away over

agency will have little choice but to do so, the only questions being where and how deeply it must cut.

I. CLIMATE CHANGE AS AN AGENT OF ECOLOGICAL RESHUFFLING

The ESA is a change-management law designed to arrest change in one direction – the decline of a species – and bring about a new trajectory of change – recovery of the species. The FWS administers several core programs aimed toward that objective, the details of which are more fully explored later in the Article:

- Section 4 of the ESA authorizes the FWS to identify "endangered" and "threatened" species, known as the listing function,[44] and then to designate "critical habitat"[45] and develop "recovery plans"[46] for the species.
- Section 7 requires all federal agencies to "consult" with the FWS to ensure that actions they carry out, fund, or authorize do not "jeopardize" the continued existence of listed species or "adversely modify" their critical habitat.[47]

time, refining their approach as circumstances change and they develop a more nuanced understanding of how best to proceed." Massachusetts v. EPA, 127 S. Ct. 1438, 1457 (2007) (citations omitted).

[44] 16 U.S.C. § 1522(a)(1) (2000). For a description of the listing process, see generally LIEBESMAN & PETERSEN, *supra* note 7, at 15-20; STANFORD ENVTL. LAW SOC'Y, *supra* note 7, at 38-58; SULLINS, *supra* note 7, at 11-25; J.B. Ruhl, *Section 4 of the ESA: The Keystone of Species Protection Law*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 7, at 19, 19-33; *infra* notes 120-30 and accompanying text.

[45] 16 U.S.C. § 1533(a)(3) (2000). For a description of the critical habitat designation process, see generally LIEBESMAN & PETERSEN, *supra* note 7, at 20-24; STANFORD ENVTL. LAW SOC'Y, *supra* note 7, at 59-69; SULLINS, *supra* note 7, at 26-28; Federico Cheever, *Endangered Species Act: Critical Habitat*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 7, at 47; Murray D. Feldman & Michael J. Brennan, *The Growing Importance of Critical Habitat for Species Conservation*, 16 NAT. RESOURCES & ENV'T 88 (2001); *infra* notes 131-39 and accompanying text.

[46] 16 U.S.C. § 1533(f) (2000). For a description of the recovery plan process, see generally LIEBESMAN & PETERSEN, *supra* note 7, at 24-26; STANFORD ENVTL. LAW SOC'Y, *supra* note 7, at 71-77; SULLINS, *supra* note 7, at 34-37; John M. Volkman, *Recovery Planning*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 7, at 71; *infra* notes 140-47 and accompanying text.

[47] 16 U.S.C. § 1536(a)(2) (2000). For a description of the consultation process, see generally LIEBESMAN & PETERSEN, *supra* note 7, at 27-39; STANFORD ENVTL. LAW SOC'Y, *supra* note 7, at 83-103; SULLINS, *supra* note 7, at 59-86; Marilyn Averill, *Protecting Species Through Interagency Cooperation*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 7, at 87; *infra* notes 169-91 and accompanying text.

- Section 9 requires that all persons, including all private and public entities subject to federal jurisdiction, avoid committing "take" of listed species of fish and wildlife.[48]

- Sections 7 (for federal agency actions)[49] and 10 (for actions not subject to Section 7)[50] establish a procedure and criteria for FWS to approve "incidental take" of listed species.[51]

These programs generate the regulatory firepower needed to effectively intervene in several categories of environmental change that cause species decline: (1) the present or threatened destruction, modification, or curtailment of habitat; (2) over-utilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; and (4) other natural or manmade factors.[52] Of course, this authority is only useful in circumstances where intervention is feasible and effective. For example, habitat loss, the leading cause of species decline,[53] is often the result of easily identifiable human-induced factors susceptible to discrete and effective regulation.[54] By contrast, invasive species, the runner-up in causes of species decline,[55]

[48] 16 U.S.C. § 1538(a)(1) (2000). For a description of the cases developing the legal standards for what constitutes "take," see generally LIEBESMAN & PETERSEN, *supra* note 7, at 39-46; STANFORD ENVTL. LAW SOC'Y, *supra* note 7, at 104-12; SULLINS, *supra* note 7, at 44-54; Alan M. Glen & Craig M. Douglas, *Taking Species: Difficult Questions of Proximity and Degree*, 16 NAT. RESOURCES & ENV'T 65 (2001); Gina Guy, *Take Prohibitions and Section 9*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 7, at 191; Steven P. Quarles & Thomas R. Lundquist, *When Do Land Use Activities "Take" Listed Wildlife Under ESA Section 9 and the "Harm" Regulation?*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 7, at 207; *infra* notes 148-68 and accompanying text.

[49] 16 U.S.C. § 1536(b)(4) (2000).

[50] *Id.* § 1539(a)(1).

[51] "Incidental take," although not explicitly defined in a specific statutory provision, is described in section 10 of the statute as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." *Id.* § 1539(a)(1)(B). The FWS has adopted this meaning in regulations implementing section 7's incidental take authorization. 50 C.F.R. § 402.02 (2003). For a description of the incidental take authorization procedures, see generally LIEBESMAN & PETERSEN, *supra* note 7, at 46-50; STANFORD ENVTL. LAW SOC'Y, *supra* note 7, at 127-73; SULLINS, *supra* note 7, at 87-102; *infra* notes 192-202 and accompanying text.

[52] These are the factors upon which listing decisions are made. *See* 16 U.S.C. § 1533(a)(1)(A)-(E) (2000).

[53] *See* David Wilcove et al., *Quantifying Threats to Imperiled Species in the United States*, 48 BIOSCIENCE 607, 609 (1998).

[54] Indeed, this is the source of the statute's "pit bull" status and largely the reason it is so controversial – discrete actions directly impairing the habitat of protected species make for easy targets of ESA regulation. *See* Glen & Douglas, *supra* note 48, at 68 (discussing the proof and causation requirements necessary to demonstrate harm).

[55] *See* Wilcove et al., *supra* note 53, at 609.

typically present exceedingly complex causes and solutions,[56] meaning there usually is no identifiable regulatory target.[57]

In this respect, climate change presents a complicated scenario. To be sure, there is an easily identifiable regulatory target: greenhouse gas emissions. Leaving until later the question of how much discretion the ESA affords the FWS to regulate greenhouse gas emissions, there are obvious practical obstacles to this approach. First, regulating emissions in the United States alone is highly unlikely to sufficiently reduce global emission levels.[58] Second, even if regulatory measures are implemented worldwide to curtail emissions, the political reality is that the measures will impose phased-in reductions taking several decades to return to benchmark emission levels designed to stabilize or reduce greenhouse gas concentrations in the troposphere.[59] Third, and most significantly, even if benchmark levels are

[56] *See* Peter M. Vitousek et al., *Biological Invasions as Global Environmental Change*, 84 AM. SCIENTIST 468, 472-77 (1996). For a series of articles covering the invasive species issue comprehensively, see generally *Special Section: Population Biology of Invasive Species*, 17 CONSERVATION BIOLOGY 24-92 (2003).

[57] One exception is ship ballast water discharges, which have been a remarkably effective means of transporting aquatic species around the globe and have thus become a subject of regulatory interest. *See* Sandra B. Zellmer, *The Virtues of "Command and Control" Regulation: Barring Exotic Species from Aquatic Ecosystems*, 2000 U. ILL. L. REV. 1233, 1234. The United States Coast Guard adopted regulations covering ballast water discharges in 2004. *See* 33 C.F.R. §§ 151.1500-.1518, 151.2000-.2065 (2007).

[58] The FWS cannot regulate developing nations such as China, which has become the world's leading source of greenhouse gas emissions and has shown only tentative interest in self-imposed or internationally-imposed emission limits. *See* Kathleen E. McLaughlin, *China, Report Says Country Has Already Overtaken U.S. as Leading Source of Carbon Emissions*, 38 Env't Rep. (BNA) 1429, 1429 (June 29, 2007); Daniel Pruzin, *China, Country 'Will Not Accept' Emissions Limits; Government Advisor Cites Insufficient Data*, 38 Env't Rep. (BNA) 1515, 1515 (July 13, 2007); Hou Yanli & Hu Min, *China and Her Coal*, WORLDWATCH, Jan.-Feb. 2007, at 14, 14.

[59] For example, following California's lead, in 2007 Florida Governor Charlie Crist signed executive orders directing the adoption of maximum emission levels of greenhouse gases for electric utilities. *See* State of Florida, Office of the Governor, Exec. Order 07-127 (July 13, 2007), *available at* http://www.myfloridaclimate.com/news/article/34. The standard will require a reduction of emissions to 2000 levels by 2017, to 1990 levels by 2025, and to 80 percent of 1990 levels by 2050. *Id.* Florida will also adopt the California motor vehicle emission standards, pending EPA approval of a waiver from federal standards, imposing a 22-percent reduction in vehicle emissions by 2012 and a 30-percent reduction by 2016. *Id.* For summaries of other proposed and adopted federal and state benchmarks, see generally Stephen C. Jones & Paul R. McIntyre, *Filling the Vacuum: State and Regional Climate Change Initiatives*, 38 Env't Rep. (BNA) 1640 (2007); Pew Ctr. on Global Climate Change, A Look at Emissions Targets, http://www.pewclimate.org/what_s_being_done/targets (last visited Nov. 16, 2007). Many observers believe these benchmarks are unrealistic. *See, e.g.*, Robert N. Stavins, *Free GHG Cuts: Too Good To Be*

attained in the near future, the physical dynamics of greenhouse gas effects on climate are such that climate change will continue on its present trajectory for a significant time period.[60]

Thus, even if the ESA is enlisted as a regulatory weapon against greenhouse gas emissions, the imminent challenge for the statute will be how to address the unavoidable impacts of climate change that have been set in motion by past emissions and which will play out over at least the next 50 years. In this sense, climate change presents scenarios that make anything the FWS has faced in the past look simple. A complex array of climate change effects will lead directly to primary and secondary stresses on ecosystems which we have never before seen or even contemplated, not to mention a tertiary wave of stresses caused when humans themselves adapt to climate change. The picture, to say the least, is not pretty.

A. *Feedback, Nonlinearity, and Reshuffling – Facing a No-Analog Future*

Three metrics drive much of the discussion of climate change as a *global* phenomenon: rising tropospheric carbon dioxide levels as a causal agent, and escalating mean global surface temperatures and rising sea levels as the global effects.[61] The cause and effect relationships at this level are fairly well understood: carbon dioxide and other greenhouse gases trap heat radiating from the earth's surface, which causes surface level temperatures to rise, which in turn causes polar and glacial ice to melt and ocean water volume to expand, which cause sea levels to rise.[62] Nevertheless, models of surface temperature and sea level changes assembled not too long ago are already proving inaccurate based on observed conditions. In general, although commonly accepted projections of carbon dioxide levels in the atmosphere appear to closely track observed conditions, the global mean surface temperature is rising at a rate in the far upper range of model predictions and the sea level is

True?, ENVTL. F., May-June 2007, at 16, 16 (asserting that the cost estimates California is providing for its benchmark goals are wildly low).

[60] *See* IPCC, CLIMATE CHANGE IMPACTS SUMMARY, *supra* note 2, at 19 ("Past emissions are estimated to involve some unavoidable warming . . . even if atmospheric greenhouse gas concentrations remain at 2000 levels."). Of course, if one believes that climate change is a purely natural phenomenon, then presumably it will continue for some period – perhaps a very long period – regardless of emission reductions.

[61] *See* Stefan Rahmstorf et al., *Recent Climate Observations Compared to Projections*, 316 SCIENCE 709, 709 (2007).

[62] This causal chain as well as other primary and secondary drivers, both natural and anthropogenic, are covered in PHYSICAL SCIENCE BASIS SUMMARY, *supra* note 2, at 10-17. Although much attention has been focused on ice sheet calving and melting, melting of glacial ice appears to be contributing about sixty percent of the "new water" component of sea level rise. *See* Mark F. Meier et al., *Glaciers Dominate Eustatic Sea-Level Rise in the 21st Century*, 317 SCIENCE 1064, 1064 (2007).

rising faster than the upper range of model predictions.[63] More recent models suggest the trends will soon drift considerably above those ranges.[64] In other words, even what we understand best about climate change has proven difficult to model and predict.

Climate change, it turns out, is not a one-variable, one-way phenomenon. Greenhouse gas emissions are not the only phenomena acting as a climate change "forcing."[65] Dust, pollutant haze, and other aerosols in the atmosphere, for example, deflect incoming solar radiation and thus have a cooling effect.[66] As temperatures rise, moreover, other positive and negative feedback effects are triggered that could amplify or impede further warming. Melting tundra, for example, releases more greenhouse gases, and researchers have found this effect is far exceeding expected levels because of its feedback properties.[67] On the other hand, increased duration and intensity of fire regimes may increase warming effects in the short-term because of carbon dioxide emissions but reduce temperatures in the long-term because of increased surface reflectivity

[63] *See* Rahmstorf et al., *supra* note 61, at 709. Given the complexity of the problem, it is no surprise that climate change effects models are proving difficult to calibrate. Even when climate change has not been a factor, reliable models using weather forecast variables to predict the secondary effects of annual weather patterns on other phenomenon have proven elusive. One recent study showed, for example, that river-level forecasting using annual weather forecast variables is at best moderately accurate only three days into the future. *See* Richard A. Kerr, *River-Level Forecasting Shows No Detectable Progress in 2 Decades*, 316 SCIENCE 1555, 1555 (2007).

[64] *See* Doug M. Smith et al., *Improved Surface Temperature Prediction for the Coming Decade from a Global Climate Model*, 317 SCIENCE 796, 796 (2007) (concluding that natural cooling trends that have been offsetting human-induced warming will die out by 2009, giving way to untempered human-induced warming); *see also* Richard A. Kerr, *Humans and Nature Duel Over the Next Decade's Climate*, 317 SCIENCE 746, 747 (2007) (explaining the difficulty, but necessity, of building climate change models that take into account human-induced *and* natural climate variation causes).

[65] Climatologists refer to phenomena that have a discernable effect on climate as "forcings." *See, e.g.*, 2007 SYNTHESIS REPORT SUMMARY, *supra* note 2, at 5.

[66] *See Another Global Warming Icon Comes Under Attack*, 317 SCIENCE 28, 28 (2007) (explaining that because "[a]erosols cool the planet by reflecting away sunlight and increasing the reflectivity of the clouds," climate change models can vary widely depending on assumptions about aerosol levels).

[67] *See* K.M. Walter et al., *Methane Bubbling from Siberian Thaw Lakes as a Positive Feedback to Climate Warming*, 443 NATURE 71, 71 (2006). The effect leads to a positive feedback loop in the following manner: as the greenhouse gases are released, they contribute to warming that melts the tundra faster, which releases more greenhouse gases more rapidly, and so on. *See* Katey M. Walter et al., *Methane Bubbling from Northern Lakes: Present and Future Contributions to the Global Methane Budget*, 365 PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOC'Y A 1657, 1671 (2007). This effect is believed to have played a significant role in the last deglaciation. *See* K.M. Walter et al., *Thermokarst Lakes as a Source of Atmospheric CH_4 During the Last Deglaciation*, 318 SCIENCE 633, 633 (2007).

(albedo).[68] Even some human-induced phenomena deemed environmentally adverse in other contexts can prove helpful in the climate change context – for example, agricultural soil erosion sequesters organic carbon in stream and lake sediment – meaning feedback effects can cross policy realms with different outcomes in each.[69] As climate change is increasingly studied, nonlinear positive and negative feedback loops like these are being uncovered,[70] making it excruciatingly difficult to construct models of global trends over long time periods.[71]

Indeed, even as we learn more about the highly coupled, tightly interacting processes that comprise the climate, the likelihood is that we will realize with even greater clarity that it is inherently unpredictable. Consider that "[t]he envelope of uncertainty in climate projections has not narrowed appreciably over the past 30 years, despite tremendous increases in computing power, in observations, and in the number of scientists studying the problem."[72] The emerging assessment is that things are unlikely to improve:

> [I]t is evident that the climate system is operating in a regime in which small uncertainties in feedbacks are highly amplified in the resulting climate sensitivity. We are constrained by the inevitable: the more likely a large warming is for a given forcing (i.e., the greater the positive feedbacks), the greater the uncertainty will be in the magnitude of that warming.[73]

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[68] *See* J.T. Randerson et al., *The Impact of Boreal Forest Fire on Climate Warming*, 314 SCIENCE 1130, 1130 (2006) ("Although changes in boreal forest albedo can have a considerable cooling effect on Northern Hemisphere climate, these changes are offset by carbon accumulation, so the net effect . . . on climate change may be close to neutral . . . ." (citations omitted)).

[69] *See* K. Van Oost et al., *The Impact of Agricultural Soil Erosion on the Global Carbon Cycle*, 318 SCIENCE 626, 626 (2007).

[70] These and others are discussed in PHYSICAL SCIENCE BASIS SUMMARY, *supra* note 2, at 10-17.

[71] At the global level, one significant limitation for modeling projection accuracy is the obvious fact that we have no experience with a global climate operating at temperatures like those predicted. In short, "once the world has warmed by 4°C, conditions will be so different from anything we can observe today (and still more different from the last ice age) that it is inherently hard to say when the warming will stop." Myles R. Allen & David J. Frame, *Call Off the Quest*, 318 SCIENCE 582, 582 (2007).

[72] Gerard H. Roe & Marcie B. Baker, *Why Is Climate Sensitivity So Unpredictable?*, 318 SCIENCE 629, 629 (2007).

[73] *Id.* at 632. *But see* M.D. Meyers et al., *USGS Goals for the Coming Decade*, 318 SCIENCE 200, 200 (2007) (expressing optimism that the USGS "will increase its capacity to provide output from predictive and empirical models for managers to test adaptive strategies, to reduce risk, and to increase the potential for hydrological and ecological systems to be self-sustaining, resilient, or adaptable to climate change and related disturbances").

More knowledge about the climate system, in other words, does not necessarily mean greater predictive capacity about global climate patterns.

Of course, what matters for most regulatory agencies is not how well we predict global trends such as surface temperature and sea levels, but what happens at the sub-global regional and local levels at which agencies act. In other words, as surface temperatures and sea levels rise, agencies need to know what happens next, and where. As the EPA puts it, "[e]ffects of global change drivers differ by place and in scale, necessitating place-specific impacts information to enable stakeholders to respond appropriately."[74] Yet even rather fundamental secondary effects questions, such as where it will rain more and less and how fast the ice will melt, remain open to wide variation in available models.[75] For example, in its proposal to list the polar bear as a threatened species under the ESA, the FWS pointed out that "studies indicate that previous projections regarding the rate and extent of climate change underestimated the temperature trend, reductions to annual sea ice during the summer and winter periods, reductions to multi-year pack ice, and reductions in thickness."[76]

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[74] Climate and Land Use Change Effects on Ecological Resources in Three Watersheds: A Synthesis Report, 72 Fed. Reg. 45,045, 45,046 (Aug. 10, 2007) (notice of public comment period).

[75] *See, e.g.*, Frank J. Wentz et al., *How Much More Rain Will Global Warming Bring?*, 317 SCIENCE 233, 233 (2007). The difficulties associated with downscaling global climate change to local secondary effects are relevant, of course, not only to legal responses to threats posed to species, but to threats posed to human populations as well. *See* Robert L. Glicksman, *Global Climate Change and the Risks to Coastal Areas from Hurricanes and Rising Sea Levels: The Costs of Doing Nothing*, 52 LOY. L. REV. 1127, 1128 (2006).

[76] Endangered and Threatened Wildlife and Plants; 12-Month Petition Finding and Proposed Rule To List the Polar Bear as Threatened Throughout Its Range, 72 Fed. Reg. 1064, 1071 (proposed Jan 9, 2007) (to be codified at 50 C.F.R. pt. 17). Indeed, the degree to which projections were off appears to be considerable – we are approximately thirty years ahead of what models forecasted losses would have been by 2006. *See* Julienne Stroeve et al., *Arctic Sea Ice Decline: Faster than Forecast*, 34 GEOPHYSICAL RESEARCH LETTERS L09501, at 4-5 (2007). Part of the problem is the lack of understanding about how human-induced and natural processes interact, with "models probably lack[ing] some realistic feedbacks, natural processes that can amplify a climactic nudge – whether natural or humanmade – into a shove." Richard A. Kerr, *Is Battered Arctic Sea Ice Down for the Count?*, 318 SCIENCE 33, 33 (2007). In an effort to bring the models up to date with observations in order to assist the FWS in its polar bear assessment, in 2007 the U.S. Geological Survey screened all models that failed to predict within twenty percent of the 2006 September sea ice extent of the Arctic and projected future trends based on the remaining models. *See* ERIC DEWEAVER, U.S. GEOLOGICAL SURVEY, UNCERTAINTY IN CLIMATE MODEL PROJECTIONS OF ARCTIC SEA ICE DECLINE: AN EVALUATION RELEVANT TO POLAR BEARS 1 (2007). Using only the models that satisfied this accuracy test – there were only ten – the agency found that "all lose at least 30% of their September ice extent, and 4 lose over 80% of their September ice by the middle of the 21st Century." *Id.* Seven of the ten models proven to be most accurate thus far are ice free by September 2099. *Id.*

Indeed, for the FWS it often will be the case that what matters for a particular species is primarily a function of local ecological conditions and their effects on the species. The FWS, in other words, has to find models that predict the effects of global climate warming on a wide range of physical and biological cycles, "downscale" those effects to local ecological conditions, and then evaluate the effects of those local changes on the species of concern. Such specific downscaling efforts encounter the same nonlinear feedback properties that make climate change effects difficult to model and predict at mean global levels, but they operate with even more volatility at regional and local levels.[77] As the U.S. Climate Change Science Program has summarized:

> In spite of the great interest and importance in understanding and forecasting ecosystem responses to climate change and variability, it is often difficult to relate specific, observable changes in ecosystems to climate change in a rigorous, causal manner. This is partly because climate variables are linked to specific ecosystem responses through complex, nonlinear chains of interacting processes. Part of the difficulty is also related to the need to 'downscale' attributes of change in the climate system to understand ecosystem changes at regional or ecoregional scales. Moreover, effects of climate change on ecosystems and their constituent species and processes are typically confounded with effects of numerous other human actions, including land-use changes that fragment and degrade ecosystems at various spatial scales, pollutants, invasions of non-native species, and resource management and utilization practices. It is difficult to tease apart effects of climate change from these other effects. These challenges are made more difficult by the current paucity of long-term data and information for most ecosystem types and ecoregions, especially from experiments designed to ascertain cause-and-effect relationships.[78]

Applying these projections to the known ecoregions of polar bear habitat, the agency concluded that two-thirds of the world's polar bear population will be lost by mid-century. *See* U.S. GEOLOGICAL SURVEY, USGS SCIENCE TO INFORM U.S. FISH & WILDLIFE SERVICE DECISION MAKING ON POLAR BEARS, EXECUTIVE SUMMARY 2 (2007). The full set of USGS reports is available at U.S. Geological Survey, New Polar Bear Finding, http://www.usgs.gov/newsroom/special/polar%5Fbears/ (last visited Feb. 20, 2008).

[77] *See* U.S. CLIMATE CHANGE SCIENCE PROGRAM, CCSP SYNTHESIS AND ASSESSMENT REPORT 3.1, CLIMATE MODELS: AN ASSESSMENT OF STRENGTHS AND LIMITATIONS FOR USER APPLICATIONS, PUBLIC REVIEW DRAFT 70-71 (2007) (describing problems with existing capacities for downscaling).

[78] U.S. CLIMATE CHANGE SCIENCE PROGRAM, CCSP SYNTHESIS AND ASSESSMENT PRODUCT 4.2, PROSPECTUS FOR THRESHOLDS OF CHANGE IN ECOSYSTEMS 1-2 (2007) (describing the scope of research to be conducted on ecological downscaling models). It is, of course, equally as important to study and understand macroecological effects. *See* Jeremy T. Kerr et al., *The Macroecological Contribution to Global Change Solutions*, 316 SCIENCE 1581, 1581 (2007).

Fundamentally, therefore, the FWS has no models of this sort at its disposal because nobody has the experience or knowledge upon which to base them. Ultimately, they may simply be beyond our capacity. Although all ecosystems undergo disturbance regimes such as flood, fire, and drought, all of which we have some experience observing and predicting, ecologists understand that these forms of disturbance are part of the stable disequilibrium of resilient, dynamic ecosystems.[79] But climate change does not present just another disturbance regime, the operations of which we can extrapolate from current ecological knowledge; rather, it will be the undoing of ecosystems as we know them.[80] As leading ecologists have observed, this makes it inherently difficult to predict long-term outcomes for defined ecosystems:

> New climates are expected to cause ecosystem reshuffling as individual species, constrained by different environmental factors, respond differently. One tree may be limited by summer rains that hold back seedling recruitment, for instance, whereas another species may be limited by winter freezes that control insect pests. Some species may migrate up-latitude or up-elevation, while others stay put. An ecosystem might see many species vanish – but also new arrivals.[81]

These scenarios are no longer hypothetical. For example, a group of oceanographers, climatologists, and ecologists recently reported that unusual ocean conditions and marine die-offs reshaped their understanding of the ocean ecosystem off the Pacific coast of the United States.[82] Synthesizing decades of atmospheric and oceanographic data, the researchers found that drastic fluctuations in winds and currents seem to explain observed ocean anomalies, such as low oxygen zones and a massive die-off of seabirds.[83] The underlying weather patterns were consistent with climate change predictions, but their effects were unexpected. As one of the researchers observed, "[c]limate change is upon us, there is no doubt about that.... What's catching us by surprise is the rate at which warming is hitting us. And, of course, how fast the ocean has changed – that is what amazes me."[84]

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[79] For a comprehensive treatment of disequilibrium and resilience theories of ecosystem dynamics, see generally PANARCHY: UNDERSTANDING TRANSFORMATION IN HUMAN AND NATURAL SYSTEMS (Lance H. Gunderson & C.S. Holling eds., 2002).

[80] *See* CLIMATE CHANGE IMPACTS SUMMARY, *supra* note 2, at 8 ("The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources).").

[81] Fox, *supra* note 37, at 823.

[82] *Interplay of Climate and Currents Disrupts Marine Ecosystems*, *supra* note 36.

[83] *Id.*

[84] *Id.* (quoting Bill Peterson of NOAA). The U.S. Climate Change Science Program is, as of this writing, working to complete a comprehensive overview of ecological responses and adaptations to climate change, known as Synthesis and Assessment Product 4.4:

This is the no-analog future of the ESA. Some effects will be more predictable than others, such as that warmer waters will exceed the temperature limits of some fish species.[85] But many effects will be difficult to predict, such as the cascade effects the loss of a top-level predator fish causes in its ecosystem.[86] Where and when these effects will occur, their magnitude and duration, and the other effects they will set in motion are questions the FWS has only begun to confront.

B. *A Typology of Climate Change Threats to Species*

Accurate prediction of climate change effects on local ecological conditions is, for now (and perhaps always will be), beyond the capacity of ecological models. A taxonomy of effects can, nevertheless, be constructed and may be useful for evaluating where the ESA can be most effectively employed when climate change threatens the continued existence of a species. I divide the taxonomy at its highest level between primary ecological effects, secondary ecological effects, and human adaptation impacts.[87]

1. Primary Ecological Effects

The pika presents a relatively straightforward scenario of climate-induced species decline – the ecological conditions it needs for survival do not exist below a particular temperature regime. Of course, it is possible that as climate change takes hold, suitable conditions for the pika will materialize somewhere else in the world, but that will do the pikas of the Great Basin little good. They do not have the option of relocating once the temperature regime lifts above the peaks which they now call home.[88] Rather, the pika and other species with specific ecological needs and limited migration capacity are likely to face significant threats from this kind of first order change in ecological conditions. Threats in this category will come in several forms:

Stranding. Some species will not be able to withstand the degradation or complete loss of essential habitat conditions beyond tolerable thresholds

Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources. *See* 72 Fed. Reg. 46,610, 46,610 (Aug. 21, 2007) (notice of availability of draft report and request for public comments).

[85] *See* Hans O. Portner & Rainer Knust, *Climate Change Affects Marine Fishes Through the Oxygen Limitation of Thermal Tolerance*, 315 SCIENCE 95, 95 (2007).

[86] *See* Ransom A. Myers et al., *Cascading Effects of the Loss of Apex Predatory Sharks from a Coastal Ocean*, 315 SCIENCE 1846, 1846 (2007).

[87] All of the impact categories covered in my typology have been discussed to one extent or another in scientific literature. *See, e.g.*, CLIMATE CHANGE AND BIODIVERSITY, *supra* note 2, at 16-23. My arrangement of them is designed to coincide with the legal analysis of the ESA covered *infra* Parts II-IV.

[88] Of course, humans have the option of moving pikas to new locations. I take up the issue of "assisted migration" below. *See infra* Part III.D.2.

and will have no adaptive capacity to migrate and seek suitable conditions elsewhere.[89]

Life-Stage Habitat Loss. Some species will find ecological conditions for essential life-stage junctures, such as migratory pathways or refuge habitat during juvenile stages, disrupted beyond tolerable thresholds, making the continued availability of suitable ecological conditions for other life-stages irrelevant.[90]

Altered Biological Events. Some species will respond to climate change, particularly warming of surface and water temperatures, through phenologic changes such as shifts in the timing of budding, spawning, or migration. If, as is likely, all ecologically linked species do not shift in synch, some species may face significant threats.[91]

2. Secondary Ecological Effects

Not all species will find it necessary and possible to depart their current ecosystems in order to withstand the direct effects of climate change, but many will. Others will stay to fight it out. While humans might cheer these species on, the aggregate effects of ecological disruption and species reshuffling are likely to lead to several secondary threats.

Increased Stress. Some species will not experience primary ecological changes beyond tolerable thresholds, but will experience increased stress as those thresholds are approached and will become more susceptible to disease, parasitism, predation, and other forms of mortality.[92]

Successful Adaptive Migration. As some species adapt to climate change by successfully migrating to and establishing in areas that present suitable conditions, their introduction may disrupt predator-prey or other ecological conditions to the detriment of other species.[93] One species' successful adaptive migration, in other words, can be another's demise.[94]

[89] *See, e.g.*, CLIMATE CHANGE AND BIODIVERSITY, *supra* note 2, at 22.

[90] *See, e.g., id.* at 17-18.

[91] *See, e.g., id.* at 12.

[92] *See, e.g., id.* at 13-14.

[93] *See, e.g., id.* at 17.

[94] The reintroduction of wolves into Yellowstone illustrates the effects that can be expected from successful migrations. Researchers believe that the wolves, by preying on elk, have set in motion a series of ecological adjustments leading to rejuvenation of aspen stands. In the absence of their natural predator, the grazing elk were suppressing aspen regeneration; whereas, the introduced wolves have not only reduced elk numbers but also have deterred them from entering aspen stands where they are easy targets. *See* Virginia Morell, *Aspens Return to Yellowstone, with Help from Some Wolves*, 317 SCIENCE 438, 438 (2007).

Opportunistic Invasion. Rather than increased stress effects, some species will find an erosion of barriers, such as temperature limits or water availability, which formerly prevented them from successfully establishing in a particular area, notwithstanding a history of natural or human-induced introduction opportunities. Climate change will close down on some species, but open doors for others.[95]

3. Human Adaptation Impacts

Just as the primary threats to species before climate change centered around human-induced ecological change, it is likely that human adaptation to climate change will play a leading role in threatening species. For example, climate change will likely lead human populations to increase rainwater harvesting and water storage, to adjust the timing and location of crop plantings, to relocate seawalls and other storm barriers, to relocate urban infrastructure, and to shift recreational facilities such as ski slopes to higher altitudes.[96] Several forms of human adaptation impacts will present the most pernicious of such threats:

Direct Habitat Conversion. Many human communities are likely to find it necessary and possible to migrate to avoid rising sea levels along coastal areas, to relocate agricultural land uses, and to obtain secure water supplies.[97] These migrations will necessarily involve some conversion of land uses in areas that presently provide suitable ecological conditions for particular species, in some cases at scales sufficient to pose a threat to the species.[98]

Degraded Ecological Conditions. Relocated human communities will likely introduce ecological degradations from new or amplified pollution, noise, water diversions, and other stresses.[99] Many human communities, relocated or not, also will implement climate change mitigation and adaptation measures designed primarily to protect human health and welfare, such as coastal flood barriers, which in some cases could

[95] *See, e.g.*, CLIMATE CHANGE AND BIODIVERSITY, *supra* note 2, at 16-17. An example already observed is the expansion of the giant Humboldt squid into the coastal waters of central California. Previously known in that area only during periodic El Nino events, which allowed them to ride warm water currents northward from Mexico for temporary foraging on hake, the squid have permanently taken residence as warmer water temperatures present the necessary ecological conditions. *See* Louis D. Zeidberg & Bruce H. Robinson, *Invasive Range Expansion by the Humboldt Squid,* Dosisicus gigas, *in the Eastern North Pacific*, 104 PROC. OF THE NAT'L ACAD. OF SCI. 12,948, 12,949-50 (2007).

[96] *See* 2007 SYNTHESIS REPORT SUMMARY, *supra* note 2, at 15.

[97] *See* Norman Meyers, *Environmental Refuges in a Globally Warmed World*, 43 BIOSCIENCE 752 *passim* (1993).

[98] *See* CLIMATE CHANGE AND BIODIVERSITY, *supra* note 2, at 3-4.

[99] *See id.* at 42-43.

threaten ecological conditions for other species.[100] Even planting of forests to sequester carbon could degrade conditions for some species.[101]

Induced Invasions. Human adaptation to climate change is likely to involve spatial relocations, as well as increased flow of goods to new settlement areas, which, as in the past, are likely to introduce non-native species to local ecosystems, some of which will establish successfully.[102]

To be sure, it can be expected that some species will fare well, perhaps even spectacularly, with climate change. On balance, however, "[a]pproximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperatures exceed 1.5-2.5°C."[103] Whichever of the foregoing effects takes hold, therefore, and whenever and wherever they threaten a particular species, it seems beyond question that the ESA has a busy future in store. The next section grounds that assessment in practical policy terms for the FWS.

II. THE IMPACT OF CLIMATE CHANGE ON THE ESA

Recently, the director of the National Aeronautics and Space Administration opined that while he has "no doubt that . . . a trend of global warming exists," he is "not sure that it is fair to say that it is a problem we must wrestle with."[104] His reasons for advocating inaction included that it is not "within the power of human beings to assure that the climate does not change" and that, in any event, it is "arrogant" for us today to decide "that this particular climate we have right here today, right now, is the best climate for all other human beings."[105] That, of course, is one view, and it suggests a limited role for the ESA in the development of climate change policy.

At the other extreme, scientists from the World Wildlife Fund argue that "[t]he most direct way to protect the ecosystems in which [endangered] species live – the mandate of the ESA – will be to address the cause of climate change:

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[100] *See id.* at 43.

[101] *See id.* at 36.

[102] The EPA has suggested that "important progress has been made in identifying climate change effects on invasive species, but . . . our understanding of effects on specific species and interactions of other stressors needs to be improved." Effects of Climate Change on Aquatic Invasive Species and Implications for Management and Research, 72 Fed. Reg. 45,046, 45,047 (Aug 10, 2007) (notice of availability of research report and public comment period). Most invasive species introductions are human-induced. *See* Vitousek et al., *supra* note 56, at 468.

[103] CLIMATE CHANGE IMPACTS SUMMARY, *supra* note 2, at 11.

[104] Donald Kennedy, *Mixed Messages About Climate*, 317 SCIENCE 169, 169 (2007) (quoting Michael Griffin from radio interview with National Public Radio, the transcript of which is available at NPR, NASA Administrator Michael Griffin Not Sure that Global Warming is a Problem, http://www.npr.org/about/press/2007/053107.griffinaudio.html (last visited Jan. 12, 2008)).

[105] *Id.*

greenhouse gas emissions," and that "it is important that we also consider how implementation of the ESA can be used to reduce the vulnerability of imperiled species and aid in their recovery despite changing conditions."[106] This view suggests a much larger role for the ESA.

A. *Reshuffling the Regulatory Landscape*

The ESA instructs the FWS to use the regulatory powers it confers on the agency to "provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved."[107] Achieving this primary statutory goal presents difficult questions of policy discretion. While preserving ecosystems is clearly the statute's primary goal, how precisely to use the agency's regulatory discretion to "provide a means" of achieving the goal is not self-evident from the text of the statute. Add to that the presence of secondary goals sprinkled throughout the statute, such as the command that the FWS "shall cooperate with State and local agencies to resolve water resource issues in concert with conservation of endangered species"[108] and that designation of critical habitat must take "into consideration the economic impact, the impact on national security, and any other relevant impact,"[109] and the agency is confronted with yet another layer of policy balancing. Indeed, the FWS has endured nearly constant scrutiny in Congress and the courts over how it has executed the ESA's primary and secondary goals.[110]

Alas, the balancing act does not end there for the agency. An important driver of policy discretion under the ESA has for decades been the background social, economic, and legal context within which the statute is situated. The ESA's "pit-bull" reputation has come at some cost, as the statute is often portrayed as unduly interfering with property rights, susceptible to unscientific agency biases, and riddled with irrational fiscal outcomes. It is, to put it mildly, not well liked in some quarters, and at some junctures in its history those who deride the statute have been in a position to act on this sentiment. For example, by the mid-1990s the ESA had reached a low-point in the Republican-controlled Congress, where the statute had become a whipping boy for property rights and "sound science" advocates.[111] Adeptly, however, then-

[106] Lara Hanson & Christopher R. Pyke, *Climate Change and Federal Environmental Law*, SUSTAINABLE DEV. L. & POL'Y, Winter 2007, at 26, 27.

[107] 16 U.S.C. § 1531(b) (2000).

[108] *Id.* § 1531(c)(2).

[109] *Id.* § 1533(b)(2) (2000 & Supp. 2005).

[110] For an overview of the pressures the FWS has faced in this respect, including demands on the one hand that it be more "precautionary" and on the other hand that it be more "scientific," see generally J.B. Ruhl, *The Battle Over Endangered Species Act Methodology*, 34 ENVTL. L. 555 (2004) [hereinafter Ruhl, *Methodology*].

[111] For comprehensive and thoughtful "insider" accounts of the fate of the ESA in this period, see generally John D. Leshy, *The Babbitt Legacy at the Department of Interior: A Preliminary View*, 31 ENVTL. L. 199 (2001), and Joseph L. Sax, *Environmental Law at the*

Secretary of the Interior Bruce Babbitt spearheaded a series of policy reforms designed to forge a two-part agenda of promoting species conservation while nonetheless responding to the concerns voiced in opposition to the statute. One side of the agenda focused on enhancing species conservation through greater emphasis on ecosystem-level management of habitat and other resources vital to the sustainability of imperiled species.[112] The other side focused on confirming the science-based mission of the statute and providing greater voice and fairness to landowners on whose property imperiled species are found.[113] Over time, this double-barreled agenda took many forms and led to numerous regulatory innovations.[114] Implementing this strategy, however, depended on innovative interpretations of ESA authorities and the extent of agency discretion,[115] the very task that climate change may force on the agency once again.

The FWS thus has been in the policy balancing game for some time, working where it can to keep the primary and secondary statutory goals in line and the overall statutory profile in harmony with the relevant background policy context. So what is new about climate change for an agency already seasoned in the exercise of policy balancing? Everything. Climate change does not fit into one of the familiar policy realms, affecting the policy balance by operating from within the existing set of trade-offs. Rather, climate change operates on all levels of the policy triad – i.e., the primary mission, secondary goals, and background policy context – at once, disrupting not only the contents of each, but also how the trade-off dynamics between each level play out. The ESA's primary goal of species conservation will be challenged by the primary, secondary, and human adaptation effects of climate change. The ESA's secondary goals, such as economic practicability and water resources management, will face their own set of climate change challenges. And the background policy context of property rights, scientific norms, agency

Turn of the Century; A Reportorial Fragment of Contemporary History, 88 CAL. L. REV. 2375 (2000).

[112] *See, e.g.*, Endangered and Threatened Wildlife and Plants: Notice of Interagency Cooperative Policy Regarding the Role of State Agencies in Endangered Species Act Activities, 59 Fed. Reg. 34,274, 34,275 (July 1, 1994) (emphasizing the role states play in species conservation); George Frampton, *Ecosystem Management in the Clinton Administration*, 7 DUKE ENVTL. L. & POL'Y F. 39 *passim* (1996) (presenting various policies that, in the view of one DOI official, changed the regulatory system "into a strategy that sparks regional multi-species ecosystem planning").

[113] *See* J.B. Ruhl, *Who Needs Congress? An Agenda for Administrative Reform of the Endangered Species Act*, 6 NYU ENVTL. L.J. 367, 388-400 (1998) (providing a cotemporaneous survey of policies serving this purpose).

[114] For a retrospective summary of the full effect of the Babbitt-era reforms, see J.B. Ruhl, *Endangered Species Act Innovations in the Post-Babbittonian Era – Are There Any?*, 14 DUKE ENVTL. L. & POL'Y F. 419, 430-34 (2004).

[115] Once again, an insider's account provides a thoughtful perspective on the strategic approach the Babbitt administration took. *See* Leshy, *supra* note 111, at 212-14.

performance, fiscal constraints, and other concerns will also evolve as climate change places broad pressure on the economy and society. How the FWS balances between these three disassembling realms of policy attention will also inevitably change, as the agency will have had no prior experience with the emerging set of relationships.

In short, just as climate change will reshuffle ecosystems, it will reshuffle the policy context of regulatory programs such as the ESA. Babbitt tested the policy limits of the ESA against fairly well-defined constraints and complaints that boiled down, for the most part, to politics. In the climate change era, by contrast, what will qualify as scientifically credible, fiscally sound, attentive to property rights, and a means of conserving species is uncharted territory for Congress, the courts, and the agency alike. Politics will matter, but the physical world will matter more.

B. *Focal Points for Policy Choices*

Where are the pervasive, transformative policy implications of climate change most likely to place pressure on administration of the ESA? Like the EPA after *Massachusetts v. EPA*, the FWS surely will find itself effectively barred from taking the position that climate change is not occurring or, if it is occurring, that it has no anthropogenic causal component. Unlike where the Clean Air Act takes the EPA, however, accepting that human-induced climate change is occurring does not lead inevitably to particular administrative duties or findings under the ESA. No provision of the ESA addresses pollutants, emissions, or climate in any specific regulatory sense. Rather, the statute operates on fairly holistic levels, requiring the FWS to consider what constitutes endangerment, take, jeopardy, and recovery of species. Far from insulating the FWS from the need to test the range of its discretion, the general nature of the ESA will thrust the FWS into several key policy quagmires:

Identifying Climate-Threatened Species. As no regulatory authorities of the ESA operate until a species is listed as endangered or threatened under Section 4 of the ESA, the initial pressure point is how the FWS uses available science to determine the effects of climate change on particular species. Identifying climate change as a basis for listing a species is likely to invite charges from industry that the agency is using weak models and sparse data, whereas declining to list a species for which a plausible case of climate threat can be made is likely to invite claims from environmental groups that the agency is ignoring the science.

Regulating Greenhouse Gas Emissions. If the FWS identifies climate change as a basis for designating a species for protection under the ESA, it inevitably will face the question whether federal actions that cause, fund, or authorize greenhouse gas emissions jeopardize the species under Section 7, and whether any person emitting greenhouse gases is taking

the species in violation of Section 9.[116] Weak regulation of emissions would ignore the evidence that they are the primary human activity directly contributing to climate change, whereas strong regulation would run into complicated cause-and-effect issues, not to mention potentially caustic political battles.

Regulating Non-Climate Effects To Protect Climate-Threatened Species. Regardless of how aggressively the FWS attempts to regulate greenhouse gas emissions to protect a climate-threatened species, it inevitably will face the problem of how aggressively to regulate other actions that injure the species but which do not contribute to climate change, such as habitat conversion, water diversion, and pollution. Indeed, the agency will face this question even if it adopts the position that climate change is purely natural in cause. For species imperiled primarily because of climate change, however, regulating human activities having no climate change impacts could be controversial and, in the final analysis, futile.

Designing Conservation and Recovery Initiatives. As the FWS regulates more activities associated with climate-threatened species, it inevitably will face the need to design conservation measures as conditions for approval of incidental take under Sections 7 and 10, as well as the need to formulate recovery measures for the species under Section 4. The long-term effectiveness of such measures, however, will be thrown into question as rising sea levels, rising temperatures, and the general reshuffling of ecosystems alter the underlying premises used to design them.

Species Trade-Offs. As noted above, the ESA depends on an overriding purpose of "provid[ing] a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved."[117] Yet, the reshuffling of species under climate change conditions will make it difficult to identify "the ecosystems" to be conserved and is likely to pit species against species in a manner unprecedented in nature.[118] Can the

[116] Some environmental advocacy groups have made no bones about their intention to pursue litigation forcing the FWS and NMFS to regulate greenhouse gases in order to protect climate-threatened species and their designated critical habitat areas. For example, the Center for Biological Diversity believes that the designation of critical habitat for several species of climate-threatened corals "actually moves the entire Endangered Species Act [ESA] onto a firm legal foundation for challenging global-warming pollution." *See* Mark Clayton, *New Tool To Fight Global Warming: Endangered Species Act?*, CHRISTIAN SCIENCE MONITOR, Sept. 7, 2007, at USA 3 (quoting Kieran Suckling, Policy Dir., Ctr. for Biological Diversity), *available at* http://www.csmonitor.com/2007/0907/p03s03-usgn.html.

[117] 16 U.S.C. § 1531(b) (2000).

[118] Obviously, species naturally compete with one another, such as for habitat and food, or in conflict as predator and prey. There are also a number of examples in which conservation measures taken to benefit a species protected under the ESA pose adverse

FWS reasonably hope to defy climate change and keep existing ecological regimes intact, or should it follow where the reshuffling leads and work toward conserving the new order?

Dealing with the Doomed. Perhaps the most confounding question for the FWS will be how to respond with respect to species that appear doomed because of lack of migratory and adaptive capacity to withstand climate change effects in their natural habitat range. Should the FWS assist such species if it means relocating them to areas climate change has altered in such a way as to provide suitable habitat? If so, how must the agency take into account the impact of assisted migration on other species? Or, if the doomed are left where they are, must the agency expend resources protecting them, or can they be ignored?

These six policy choices define the core of the ESA: which species to protect; which threats to regulate; how to help. Left to its own choosing, the FWS might decide to downplay climate change as a factor in all these respects, to integrate it aggressively, or to mix and match according to a menu of objectives and depending on a variety of criteria. The agency might determine, for example, that identifying all species plausibly threatened by climate change is a salutary use of the ESA, but that expending regulatory authority on those species threatened primarily by climate change – the doomed – is unwise. Or it may decide that the "pit-bull" version of the ESA is the nation's most promising mechanism for going after large emitters of greenhouse gases. The point, however, is that the choice is not all for the FWS to make. Before turning to what the FWS ought to do, we must consider what it can do.

III. FITTING AGENCY DISCRETION WITH CLIMATE CHANGE

Climate change inevitably will rear its head in several ESA programs. The question will be whether the FWS will use its discretion to the fullest in an attempt to incorporate climate change as a regulatory mechanism or, instead, will use its discretion to minimize the role of climate change in decision making. But what is the extent of the agency's discretion – how passive or aggressive can it choose to be? The petitioners who have sought rulemaking changes to address climate change under the ESA "believe that existing law and regulations already *require* the . . . consideration of global warming in all relevant decisions," but do not explain the basis for that assertion in their petition.[119] Keeping the six policy choices outlined above in mind, this Section examines the extent of discretion granted to the agency via five distinct ESA

effects for other species protected under the ESA or for other species generally. *See* NAT'L RESEARCH COUNCIL, SCIENCE AND THE ENDANGERED SPECIES ACT 111-23 (1995). For a detailed case study of such a conflict in its legal context, see generally William W. Kinsey, Zalaphus *(Sea Lion) and* Oncorhynchus *(Salmon/Steelhead): Protected Predator Versus Protected Prey*, NAT. RESOURCES & ENV'T, Fall 2007, at 36.

[119] *See* Petition for Rulemaking, *supra* note 14, at 3 (emphasis added).

components: the listing programs found in Section 4 of the statute; the take regulations of Section 9; the jeopardy consultation program of Section 7; the HCP permit program of Section 10; and, the statute's pervasive "best scientific data available" standard for decision making.

A. *Section 4: Listing, Critical Habitat, and Recovery Plans*

Section 4 establishes a package of programs aimed at identifying imperiled species: (1) the listing function, through which such species are identified as endangered or threatened; (2) the designation of critical habitat essential for the survival of such species; and (3) a planning function designed to identify the steps needed for their recovery. Each program presents the FWS with junctures of narrow and broad discretion with respect to climate change.

1. Identifying Species

Section 4(a)(1) of the ESA requires the FWS to:

> [D]etermine whether any species is an endangered species or a threatened species because of any of the following factors:
>
> (A) the present or threatened destruction, modification, or curtailment of its habitat or range;
>
> (B) overutilization for commercial, recreational, scientific, or educational purposes;
>
> (C) disease or predation;
>
> (D) the inadequacy of existing regulatory mechanisms;
>
> (E) other natural or manmade factors affecting its continued existence.[120]

There could hardly be a more definitive mandate to consider the effects of greenhouse gas emissions and climate change on species. Greenhouse gas emissions are unquestionably a "manmade factor," and if as abundant evidence suggests they are contributing to climate change, they are potentially "affecting . . . [the] continued existence" of climate-threatened species. Regardless of their causal agents, atmospheric warming, sea level rise, and other primary ecological effects of climate change involve "the destruction, modification, or curtailment of . . . [species'] habitat or range." Furthermore, the ecological reshuffling effects of climate change contribute to secondary ecological effects such as "disease or predation." The effects of climate change, therefore, are unambiguously within the ambit of the listing criteria, leaving no room for the FWS to argue that it may leave climate change out of the listing calculus.

[120] 16 U.S.C. § 1533(a)(1) (2000). The statute also requires the director of the FWS to "make determinations required by subsection (a)(1) of this section solely on the basis of the best scientific and commercial data available to him after conducting a review of the status of the species." *Id.* § 1533(b)(1)(a). For a discussion of the "best scientific data available" standard, see *infra* Part III.E.

Hence, like the EPA under the Clean Air Act, the FWS seems stuck with the challenge of identifying which species are endangered or threatened partly or primarily because of climate change. The pika, which is not yet listed as endangered or threatened, should be at the front of this line.

Although Section 4 leaves no room for debate over whether the agency must integrate climate change effects in the listing decision, the statute provides considerable flexibility for how the agency does so. For example, a species is endangered if it is "in danger of extinction throughout all or a significant portion of its range"[121] and is threatened if it "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."[122] These are not precise concepts. For example, what does "all or a significant portion of its range" mean? One court described the passage as "odd phraseology" and an "enigmatic phrase,"[123] and recently it took the lawyers at the Department of the Interior nineteen single-spaced pages of dense legal analysis, accompanied by seventeen single-spaced pages of probing discussion of the ESA's legislative history, to explain to the FWS what the lawyers believe this phrase means.[124] Between this interpretational difficulty and phrases such as "in danger of," "is likely to," and "foreseeable future," the FWS may not be so hemmed in after all. Given the extent of agency expertise that must necessarily go into making such judgments, and given the uncertainty associated with downscaling global climate change effects to local species-specific ecological contexts, the FWS likely has considerable play in terms of matching different climate change threat scenarios with the ESA's endangered, threatened, not-threatened matrix. Indeed, the agency thus far has weaved between these terms and used its agency expertise and administrative discretion to find climate change a factor in some cases and not in others.[125] Some species may present such compelling

[121] 16 U.S.C. § 1532(6) (2000).

[122] *Id.* § 1532(20).

[123] Defenders of Wildlife v. Norton, 258 F.3d 1136, 1141 (9th Cir. 2001).

[124] Memorandum from Solicitor, U.S. Dep't of the Interior, to Director, U.S. Fish and Wildlife Serv., The Meaning of "In Danger of Extinction Throughout All or a Significant Portion of its Range" (Mar. 16, 2007).

[125] For example, unlike its conclusions thus far for the polar bear and penguins, the agency was unconvinced that the American eel is endangered as a result of the effects climate change has had on ocean conditions, notwithstanding ample evidence that the effects are real and posing imminent threats to the species. *Compare* Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the American Eel as Threatened or Endangered, 72 Fed. Reg. 4967, 4995 (Feb. 2, 2007) (rejecting a listing petition "because oceanic conditions are within normal variations [and] the American eel is evolutionarily adapted to oceanic variations"), *with* Thierry Wirth & Louis Bernatchez, *Decline of North Atlantic Eels: A Fatal Synergy?*, 270 PROC. OF THE ROYAL SOC'Y OF LONDON 681, 681 (2003) (compiling evidence of threats from changing oceanic conditions associated with climate change).

cases of climate change threat that even aggressive use of discretion could not support a decision not to list, but many will present more ambiguous scenarios.

Another source of discretion in the listing function rests in Section 4(d), which, as codified, provides:

> Whenever any species is listed as a threatened species pursuant to subsection (c) of this section, the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species. The Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 1538(a)(1) of this title, in the case of fish or wildlife, or section 1538(a)(2) of this title, in the case of plants, with respect to endangered species . . . .[126]

In an article illustrating the interplay between this authority and the regulatory provisions of the ESA, Madeline June Kass explained how Section 4(d) of the statute provides considerable regulatory flexibility.[127] When animal species are listed as endangered, the "take" prohibition of Section 9 applies automatically and fully, leaving less discretion to the FWS as to how to regulate activities that might cause take of the species. By contrast, under Section 4(d) the FWS has the discretion to prescribe the level of take protection afforded species listed as threatened. Kass describes how the FWS (like its sister agency, the NMFS) has increasingly turned to this option to relieve the angst associated with Section 9, crafting complex rules under Section 4(d) detailing activities that are and are not prohibited under Section 9.[128]

This option may prove especially useful for the FWS with respect to a climate-threatened species. It may allow the FWS to identify and regulate the specific effects of human adaptation to climate change that pose significant obstacles to the survival and recovery of a species, whereas broad, dispersed actions such as greenhouse gas emissions could be entirely excluded from regulation. Indeed, the FWS has proposed to list the polar bear as threatened, and has suggested it might employ this approach.[129] Of course, the success of

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[126] 16 U.S.C. § 1533(d) (2000).

[127] *See* Madeline June Kass, *Threatened Extinction of Plain Vanilla 4(d) Rules*, 16 NAT. RESOURCES & ENV'T 78, 78-79 (2001).

[128] *See id.* at 79-81.

[129] *See* Endangered and Threatened Wildlife and Plants; 12-Month Petition Finding and Proposed Rule To List the Polar Bear (*Ursus maritimus*) as Threatened Throughout Its Range, 72 Fed. Reg. 1064, 1097 (proposed Jan. 9, 2007) (to be codified at 50 C.F.R. pt. 17). NMFS took this approach when it listed two coral species as threatened, in part due to climate change effects, and noted that it would evaluate "the necessity and advisability of proposing protective regulations pursuant to section 4(d) of the ESA for these two coral species." Endangered and Threatened Species: Final Listing Determinations for Elkhorn Coral and Staghorn Coral, 71 Fed. Reg. 26,852, 26,859 (May 9, 2006) (to be codified at 50 C.F.R. pt. 223); *see also* Robin Kundis Craig, Acropoa spp.: *Water Flow, Water Quality, and Threatened Corals*, NAT. RESOURCES & ENV'T, Fall 2007, at 8, 9.

this strategy depends on a scientifically credible basis for designating the species as threatened. Moreover, the condition that protective regulations be "necessary and advisable to provide for the conservation of such species" has not been tested in a context like that suggested – i.e., to exclude one set of causal factors, ostensibly because the cause, effect, and response associated with them is so complex, so as to focus conservation resources on a more manageable set of factors. Not surprisingly, therefore, this new approach, while "creative and fresh,"[130] is controversial, and would no doubt prove doubly so if used as suggested for dealing with climate-threatened species.

2. Designating Critical Habitat

Section 4(a) of the ESA also requires that, "to the maximum extent prudent and determinable [the FWS] shall, concurrently with making a determination under paragraph (1) that a species is an endangered species or a threatened species, designate any habitat of such species which is then considered to be critical habitat."[131] The statute defines critical habitat as:

> (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and
>
> (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the [FWS] that such areas are essential for the conservation of the species.[132]

The critical habitat program has proven quite controversial. In addition to a wave of suits involving missed statutory deadlines for critical habitat designations, "both the protection provided by and the analysis required for critical habitat designation are coming under increasing judicial scrutiny."[133] Nevertheless, in the context of climate change, the critical habitat program could lend considerable flexibility to the FWS in several respects.

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[130] Kass, *supra* note 127, at 133.

[131] 16 U.S.C. § 1533(a)(3)(A).

[132] *Id.* § 1532(5)(A).

[133] *See* Feldman & Brennan, *supra* note 45, at 88. The wave of litigation has become so intense and costly that the FWS has described it as having nothing short of debilitating effects on the agency's ability to carry out its conservation mission. The agency has long believed that, "in most circumstances, the designation of 'official' critical habitat is of little additional value for most listed species, yet it consumes large amounts of conservation resources," and "that the present system for determining and designating critical habitat is not working." Endangered and Threatened Wildlife and Plants; Notice of Intent To Clarify the Role of Habitat in Endangered Species Conservation, 64 Fed. Reg. 31,871, 31,872 (June 14, 1999).

On the one hand, the provision allowing designation of specific areas outside the geographical area occupied by the species if "essential for the conservation of the species" may be an ideal way for FWS to respond aggressively to ecological reshuffling. To the extent downscale models can predict with reasonable certainty where a species might successfully migrate to adapt to changes brought about by climate change, a credible interpretation of the critical habitat provisions would allow the agency to "reserve" those areas through critical habitat designations.[134] This would provide an effective tool to force human adaptation measures to minimize effects in such areas, thus securing a greater chance for the species to withstand climate change transitions and establish a viable population in its new ecological home.

On the other hand, several provisions also open the door to a more passive approach. For example, the agency could justifiably conclude that designation of critical habitat for species doomed by climate change fails to meet the "prudent" standard, as the designation will provide no benefit.[135] Indeed, for a doomed species, arguably there is no habitat "essential to the conservation of the species," as conservation of the species is not possible. Even for species that might be assisted through critical habitat designation, the complexities of climate change could render the extent of such habitat "indeterminable,"[136] which would delay designation for up to one year after the species is listed.[137]

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[134] The FWS took an approach like this with respect to the Preble's Meadow Jumping Mouse, deciding to include small streams in the species' critical habitat, even though larger streams are more important to the species, on the ground that "Preble's populations along mountain streams may be less subject to certain threats including . . . long-term climate change." Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*), 68 Fed. Reg. 37,276, 37,285 (June 23, 2003) (codified at 50 C.F.R. pt. 17). On the other hand, it declined to do so for the Spreading navarretia plant. A commenter suggested that the critical habitat should "include areas of unoccupied suitable habitat that would provide for recovery opportunities, including . . . migration in response to climate change," but the agency merely observed that "critical habitat designations do not signal that habitat outside the designation is unimportant or may not be required for recovery." Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Navarretia fossalis* (Spreading Navarretia), 70 Fed. Reg. 60,658, 60,662 (Oct 18, 2005) (codified at 50 C.F.R. pt 17).

[135] The statute does not define "prudent." According to FWS regulations, designation of critical habitat is not prudent if it "would not be beneficial to the species." 50 C.F.R. § 424.12(a)(1)(ii) (2006). Courts have examined "not prudent" determinations by the FWS with a "hard look" review demanding more than conclusory statements and expecting that such determinations will be rare. *See* LIEBESMAN & PETERSEN, *supra* note 7, at 20-21; STANFORD ENVTL. LAW SOC'Y, *supra* note 7, at 64-66. No phenomenon operating on the scale of climate change has been involved in those cases.

[136] The statute does not define "indeterminable." According to FWS regulations, critical habitat is indeterminable if "(i) Information sufficient to perform required analyses of the impacts of the designation is lacking, or (ii) The biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat." 50 C.F.R. § 424.12(a)(2). This is the position the FWS has taken thus far with respect to the polar bear.

In addition, the statute specifies that the FWS "shall designate critical habitat, and make revisions thereto, under subsection (a)(3) . . . on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat."[138] Based on this analysis, the agency "may exclude any area from critical habitat if [the agency] determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless [the agency] determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned."[139] The FWS could put together a credible case that a designation of critical habitat for some climate-threatened species might so extensively impede human adaptation to climate change as to warrant exercise of its discretion not to act, assuming the case also can be made that extinction is not therefore inevitable.

3. Formulating Recovery Plans

Section 4(f) of the ESA requires the FWS to "develop and implement plans (. . . 'recovery plans') for the conservation and survival of endangered species and threatened species listed pursuant to this section, unless [the FWS] finds that such a plan will not promote the conservation of the species."[140] The agency must also "give priority to those endangered species or threatened species, without regard to taxonomic classification, that are most likely to benefit from such plans, particularly those species that are, or may be, in conflict with construction or other development projects or other forms of economic activity."[141] Arguably, this prioritization mandate speaks directly to climate-threatened species which, perhaps only with the help of the ESA, could survive the transition to stabilized climate regimes. On the other hand, one striking aspect of the recovery plan program is that it specifically relieves the FWS of any duty to prepare a plan if the agency finds that "a plan will not promote the conservation of the species."[142] For a species essentially doomed by climate change through stranding or other extreme effects, the FWS could

See Endangered and Threatened Wildlife and Plants; 12-Month Petition Finding and Proposed Rule To List the Polar Bear (*Ursus maritimus*) as Threatened Throughout Its Range, 72 Fed. Reg. 1064, 1096 (proposed Jan. 9, 2007) (to be codified at 50 C.F.R. pt. 17) (citing 50 C.F.R. § 424.12(a)(2)).

[137] *See* 16 U.S.C. § 1533(b)(6)(C)(ii) (2000). At the end of that year, critical habitat must be designated "to the maximum extent prudent." *Id.*

[138] *Id.* § 1533(b)(2) (2000 & Supp. 2005). For a discussion of the "best scientific data available" standard, see *infra* Part III.E.

[139] 16 U.S.C. § 1533(b)(2) (2000 & Supp. 2005).

[140] *Id.* § 1533(f)(1) (2000).

[141] *Id.* § 1533(f)(1)(A).

[142] *Id.* § 1533(f)(1).

justifiably reach such a finding and avoid expending agency resources developing a plan for the species.

Even if the FWS does prepare a recovery plan for a climate-threatened species, presumably on the premise that the ESA can help the species, it will be of limited application as the courts have interpreted recovery plans to have no mandatory effect on federal agencies, much less anyone else.[143] They are plans, and that's it.

Nevertheless, recovery plans are not necessarily meaningless. They do provide a wealth of information about a species and its road to recovery.[144] Although Professor Federico Cheever has meticulously chronicled the failure of recovery planning to amount to anything in terms of enforceability,[145] he also has outlined the case for using recovery plans to guide implementation of the other ESA programs, including those that do have regulatory force. Professor Cheever's argument points to the influence recovery plans have had on judicial determinations of such matters as whether an activity causes take, whether an activity jeopardizes a species, and whether a species should be reclassified from endangered to threatened.[146] Moreover, recovery plans can help motivate and guide state, local, and private collaborative efforts to respond to the effects of climate change on the species.[147] Through recovery plans, therefore, the FWS may be able to influence how climate change effects are viewed for species in the regulatory programs of the ESA – the take prohibition, the jeopardy consultation program, and the HCP permit program – which are taken up in the next three sections of the Article.

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[143] *See* LIEBESMAN & PETERSEN, *supra* note 7, at 25-26; STANFORD ENVTL. LAW SOC'Y, *supra* note 7, at 76-77.

[144] For example, the FWS must incorporate in each plan:

> (i) a description of such site-specific management actions as may be necessary to achieve the plan's goal for the conservation and survival of the species;
>
> (ii) objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list; and
>
> (iii) estimates of the time required and the cost to carry out those measures needed to achieve the plan's goal and to achieve intermediate steps toward that goal.

16 U.S.C. § 1533(f)(1)(B).

[145] *See* Federico Cheever, *Recovery Planning, the Courts and the Endangered Species Act*, 16 NAT. RESOURCES & ENV'T 106, 108-10 (2001).

[146] *See id.* at 110-11, 135.

[147] *See, e.g.*, Proposed Recovery Plan for the Evolutionarily Significant Unit (ESU) of the Puget Sound Chinook Salmon, 70 Fed. Reg. 76,445, 76,447 (proposed Dec. 27, 2005) (stating that integration of climate change effects in the recovery plan can "support recovery actions to protect and restore local habitat conditions as a buffer against larger-scale changes").

B. *Section 9: The Take Prohibition*

Section 9(a)(1) of the ESA instructs that, except as provided elsewhere in the ESA,[148] "with respect to any endangered species of fish or wildlife . . . it is unlawful for any person subject to the jurisdiction of the United States to . . . take any such species within the United States or the territorial sea of the United States."[149] Recognizing that this so-called "take prohibition" has defined limits – it does not apply to plant species[150] and does not apply automatically to threatened species of fish and wildlife[151] – where applicable, it takes effect sweepingly and with tremendous force. Persons subject to the prohibition include all federal, state, and local governments and all private organizations and individuals.[152] The prohibition applies "within the United States," on public and private lands alike. And it applies to acts that "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" the protected species.[153] Within that list of prohibited activities, the FWS and the NMFS have defined "harm" to include any modification of the species' habitat – in this case not limited to designated critical habitat – that "actually kills or injures" the species members "by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."[154] Although the United States Supreme Court upheld this interpretation of the statute in *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*,[155] the devil is in the details in this instance.

The *Sweet Home* opinion took with one hand while it gave with the other, limiting the breadth of the harm definition as much as it upheld the idea that take extends to habitat losses. The harm definition projects the take prohibition from cases in which the action causes direct death or injury (e.g., hunting, shooting, and trapping), to cases in which causality is indirect – i.e., loss of habitat leads in some way to actual death or injury. However, theories of indirect take can become quite attenuated and speculative, in which case it would be unreasonable to enforce the take prohibition's rebuttable presumption against the activity as rigorously as in more obvious cases of direct take. For example, assume that a developer's plan to build a subdivision would locate new homes in an area within several hundred yards of habitat known to be occupied by members of a protected bird species, but not actually in the habitat. Opponents of the project may argue that some of the residents of the new homes will have cats as pets, some of those cat owners will allow their

[148] The incidental take permitting program is one such exception. *See infra* Part III.D.1.

[149] 16 U.S.C. § 1538(a)(1), (a)(1)(B) (2000).

[150] Plants receive more limited protection. *See id.* § 1538(a)(2).

[151] As noted *supra* Part III.A.1, the listing agency may by rule extend some or all of the take prohibition protections to threatened species. *Id.* § 1533(d).

[152] All these entities fit the ESA's definition of "person." *See id.* § 1532(13).

[153] *Id.* § 1532(19).

[154] 50 C.F.R. § 17.3 (2006) (FWS definition); *id.* § 222.102 (NMFS definition).

[155] 515 U.S. 687, 704 (1995).

cats to wander outdoors, some of those cats may venture into the bird's habitat, and some of those cats may eat birds, and some of those birds may be individuals of the protected bird species. Anyone could speculate such possibilities, and it would be unreasonable to impose the burden on the developer of proving the postulated scenario is not possible.[156]

Rather, as the Court pronounced when it upheld the harm definition, in many cases it is appropriate to impose the burden of proof on the proponent of the indirect harm theory. Thus, the majority emphasized that the harm rule incorporates "but for" causation, with "every term in the regulation's definition of 'harm' . . . subservient to the phrase 'an act which actually kills or injures wildlife.'"[157] Furthermore, the term should "be read to incorporate ordinary requirements of proximate causation and foreseeability."[158] The majority thus implicitly endorsed Sweet Home's "strong arguments that activities that cause minimal or unforeseeable harm will not violate the [ESA] as construed."[159] In her concurrence, Justice O'Connor was more direct, limiting the scope of the harm rule to "significant habitat modification that causes actual, as opposed to hypothetical or speculative, death or injury to identifiable protected animals."[160] Since the Court established these tort-like evidentiary burdens, the lower courts have steadfastly refused to enforce the take prohibition based on attenuated indirect take theories, but have enjoined case-specific instances of take when death or injury was proven to be likely.[161]

The stiff evidentiary and proof burdens *Sweet Home* imposed largely explain why the government and citizen groups (through citizen suits) so infrequently attempt to prosecute take violation claims.[162] Prosecuting a

[156] *See* Morrill v. Lujan, 802 F. Supp. 424, 430-31 (S.D. Ala. 1992) (rejecting an ESA claim for injunctive relief based on this set of allegations). In settlement of another round of litigation initiated following denial of the injunction request, the developer in *Morrill* nonetheless agreed to prohibit house cats in the development. *See* William H. Satterfield et al., *Who's Afraid of the Big Bad Beach Mouse?*, 8 NAT. RESOURCES & ENV'T 13, 15 (1993) (citing *Developer Agrees To Protect Beach Mice*, BIRMINGHAM NEWS, Jan. 19, 1993).

[157] *Sweet Home*, 515 U.S. at 700 n.13.

[158] *Id.* at 696-97 n.9.

[159] *Id.* at 699.

[160] *Id.* at 708-09 (O'Connor, J., concurring).

[161] For a thorough survey of the post-*Sweet Home* cases, see Glen & Douglas, *supra* note 48, at 68-69.

[162] The handful of reported cases involving land uses are covered in Glen & Douglas, *supra* note 48, *passim*. As they show, most Section 9 enforcement cases are brought by citizen groups under the citizen suit provision of the ESA. A rare example of federal government prosecution is *United States v. Town of Plymouth*, 6 F. Supp. 2d 81 (D. Mass. 1998), in which the government sued a city for failing to prevent its citizens from running over a small endangered bird while riding ORVs along a public beach. *Id.* at 91-92. The FWS and citizen groups have also prosecuted a number of Section 9 cases against water diverters in western states. *See* James R. Rasband, *Priority, Probability, and Proximate*

climate change case would be no mean feat either, given the generic effects of greenhouse gas emissions and the imprecision of downscaling models. Consider, for example, a scenario in which the pika is listed as endangered due to climate change. Who is taking the pika? Are greenhouse gas emissions from, say, a coal-fired power plant in Florida taking the pika? The plaintiff in such a case would have to show that the power plant emissions are the actual as well as proximate, foreseeable cause of the primary and secondary ecological effects which are in turn the actual as well as proximate, foreseeable cause of the pika's demise.[163] Proving that would prove too much, however, as it would necessarily follow that *all* sources of greenhouse gases are taking the pika. This is an inherent feature of the take prohibition that makes it inapposite when take of a species occurs through large-scale, dispersed causal agents, such as water consumption and pollution – if *anyone* is taking the species, *everyone* is taking the species. Although nothing in the ESA prevents the FWS from attempting to prosecute such a case, it would be a daunting prosecutorial undertaking[164] as well as likely political suicide.[165] Thus far, the FWS has

Cause: Lessons from Tort Law About Imposing ESA Responsibility for Wildlife Harm on Water Users and Other Joint Habitat Modifiers, 33 ENVTL. L. 595, 618-23, 628-30 (2003).

[163] Even the Center for Biological Diversity, which has "push[ed] to use the ESA to fight global warming," concedes that "any bid to fight the construction of a power plant by arguing that emissions might harm a species would probably be thrown out of court, because such climate-change effects remain speculative." Clayton, *supra* note 116 (reporting on an interview with Kieran Suckling, Policy Dir., Ctr. for Biological Diversity); *see also* Brendan R. Cummings & Kassie R. Siegel, Ursus martimus*: Polar Bears on Thin Ice*, NAT. RESOURCES & ENV'T, Fall 2007, at 3, 7 (staff members of the Center for Biological Diversity concede that "[w]hile it is clear that global warming affects listed species, attributing an individual action's contribution to global warming is more difficult"). Difficulties in establishing actual and proximate causation permeate legal analyses of tort and other liabilities associated with climate change. *See* David A. Grossman, *Warming Up to a Not-So Radical Idea: Tort-Based Climate Change Litigation*, 28 COLUM. J. ENVTL. L. 1, 22-27 (2003).

[164] The difficulty of prosecuting take prohibition claims in such dispersed take scenarios has led some plaintiffs to simplify matters by suing state and local governments that allegedly "authorize" the behavior under state or local law. For example, if a state authorizes boating in state waters inhabited by an endangered species, the claim would be that the state is vicariously liable for injuries boaters cause to the species. This strategy is, not surprisingly, controversial and has had mixed results in the courts. *See* J.B. Ruhl, *State and Local Government Vicarious Liability under the ESA*, 16 NAT. RESOURCES & ENV'T 70, 71-73 (2001). It has never been applied successfully on a scale remotely approaching global greenhouse gas emissions.

Another approach to simplify take prosecutions in dispersed aggregate causation settings could be to single out only major sources of harm for prosecution seeking injunctive relief. For example, in the western water diversion context, which often presents multiple diverters having an aggregate impact on an aquatic species, the FWS or other plaintiff might select major water diverters as the defendants to enjoin their future diversion of water. Professor James Rasband criticizes this approach to the extent it follows anachronistic tort principles

exhibited no stomach for it,[166] and in the long run may determine to use its discretion – in this case prosecutorial discretion[167] – to leave greenhouse gas emissions out of its take enforcement agenda.[168]

The take prohibition would prove more adept at enforcing discrete, identifiable actions that make it less likely a climate-threatened species will survive through the climate change transition. In particular, climate change is likely to present collisions between many species, climate-threatened or not, and human adaptations such as relocated agricultural and urban land uses, technological structures designed to impede sea level rise and floods, and new and intensified water diversions to sustain parched urban centers. Enforcement of the take prohibition in such settings, where proximate cause may be less difficult to establish, could help ensure that human adaptation measures do not disregard the interests of imperiled species. In this sense, Section 9 would be used no differently from the way it is already used – climate change effects would simply be a reason to use it more vigilantly.

C. *Section 7: Jeopardy Consultations*

Section 7(a)(2) of the ESA provides:

> Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency (. . . "agency action") is not likely to jeopardize the

of joint and several liability with no right of contribution. Rasband suggests instead using apportioned injunctive relief based on each defendant's priority of diversion under the western appropriative rights system. *See* Rasband, *supra* note 162, at 637-44. As he points out, however, as the number of diverters increases and the proportionate diversion of any one decreases, more and more diverters must be joined in the suit in order to make a dent in the total diversion of water from the aquatic ecosystem. *See id.* at 641-42. This effect would be particularly acute in the case of greenhouse gas emissions. Neither joint and several liability nor apportioned liability has been employed as a theory of liability in a Section 9 prosecution based on greenhouse gas emissions as the alleged causal agent.

[165] *See* Rasband, *supra* note 162, at 638 (observing that prosecution of take violation cases presents daunting proof complications and is politically unpopular).

[166] For example, the agency does not identify greenhouse gas emissions in the list of activities it believes could potentially result in a violation of Section 9 with regard to the polar bear. *See* Endangered and Threatened Wildlife and Plans; 12-Month Petition Finding and Proposed Rule To List the Polar Bear (*Ursus maritimus*) as Threatened Throughout Its Range, 72 Fed. Reg. 1064, 1098 (proposed Jan. 9, 2007) (to be codified at 50 C.F.R. pt. 17).

[167] Prosecutorial discretion is relatively unbounded. *See* Heckler v. Chaney, 470 U.S. 821, 831 (1985) ("This Court has recognized on several occasions over many years that an agency's decision not to prosecute or enforce, whether through civil or criminal process, is a decision generally committed to an agency's absolute discretion.").

[168] The FWS cannot generally prevent citizen groups from launching such an enforcement effort, but the agency could do so in specific cases by listing a species as threatened and limiting the scope of the take prohibition with respect to that species, as it is authorized to do under Section 4(d) of the statute. *See supra* Part III.A.1.

> continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined . . . to be critical . . . .[169]

The statute builds an elaborate procedure for carrying out these consultations under which the agency proposing the action must "consult" with the FWS through a series of steps designed to predict the impact of the action on listed species, with the ultimate product being a "biological opinion" from the FWS "setting forth the [FWS's] opinion, and a summary of the information on which the opinion is based, detailing how the agency action affects the species or its critical habitat."[170]

The substantive content for conducting the consultation analysis is defined primarily in FWS regulations. "Jeopardize" is defined there as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."[171] Five key regulatory definitions lay out the scope of effects that must be considered to determine whether an action triggers that standard:

> *Action* means "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas."[172]

> *Effects of the action* means "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline."[173]

> *Environmental baseline* means "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."[174]

> *Indirect effects* are "those that are caused by the proposed action and are later in time, but still are reasonably certain to occur."[175]

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[169] 16 U.S.C. § 1536(a)(2) (2000). The provision also requires that "[i]n fulfilling the requirements of this paragraph each agency shall use the best scientific and commercial data available." *Id.* For discussion of the "best scientific data available" standard, see *infra* Part III.E.

[170] 16 U.S.C. § 1536(b)(3)(A).

[171] 50 C.F.R. § 402.02 (2006).

[172] *Id.*

[173] *Id.*

[174] *Id.*

[175] *Id.*

> *Cumulative effects* are "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation."[176]

The FWS has issued no official guidance on climate change with respect to the Section 7 jeopardy consultation program, but it takes no stretch of imagination to fit climate change into this framework. Consider a project being carried out, funded, or authorized by a federal agency, the construction of which will remove habitat of a listed species and the operation of which will emit greenhouse gases. The removal of habitat and emission of greenhouse gases are clearly direct effects of the action added to the environmental baseline,[177] both of which could have indirect effects that adversely affect the species. At some later time, the habitat removal could adversely affect the reproduction, numbers, or distribution of that species. Greenhouse gas emissions contribute to tropospheric warming, and the secondary effects of such warming could also, at some later time, adversely affect the species. Moreover, other state and private activities emitting greenhouse gases may also contribute to cumulative climate change effects that adversely affect the species. In short, greenhouse gas emissions and their climate change consequences both appear to be wrapped tightly into the framework for consultations under Section 7(a)(2).[178]

To be sure, as with the listing decision, the FWS consultation decision depends on a three-part causal chain: greenhouse gas emissions cause tropospheric warming, which in turn causes secondary climate change effects, which in turn cause ecological changes that adversely affect the species.

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[176] *Id.*

[177] Because past emissions of greenhouse gases will contribute to future climate change, *see supra* note 60, some increment of future climate change arguably already is within the environmental baseline. Nevertheless, until aggregate global emissions fall to levels that reduce tropospheric greenhouse gas concentrations to levels sufficient to arrest further climate change, all present and future emissions add to the environmental baseline.

[178] This reasoning is similar to guidance the Council on Environmental Quality (CEQ) issued in 1997 suggesting that the environmental impacts assessment process required of federal actions under the National Environmental Policy Act (NEPA) "provides an excellent mechanism for consideration of ideas related to global climate change." Draft Memorandum from Kathleen A. McGinty to Heads of Federal Agencies, Guidance Regarding Consideration of Global Climatic Change in Environmental Documents Prepared Pursuant to the National Environmental Policy Act 1 (Oct. 8, 1997), *available at* http://www.mms.gov/eppd/compliance/reports/ceqmemo.pdf. As CEQ explained:

> The available scientific evidence . . . indicates that climate change is "reasonably foreseeable" impacts [sic] of emissions of greenhouse gases, as that phrase is understood in the context of NEPA and CEQ regulations . . . .
>
> Specifically, federal agencies must determine whether and to what extent their actions affect greenhouse gases. Further, federal agencies must consider whether the actions they take, [for example], the planning and design of federal projects, may be affected by changes in the environment which might be caused by global climatic change.

Id. at 4. The CEQ has not issued further guidance or policy on the topic.

Although determining whether these downscale effects actually occur may be difficult to say in particular scenarios, the point is that they could occur. Unless the FWS intends on ruling out that possibility entirely – a difficult proposition after *Massachusetts v. EPA* – it stands to reason that consultations under Section 7(a)(2) should consider the possible direct, indirect, and cumulative effects of greenhouse gas emissions and climate change.

Indeed, one recent judicial opinion makes it clear that the FWS *must* at least address the effects of climate change in jeopardy consultations. In *Natural Resources Defense Council v. Kempthorne*,[179] the FWS had prepared its consultation report, known as a biological opinion (BiOp), regarding the effects of the Central Valley Project-State Water Project (CVP-SWP) in California on a small fish, the Delta smelt.[180] The BiOp's conclusions were based in part on the assumption that the hydrology of the water bodies affected by the project would follow historical patterns for the next 20 years.[181] Undercutting this assumption, a number of environmental groups directed FWS's attention to several studies on the potential effects of climate change on water supply reliability, urging that the issue be considered in the BiOp.[182] Reminiscent of the EPA's position in *Massachusetts v. EPA*, the FWS attempted to defend its failure to consider climate change at all, as the court summarized:

> Defendants and Defendant-Intervenors respond by arguing (1) that the evidence before FWS at the time the BiOp was issued was inconclusive about the impacts of climate change; and (2) that, far from ignoring climate change, the issue is built into the BiOp's analysis through the use of [saline water condition data] as a proxy for the location and distribution of Delta smelt.[183]

But the court evidenced little tolerance for the agency's failure to address these issues in the consultation documents:

> [T]he climate change issue was not meaningfully discussed in the biological opinion, making it impossible to determine whether the information was rationally discounted because of its inconclusive nature, or arbitrarily ignored . . . .
>
> . . . .
>
> The BiOp does not gauge the potential effect of various climate change scenarios on Delta hydrology. Assuming, *arguendo*, a lawful adaptive management approach, there is no discussion when and how climate

[179] 506 F. Supp. 2d 322 (E.D. Cal. 2007).

[180] *Id.* at 328.

[181] *Id.* at 367.

[182] *Id.* at 367-68.

[183] *Id.* at 369.

> change impacts will be addressed, whether existing take limits will remain, and the probable impacts on CVP-SWP operations.
>
> FWS acted arbitrarily and capriciously by failing to address the issue of climate change in the BiOp.[184]

As did the majority in *Massachusetts v. EPA*, however, the *Kempthorne* court made it clear that at this stage of the litigation "[t]here is no basis to determine what weight FWS should ultimately give the climate change issue in its analysis."[185] The agency's error, in other words, was in not addressing climate change *at all*. By contrast, once it has taken up the subject in a consultation, the agency may have considerable latitude in evaluating the indirect and cumulative effects of climate change, given that they must be "reasonably certain to occur" and must "reasonably... be expected" to jeopardize the species.[186]

As with the Section 9 take prohibition, however, the problem with fitting climate change into the consultation framework is that it exhibits more certainty at macro levels than at micro levels. Consider, for example, the proposed coal-fired power plant in Florida and its effects on the pika in the Sierra Nevada Mountains.[187] It would seem quite a stretch to conclude that the power plant emissions will jeopardize the pika. Yet, at a macro level the analysis is rather straight forward: the power plant emits greenhouse gases (a direct effect of the action), greenhouse gases are reasonably certain to warm the troposphere (an indirect effect of the action), a warming troposphere is reasonably certain to adversely alter ecological conditions for the pika, and it is reasonably expected that such ecological changes will bring an end to the pika. At the micro level, however, it becomes difficult to link the *individual* plant's emissions as the jeopardizing agent for the pika, given that *all* greenhouse gas emissions worldwide are subject to the same macro analysis. Other than quantity of emissions, the FWS would have no reasoned basis for distinguishing between the power plant in Florida, a farm in Kansas, or an

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[184] *Id.* at 369-70.

[185] *Id.* at 370 n.28.

[186] *See supra* text accompanying notes 171, 174-75.

[187] The considerable distance between the action and the species is not determinative. The FWS consultation regulations define "action area" – the geographic scope of the consultation analysis – as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." 50 C.F.R. § 402.02 (2006). Thus, the analysis is not limited to the "footprint" of the action, nor is it limited by the Federal agency's authority. Rather, it is a biological determination of the reach of the proposed action on listed species. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon the action area. *Id.* (defining "environmental baseline" and, by incorporation, "effects of the action" as based on action area).

elementary school in Oregon.[188] All have an adverse effect on the pika – and some arguably have more of an effect – but given the small proportion of total greenhouse gas emissions that each represents, the FWS can likely justify finding that none of the emitting land uses jeopardizes the species.

Given these attributes of greenhouse gas emission effects on climate, it is difficult to conceive of how the agency would go about aggressively regulating greenhouse gas emissions through the jeopardy consultation program. The FWS does not have the pollution control expertise of the EPA, nor does any provision of the ESA explicitly provide authority to engage in emissions regulation. Given that all emission sources contribute to warming effects, the threat of jeopardy findings would have to be applied universally to all sources. This, in turn, might induce emission sources to engage in emission offsets (e.g., by purchasing forestation credits) or technological and operational emission reductions. But is the FWS equipped to assume the role of nation-wide regulator of farms, industrial facilities, auto emissions, and everything else? In short, the idea that *all* emission sources present jeopardy conditions to each and every climate-threatened species would prove too much, and likely render the ESA and the FWS political targets in the first degree.

On the other hand, the climate change issue in *Kempthorne* did not involve analysis of the indirect effects of a project's greenhouse gas emissions, but rather focused on how the cumulative effects of climate change will influence the effects of a project on a protected species.[189] The FWS evaluated the effects of the project on the smelt assuming no change in hydrology relevant to the smelt, but there was evidence that climate change could adversely affect hydrological conditions for the smelt in a way that could have altered the consultation effects analysis. The effect of *Kempthorne* is to require that where downscale modeling and field observations indicate it is "reasonably certain" that climate change will lead to changes in ecological conditions to the detriment of a protected species, the FWS *must* engage in a consultation to determine whether the project, taking those changes into account as cumulative effects, is "reasonably expected" to jeopardize the species. The FWS may in many cases point to the difficulty of downscaling climate change effects to support a no-jeopardy finding,[190] but that does not absolve it of the duty to conduct the analysis.

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[188] Staff members of the Center for Biological Diversity have suggested that federal actions contributing "appreciable amounts" of greenhouse gases – whether individual actions, such as approval of a large coal fired power plant, or aggregate actions, such as setting fuel standards for SUVs – are appropriate for Section 7 consultations. *See* Cummings & Siegel, *supra* note 163, at 7. They do not, however, provide a rationale for drawing the line between "appreciable" and "not appreciable," nor do they offer a basis for not subjecting all emissions to consultation given that all contribute to climate change.

[189] *See Kempthorne*, 506 F. Supp. 2d at 368-70.

[190] Many commentators have argued that the ESA inherently demands implementation under an implied background principle of affirmative conduct favoring conservation of protected species. The most prominent example is found in the 1995 report of the National

Like the EPA under the Clean Air Act, therefore, the FWS has no room to dodge its mandate to consider the effects of climate change in consultations under Section 7(a)(2) of the ESA. The fact that most consultations will not reach a jeopardy finding based on the indirect effects of the action's greenhouse gas emissions or the cumulative effects of climate change is beside

Academy of Sciences' National Research Council (NRC), in which NRC engaged in a top-to-bottom review of the role of science in ESA decision making and concluded, among other things, that the precautionary principle should be applied in ESA contexts so as to impose the burden of proving no harm on the proponent of an action. *See* NAT'L RESEARCH COUNCIL, *supra* note 118, at 169. Indeed, some passages of the legislative history of the jeopardy consultation provisions suggest that Congress believed the FWS and the NMFS should, or at least could, "give the benefit of the doubt to the species" when information is not conclusive, as might often be the case with respect to climate change effects. *See* H.R. CONF. REP. NO. 96-697, at 12 (1979), *as reprinted in* 1979 U.S.C.C.A.N. 2557, 2576. In these and other decision-making settings, where incomplete or inconclusive information requires the agency to make a close call, several courts have also endorsed the idea of giving the benefit of the doubt to the species. *See, e.g.*, Conner v. Burford, 848 F.2d 1441, 1451-54 (9th Cir. 1988) (requiring the FWS to "give the benefit of the doubt to the species" when the FWS concluded that there was "insufficient information available to render a comprehensive biological opinion" concerning oil and gas leases); Defenders of Wildlife v. Babbitt, 958 F. Supp. 670, 677, 680 (D.D.C. 1997) (stating that the FWS must "give 'the benefit of the doubt to the species'" and list the Canada Lynx despite the FWS's claim that there was not "substantial information that the southern Rocky Mountain population of the Canada lynx meets the definition of a 'species'"). Also, the NMFS has on occasion announced in listing and jeopardy consultation decisions that it would provide that benefit of the doubt to the species or, in the same spirit, would "err on the side of the species." *See, e.g.*, Regulations Governing the Approach to Humpback Whales in Alaska, 66 Fed. Reg. 29,502 (May 31, 2001) (codified at 50 C.F.R. pt. 224) (promulgating regulations under the ESA governing treatment of listed whales, in part to implement a precautionary principle approach); Endangered and Threatened Species; Endangered Status for Snake River Sockeye Salmon, 56 Fed. Reg. 58,619 (Nov. 20, 1991) (codified at 50 C.F.R. pt. 22) (deciding to list a population of salmon notwithstanding uncertainty as to whether it was genetically distinct from other populations); Nat'l Marine Fisheries Serv., Section 7 Consultation Biological Opinion for Bering Sea/Aleutian Islands Groundfish Fisheries 133 (Oct. 19, 2001) (explaining that the agency conducted the consultation by at all times giving the "benefit of the doubt" to the species); Nat'l Marine Fisheries Serv., Section 7 Consultation Biological Opinion on Atlantic Highly Migratory Species Fishery Management Plan 99 (June 14, 2001) (explaining that in selecting takes of turtles from specified activities the agency would "err on behalf of the species"); *see also* Or. Natural Res. Council v. Daley, 6 F. Supp. 2d 1139, 1149 (D. Or. 1998) (quoting an NMFS official's rationale for recommending listing of a population of salmon as being the "err on the side of the species" principle). But it is clear that the statute *imposes* no such default rule, and the agencies have not officially adopted one as formal policy. Saying that the FWS and the NMFS *may* err on the side of the species in the face of inconclusive evidence, including in the case of climate change effects, does not mean that they *must*. *See infra* Part III.E (discussing the "best scientific data available" standard).

the point – most consultations already do not reach jeopardy findings.[191] Conducting the climate change analyses, however, will improve knowledge about the effects of climate change on species and, thus, is by no means a waste of agency resources.

D. *Section 10: Incidental Take Permits and Experimental Populations*

Section 10 of the ESA contains a hodge-podge of permitting programs and other exceptions to the proscriptions found elsewhere in the statute, primarily the Section 9 take prohibition. Two such programs that are likely to be at the center of the agency's climate change policy are the incidental take permit program and the experimental populations program.

1. Adaptive Management Provisions of Incidental Take Permits

Section 10(a) of the ESA establishes a procedure under which the FWS may approve take of listed species otherwise prohibited under Section 9 for actions that are incidental to otherwise lawful actions and not subject to the Section 7 jeopardy consultation process.[192] To seek approval, an applicant must submit a habitat conservation plan (HCP), describing the project and its impact on the species.[193] The agency must then find that the HCP ensures that "the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking" and that "the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild."[194] Because the FWS's issuance of an HCP permit is a federal action within the meaning of the Section 7(a)(2) jeopardy consultation, the reasoning of the *Kempthorne* case outlined above in Part III.C will carry over to the environmental assessment process for HCP permits. The HCP program contains the additional requirement that the applicant will "minimize and mitigate" the incidental take impacts "to the maximum extent practicable." If the FWS took the great leap of characterizing greenhouse gas emissions as causing take of climate-threatened species under Section 9, the agency could assert that applicants

[191] From 1998-2001, the FWS conducted over 300,000 consultations, the vast majority of which resulted in findings that the action would not adversely affect the species or that, if there was an effect, it would not jeopardize the species. *See* U.S. FISH & WILDLIFE SERV., CONSULTATIONS WITH FEDERAL AGENCIES: SECTION 7 OF THE ENDANGERED SPECIES ACT 2 (2007), *available at* http://www.fws.gov/endangered/pdfs/consultations.pdf.

[192] For a concise but comprehensive overview of the structure, history, and policy of the HCP program, see generally Robert D. Thornton, *Habitat Conservation Plans: Frayed Safety Nets or Creative Partnerships?*, 16 NAT. RESOURCES & ENV'T 94 (2001). Actions that must track through the jeopardy consultation process can receive incidental take authorization in connection with the consultation pursuant to "reasonable and prudent measures that [FWS] considers necessary and appropriate to minimize such impact." *See* 16 U.S.C. § 1536(b)(4)(ii) (2000).

[193] *See* 16 U.S.C. § 1539(a)(2)(A) (2000).

[194] *Id.* § 1539(a)(2)(B)(ii), (iv).

must reduce or offset greenhouse gas emissions to satisfy this demand, using the "maximum extent practicable" standard to moderate what is expected. Even if greenhouse gases are kept off the table as a regulatory target, the "minimize and mitigate" requirement could limit overbearing effects of human adaptation to climate change for land uses requiring an HCP permit.

Another wrinkle of the HCP program arises under the so-called No Surprises policy for HCP permits Under this controversial process, a permittee is relieved of the need to address "unforeseen circumstances" but must agree to manage and respond to the effects of "changed circumstances" identified in the permit documents.[195] Under No Surprises, the FWS provides participants in an approved, properly implemented HCP the assurance that the Service will not impose additional mitigation requirements in the event that unforeseen circumstances negatively impact the species over time.[196] Unforeseen circumstances means changes affecting an HCP covered species or geographic area that could not reasonably have been anticipated by plan developers and the Service at the time of the plan's development, and that result in a substantial and adverse change in the status of the covered species.[197]

On the other hand, the No Surprises rule recognizes that plan developers and the Service can reasonably anticipate and plan for some changes in circumstances affecting a species or geographic area covered by an HCP (e.g., the listing of new species, or a fire or other natural catastrophic event in areas prone to such events).[198] To the extent such changed circumstances are provided for in the HCP's operating conservation program, the permittee must implement the appropriate measures in response to the changed circumstances.[199] Often these response measures are detailed and provided for under the permit provisions dealing with "adaptive management."[200]

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[195] *See* Habitat Conservation Plan Assurances ("No Surprises") Rule, 63 Fed. Reg. 8859 (Feb. 23, 1998) (codified at 50 C.F.R. §§ 17.22, 17.32 (2006)). The policy has been described as an essential component of the HCP program, necessary to make HCPs attractive to landowners. *See* Fred P. Bosselman, *The Statutory and Constitutional Mandate for a No Surprises Policy*, 24 ECOLOGY L.Q. 707, 717-19 (1997). The No Surprises policy, then rule, has been the subject of intense procedural and substantive legal challenges. *See, e.g.*, Spirit of the Sage Council v. Norton, 294 F. Supp. 2d 67, 92 (D.D.C. 2003) (finding the rule was not procedurally valid). Recently, however, the court presiding over the litigation found that all procedural defects had been corrected and deemed the rule substantively valid under the ESA. *See* Spirit of the Sage Council v. Kempthorne, 511 F. Supp. 2d 31, 44-46 (D.D.C. 2007).

[196] *See* 50 C.F.R. § 17.22(b)(5)(iii).

[197] *See id.* § 17.3.

[198] These are known as "changed circumstances." *Id.*

[199] *See id.* § 17.22(b)(5)(i).

[200] Under adaptive management, regulators use models of natural resource systems to develop performance measurements and initial policy choices, but build into the regulatory implementation framework a process for continuous monitoring, evaluation, and adjustment of decisions and practices:

The FWS has not directly addressed the issue of how climate change and greenhouse gas emissions play out under the unforeseen circumstances/ changed circumstances dichotomy. In the preamble to the rule as adopted in 1998, however, the FWS (with the NMFS) responded to comments raising the topic:

> The concept of adaptive management promotes the notion that management policies should be flexible and should incorporate new information as it becomes available. New management actions should build upon the results of previous experiments in an iterative process. It stresses the continuous use of scientific information and monitoring to help organizations and policies change appropriately to achieve specific environmental and social objectives.

NAT'L RESEARCH COUNCIL, THE MISSOURI RIVER ECOSYSTEM: EXPLORING THE PROSPECTS FOR RECOVERY 18-19 (2002). There is broad consensus today among resource managers and academics that adaptive management is the only practical way to implement ecosystem management policy. *See* Ronald D. Brunner & Tim W. Clark, *A Practice-Based Approach to Ecosystem Management*, 11 CONSERVATION BIOLOGY 48, 56 (1997); Anne E. Heissenbuttel, *Ecosystem Management – Principles for Practical Application*, 6 ECOLOGICAL APPLICATIONS 730, 730 (1996); Paul L. Ringold et al., *Adaptive Monitoring Design for Ecosystem Management*, 6 ECOLOGICAL APPLICATIONS 745, 746 (1996). Indeed, the Ecological Society of America's comprehensive study of ecosystem management treats the use of adaptive management methods as a given. *See* Norman L. Christensen, *The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management*, 6 ECOLOGICAL APPLICATIONS 665, 666 (1996). Appropriately, therefore, the FWS has announced it will administer HCP permits, where gaps in information can run high, using adaptive management as a means to "examine alternative strategies for meeting measurable biological goals and objectives through research and/or monitoring, and then, if necessary, to adjust future conservation management actions according to what is learned." *See* Notice of Availability of a Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 64 Fed. Reg. 11,485, 11,486-87 (Mar. 9, 1999). HCPs thus are acknowledged to be working hypotheses of how species will respond to changes in habitat size, location, configuration, and quality. To truly integrate adaptive management into an HCP, the plan must include a monitoring program to evaluate the performance of mitigation measures and a system that automatically triggers alternative conservation actions in the event that performance fails to meet conservation goals. Gregory A. Thomas, *Incorporating Adaptive Management and the Precautionary Principle into HCP Design*, 18 ENDANGERED SPECIES UPDATE 32, 33 (2001); George F. Wilhere, *Adaptive Management in Habitat Conservation Plans*, 16 CONSERVATION BIOLOGY 20, 22 (2002). The FWS has thus portrayed adaptive management as an important practical tool that "can assist the Services and the applicant in developing an adequate operating conservation program and improving its effectiveness." *See* Notice of Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. 35,242, 35,252 (June 1, 2000). For in-depth discussions of the integration of adaptive management into the HCP program, see generally Holly Doremus, *Adaptive Management, the Endangered Species Act, and the Institutional Challenges of "New Age" Environmental Protection*, 41 WASHBURN L.J. 50, 68-74 (2001) [hereinafter Doremus, *Adaptive Management*], and J.B. Ruhl, *Regulation by Adaptive Management – Is It Possible*, 7 MINN. J. L. SCI. & TECH. 21 (2005).

> Issue 7: Many commenters stated that the applicant is legally required to address all unforeseen circumstances in the HCP pursuant to section 10. They noted that fire, disease, drought, flood, global climate change, and non-point source pollution may be unforeseen, but are not uncommon. . . . In addition, commenters noted that the nature of many of the HCPs that the Services are approving increases the likelihood for unforeseen events to happen (i.e., the permits are issued for many years and cover large areas and many species).
>
> Response 7: The Services disagree that HCPs must address *all* hypothetical future events, no matter how remote the probability that they may occur. Rather, the Services believe that only reasonably foreseeable changes in circumstances need to be addressed in an HCP. Moreover, these circumstances are likely to vary from HCP to HCP given the ever changing mix of species and affected habitats covered by a given plan . . . . [U]nforeseen circumstances will only include events that could not reasonably have been anticipated. *All reasonably foreseeable circumstances, including natural catastrophes that normally occur in the area, should be addressed in the HCP.*[201]

By incorporating a "reasonably foreseeable" standard, the FWS thus opened the door to the same kind of framework the *Kempthorne* court adopted for consultations under Section 7(a)(2): the FWS *must* consider climate change when evaluating an HCP, and from there any reasonably foreseeable ecological effects should be taken into account under the changed circumstances category, not the unforeseen circumstances category. For long-term HCPs authorizing ongoing effects over decades, such as an industrial facility or regional development plan, a regime of adaptive management measures can be designed to integrate the capacity for the project to adjust operations and other parameters over time in response to the reasonably foreseeable climate change effects.[202] Even short-term projects, such as small subdivision developments,

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[201] Habitat Conservation Plan Assurances ("No Surprises") Rule, 63 Fed. Reg. 8859, 8863 (Feb. 23, 1998) (codified at 50 C.F.R. §§ 17.22, 17.32 (2006)).

[202] Some commentators posit that the No Surprises approach may constrain the use of adaptive management, as it cuts off revision of prior agreements about the HCP's conservation measures. *See* Doremus, *Adaptive Management*, *supra* note 200, at 72-73. On the other hand, one might just as reasonably complain that adaptive management undermines the No Surprises policy, as its very purpose is to ensure the ability to adjust decisions after the HCP is issued. In fact, the two approaches seem to me to be complementary, not conflicting. The No Surprises policy simply defines who is responsible for measures necessary to address unforeseen circumstances, and a comprehensive, criteria-specific adaptive management provision in an HCP negates the argument that matters contemplated as the subject of adaptive management were unforeseen for purposes of the No Surprises policy. It should therefore be in the interests of both the agency and the applicant to negotiate an adaptive management provision that spells out its scope and

may rely on long-term mitigation measures, such as habitat preserves, which may be influenced by climate change and which therefore should integrate long-term adaptive management measures.

2. Assisted Migration Through Experimental Populations

My earlier observation that pikas cannot fly away from the mountaintop predicament, but that we might fly them away, was not meant to be facetious. The emerging topic of assisted migration posits just that – move stranded species away from their degrading natural habitat to suitable habitat located beyond the species' migratory capacity. Ironically, it may be the case that this suitable habitat is not "natural" to where it is located, but rather has been forming far outside the doomed species' range because of climate change.

The agency appears to have the authority to engage in assisted migration. Section 10(j) of the ESA allows the FWS to transport and release members of an endangered or threatened species to areas outside its current range as an "experimental population," if the agency "determines that such release will further the conservation of such species."[203] The release must be to an area that contains suitable natural habitat within the "probable historic range" of the species, unless such habitat has been destroyed, in which case the release may be to areas not formerly occupied by the species.[204] A species losing habitat within its current and historic range because of climate change effects, but which at the same time is gaining habitat outside its historic range because of climate change, appears to fit these conditions, though there is no instance in which the FWS (or the NMFS) has exercised this option with respect to a species listed under the ESA because of threats resulting from climate change.

E. *The Ubiquitous "Best Science" Standard*

As an intersection between biological science and law, the reliability of decision making under the ESA necessarily depends on the quantity and quality of scientific information available to and used by the decision makers. The ESA could hardly operate on less than robust and reliable scientific data. But what is the agency supposed to do about defining, obtaining, and evaluating the universe of data about climate change and its effects in order to

subject matter with clarity and precision, including the reasonably foreseeable effects of climate change.

[203] 16 U.S.C. § 1539(j)(2)(A) (2000). Authorization for an agency or organization relocating the population is obtained under Section 10(a)(1)(A) of the ESA, which provides for the FWS to grant permits "to enhance the propagation or survival of the affected species, including, but not limited to, acts necessary for the establishment and maintenance of experimental populations." *Id.* § 1539(a)(1)(A). The "but not limited to" language of this permitting provision suggests other potential applications may arise in connection with enhancing the survival of climate-threatened species. *Id.*

[204] *See* 50 C.F.R. § 17.81(a) (2006).

make its substantive decisions under the listing, take prohibition, consultation, and HCP programs? What is its decision-making method to be?

The ESA's answer is the so-called "best scientific data available" standard, which permeates several of the statute's major programs. For example, when deciding whether to list a species, the FWS and NMFS must consider factors such as loss of habitat[205] using only "the best scientific and commercial data available."[206] Similarly, the biological component of the decision whether to designate critical habitat must use the "best scientific data available."[207] And the "no jeopardy" and "no adverse modification" directives to federal agencies adopt the same standard.[208] Although the ESA leaves this "best scientific data available" standard of evidentiary quality undefined,[209] in *Bennett v. Spear*[210] a majority of the Supreme Court suggested that its "obvious purpose . . . is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise" and "to avoid needless economic dislocation produced by agency officials zealously but unintelligently pursuing their environmental objectives."[211] It can act, in other words, as a check on both the hasty application of regulatory power and the uninformed use of science. Accordingly, the courts have interpreted it to impose several practical guidelines on the agencies:[212]

- The agencies may not manipulate their decisions by unreasonably relying on certain sources to the exclusion of others.
- The agencies may not disregard scientifically superior evidence.[213]

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[205] *See* 16 U.S.C. § 1533(a)(1)(A) (2000).

[206] *Id.* § 1533(b)(1)(A).

[207] *See id.* § 1533(a)(3), (b)(2).

[208] *See id.* § 1536(c); 50 C.F.R. § 402.14(g)(8) (2006).

[209] Although several other environmental statutes use the phrase or something close to it, all leave it undefined. *See* Michael J. Brennan et al., *Square Pegs and Round Holes: Application of the "Best Scientific Data Available" Standard in the Endangered Species Act*, 16 TUL. ENVTL. L.J. 387, 402 n.81 (2003) (collecting statutes); Holly Doremus, *Listing Decisions Under the Endangered Species Act: Why Better Science Isn't Always Better Policy*, 75 WASH. U. L.Q. 1029, 1034 n.9 (1997) (collecting statutes) [hereinafter Doremus, *Listing Decisions*].

[210] 520 U.S. 154 (1997).

[211] *Id.* at 176-77.

[212] *See* Sw. Ctr. for Biological Diversity v. Norton, Civ. No. 98-934 (RMU/JMF), 2002 WL 1733618, at *8-9 (D.D.C. July 29, 2002) (summarizing the existing body of case law). *See generally* Brennan et al., *supra* note 209, at 396-430; Laurence Michael Bogert, *That's My Story and I'm Stickin' To It: Is the "Best Available" Science* Any *Available Science Under the Endangered Species Act?*, 31 IDAHO L. REV. 85 (1994); Doremus, *Listing Decisions*, *supra* note 209, at 1051-85; John Earl Duke, Note, *Giving Species the Benefit of the Doubt*, 83 B.U. L. REV. 209 (2003).

[213] *Sw. Ctr.*, 2002 WL 1733618, at *8.

- Relatively minor flaws in scientific data do not render that information unreliable.[214]
- The agencies must use the best data available, not the best data possible.[215]
- The agencies may not insist on conclusive data in order to make a decision.[216]
- The agencies are not required to conduct independent research to improve the pool of available data.[217]
- The agencies thus must rely on even inconclusive or uncertain information if that is the best available at the time of the decision.[218]
- The agencies must manage and consider the data in a transparent administrative process.[219]

Similarly, in 1994 the FWS and NMFS issued a joint policy providing guidelines for how the agencies will ensure their ESA decisions incorporate this evidentiary standard.[220] The policy directs the agencies to follow six guidelines in ESA implementation decisions (including species listing, jeopardy consultations, and incidental take authorizations):[221]

- Require that all biologists evaluate all scientific and other information that will be used to make the decision;
- Gather and impartially evaluate biological, ecological, and other information that disputes official positions, decisions, and actions proposed or taken by the FWS or NMFS;
- Ensure that biologists document their evaluation of information that supports or does not support a position being proposed by the agency;
- Use primary and original sources of information as the basis for consultation decisions or recommendations;
- Adhere to the timeframes or "schedules" established by the ESA; and

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[214] *Id.* (citing Bldg. Indus. Ass'n of Superior Cal. v. Norton, 247 F.3d 1241, 1246-47 (D.C. Cir. 2001)).

[215] *Id.*

[216] *See id.* at *9.

[217] *See id.* (citing Sw. Ctr. for Biological Diversity v. Babbitt, 215 F.3d 58 (D.C. Cir. 2000))

[218] *See id.*

[219] *See* Doremus, *Listing Decisions*, *supra* note 209, at 1084-87.

[220] Endangered and Threatened Wildlife and Plants: Notice of Interagency Cooperative Policy on Information Standards Under the Endangered Species Act, 59 Fed. Reg. 34,271, 34,271 (July 1, 1994).

[221] *Id.*

• Conduct management-level review of documents developed by the agency to verify and assure the quality of the science used to establish official positions.

All that sounds impressive, but the question arises whether appending "best," "scientific," and "available" to the general standards of administrative review makes any appreciable difference in the substantive discretion the agency enjoys.[222] After all, the default rules already are provided in the conventional judicial review provisions of the Administrative Procedure Act (APA), under which any court would routinely find that an agency's reliance on sloppy, biased, or haphazard evidence is arbitrary and capricious.[223] It is difficult to pinpoint the incremental legal effect, if any, the "best scientific data available" standard adds to that baseline. On the one hand, the courts behave as if the standard means *something*,[224] yet it is not clear that any of the rulings based on the standard would have turned out differently under the conventional APA judicial review tests. It is not possible to extract from case law, administrative policy, or legislative intent any independent mandate of agency decision-making method or standard of judicial review the provision adds to

[222] I have examined this question in more detail elsewhere. *See* J.B. Ruhl, *Is the Endangered Species Act Ecopragmatic?*, 87 MINN. L. REV. 885, 927-29 (2003); Ruhl, *Methodology*, *supra* note 110, at 579-84.

[223] The conventional rules of judicial review – the default rules when the agency's organic act is silent – are found in the Administrative Procedure Act (APA). 5 U.S.C. § 706 (2000). These rules require the courts to apply considerable deference to the agency's decision. A reviewing court may not substitute its judgment for the agency's, but must undertake a "thorough, probing, in-depth review" of the agency's decision. Citizens to Preserve Overton Park, Inc. v. Volpe, 401 U.S. 402, 415-16 (1971). Thus, a court will reject an agency's decision if it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A); *see, e.g.*, Biodiversity Legal Found. v. Babbitt, 146 F.3d 1249, 1252 (10th Cir. 1998). An agency decision is arbitrary and capricious if the agency has either "relied on factors which Congress had not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation . . . counter to the evidence . . . , or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise," or if it has failed to "articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'" Motor Vehicles Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983). The ESA has been widely interpreted as being subject to these rules with no substantial exceptions. *See, e.g.*, Am. Wildlands v. Norton, 193 F. Supp. 2d 244, 251 (D.D.C. 2002); Loggerhead Turtle v. County Council of Volusia County, 120 F. Supp. 2d 1005, 1013 (M.D. Fla. 2000); Friends of the Wild Swan, Inc. v. U.S. Fish & Wildlife Serv., 945 F. Supp. 1388, 1394 (D. Or. 1996).

[224] *See, e.g.*, Sw. Ctr. for Biological Diversity v. Norton, Civ. No. 98-934 (RMU/JMF), 2002 WL 1733618, at *8-9 (D.D.C. July 29, 2002) (discussing at length the meaning of the "best evidence standard").

the picture.[225] Nor does commentary on the standard suggest that it imposes higher duties.[226]

On the other hand, if it does establish anything, the standard acknowledges that the FWS is the expert science agency when it comes to defining threats to species and the measures needed for conservation of species.[227] Hence, while the FWS is not the nation's expert science agency on the physical causes and consequences of climate change, it should be responsible for being the repository of knowledge and research on the biological effects of climate change on species. Whether it is through the "best available scientific evidence" standard or through plain vanilla APA judicial deference, if the agency lives up to that responsibility, its exercise of discretion within the bounds detailed above should be respected.

The "best scientific data available" standard can be flexibly employed by the FWS to carry out either a passive or aggressive climate change policy. After *Massachusetts v. EPA*, the FWS, like any other regulatory agency, would be hard-pressed to plead "scientific uncertainty" in taking the position that species are not threatened by climate change and thus no FWS responsibilities are triggered by the ESA. Indeed, the *Kempthorne* court rejected that position in no uncertain terms. In its effort to force the FWS to consider the effects of climate change in the biological opinion covering the Central Valley Project, the plaintiff environmental group had argued that "[r]egardless of the uncertainty involved in predicting the consequences of climate change, FWS had an obligation under the ESA to address the probable effects on Delta smelt."[228] The defendant water contractors responded that *Bennett v. Spear* "intended to preclude exactly this kind of argument."[229] The district court rebuffed that interpretation of *Bennett*, explaining that the *Bennett* Court held only "that persons who are economically burdened by a decision made under the ESA fall within the zone of interests the statute protects for the purposes of standing."[230] The district court opined further that "*Bennett* sheds little light on the current inquiry – whether and to what extent the data that was before the

[225] For example, courts have been reluctant to uphold challenges to the substance of FWS jeopardy opinions based on allegations that the best available science standard adds some special kick to the default rules of the APA. *See* Katherine Renshaw, *Leaving the Fox To Guard the Henhouse: Bringing Accountability to Consultation Under the Endangered Species Act*, 32 COLUM. J. ENVTL. L. 161, 172-81 (2007).

[226] *See, e.g.*, LIEBESMAN AND PETERSEN, *supra* note 7, at 16 (discussing the standard in the context of the basic APA judicial review criteria); Brennan et al., *supra* note 209, at 412-32 (thorough review of cases interpreting the "best scientific data available" standard).

[227] *See, e.g., Loggerhead Turtle*, 120 F. Supp. 2d at 1023 ("Where there is a substantial volume of research, data, and comments, the agency exercises its expertise to make a reasonable decision based on all of the data and information.").

[228] Natural Res. Def. Council v. Kempthorne, 506 F. Supp. 2d 322, 369 n.27 (E.D. Cal. 2007).

[229] *Id.*

[230] *Id.*

FWS regarding climate change should have been considered and addressed in the [biological opinion]."[231]

Yet, assuming the agency must peer into the climate change blender, the FWS has substantial leeway as to what it sees; downscaling global and regional models of climate change impacts to specific species and their local ecological contexts is difficult and, on this score, the FWS is *the* expert agency. Provided the agency acts within its statutory bounds by considering climate change where it must or may, engaging the available downscaling science, and assessing its application to a particular species with the air of its expert position evident in the record, courts will be hard-pressed to look behind the agency's conclusion one way or the other. This applies to questions regarding the level of threat climate change poses to a species, the areas appropriate for designation as critical habitat for a species threatened or endangered by climate change, and the effects of a proposed land use on such a species. Of course, as the downscaling science becomes "better" and more "available," the agency will be more constrained in this regard, having to acknowledge greater or less uncertainty where it plainly exists, but environmental or industry groups will have to establish that in the courts case by case. Overall, therefore, the "best scientific data available" standard appears to provide the FWS a background source of discretion that may, for the foreseeable future, be quite substantial in scope and useful to the agency in shaping policy choices under each of the ESA's primary programs.

IV. USING THE ESA TO CARRY SPECIES TO THE NO-ANALOG FUTURE

The task ahead of the FWS is daunting, and it must use the discretion outlined in Part III to develop a plan soon, lest climate change sweep away its mission along with its charges. As Part I explained, manifestations of climate change already are well underway and already have had adverse impacts on some species. More can be expected. Indeed, the FWS must assume that more climate change impacts will unfold even if the global community takes measures to mitigate greenhouse gas emissions. As Part II demonstrated, this assumption poses complex policy questions for the FWS, though Part III showed that the agency has considerable flexibility in how it answers them. It has the discretion, within bounds, to adopt passive or aggressive policies for how to integrate climate change in ESA programs.

With that foundation established, what should define the agency's set of operating assumptions about how the global community responds generally to climate change – pessimism or optimism? A worst case scenario would have the global community utterly fail to contain greenhouse gas emissions and, as a result, climate change spiraling into chaos for centuries. In that scenario, the FWS might as well pack up its bags and close shop, as climate change will become an unassailable force in ecological reshuffling, overwhelming any

[231] *Id.*

management of ecosystems or species. Exercising the ESA, in other words, is pointless in this scenario.

On the other hand, the agency also cannot afford to assume a Pollyanna future in which the global community comes together tomorrow, drastically reduces emissions, somehow sucks carbon dioxide out of the troposphere, and reaches 1990 overall levels by the end of this decade. The message of *Massachusetts v. EPA* is that a regulatory agency can't assume someone else will address the climate change problem. Each agency must "whittle away" with whatever knife Congress has provided it.

The ESA will be best served if the FWS adopts a cautious optimism that recognizes the limits of the ESA but keeps the statute relevant. Conceding that some human-induced climate change is inevitable even in the best of circumstances does not concede that it will be perpetual and chaotic. Rather, the FWS can reasonably assume that the global community will eventually arrest greenhouse gas emissions to a benchmark level and that, as a consequence, climate regimes will eventually settle into a new "natural" pattern of variation.[232] We have no analog for what that pattern will be, and the transition from the present to that future will be, by all appearances, a rocky ride, but in all probability we will get there. The job of the ESA is to help as many species as is reasonably possible get there with us – to serve as their bridge across the climate change transition into the no-analog future.

Ironically, to do this will take some humility and restraint. Going for the jugular by regulating greenhouse gas emissions is *not* where the ESA can be of most help to imperiled species. There is little to be gained for the FWS or for climate-threatened species by having the agency go down this road. The agency has no explicit authority to do so, does not have the expertise to do so, and would risk undermining the political viability of the ESA by doing so. Rather, the FWS can provide expert assistance to the agencies more appropriately charged with regulating greenhouse gas emissions, such as the EPA, by advising them about the effects of climate change on species.[233]

As for its direct role in addressing climate change, the FWS can employ the ESA most effectively by identifying species threatened by climate change, identifying which of those can be helped through the ESA's habitat-based programs, and devising a management plan – one that uses regulatory action as well as recovery planning – to build each such species its bridge. Indeed, this strategy allows the FWS to dispense with the distinction between human-

[232] There is strong evidence that almost every flow system in nature, from Earth's jet streams to Jupiter's banded winds, responds to disturbances by moving toward self-organized order. *See* Richard A. Kerr, *Order from Chaos, Power from Dissipation in Planetary Flows*, 317 SCIENCE 449, 449 (2007).

[233] For example, federal agencies required to prepare environmental impact statements under the National Environmental Policy Act in connection with projects they carry out, fund, or authorize must "[o]btain the comments of any Federal agency which has . . . special expertise with respect to any environmental impact involved." 40 C.F.R. § 1503.1(a)(1) (2007).

induced and natural climate variation. Climate change is climate change – it does not matter to the species what is causing it. What does matter to them is whether and in what shape they survive it.

This brings us to the six policy choice pressure points raised in Part II. To implement the proposed bridge policy, I suggest the FWS approach the policy choices as follows:

Identifying Climate-Threatened Species. The agency's objective should be to use the ESA to define and monitor the ecological reshuffling effects of climate change. The agency should aggressively identify species threatened by climate change. Early identification of species threatened by climate change and of the critical habitat they require for survival through climate change transition will help in defining the extent of ecological reshuffling and guide human adaptation programs. Early identification also will provide the basis for listing species as threatened, which provides more flexibility in terms of regulatory effects and recovery efforts.

Regulating Greenhouse Gas Emissions. The agency's objective should be to not squander agency resources in a futile effort for which the ESA is simply not equipped. The FWS should not attempt to use its Section 7 and Section 9 regulatory programs in an effort to regulate greenhouse gas emissions. As for the take prohibition, listing species as threatened early will allow the agency to remove greenhouse gas emissions from consideration under Section 9 while keeping the take prohibition active with respect to other contributing threats. If an animal species is in endangered status, meaning Section 9 necessarily applies in full force, difficulties in establishing the burden of proof would support the exercise of prosecutorial discretion not to attempt to regulate greenhouse gas emissions. Under the Section 7 consultation program, project-specific jeopardy analyses should promote other federal agencies to consider ways of reducing greenhouse gas emissions, but should not lead to jeopardy findings.

Regulating Non-Climate Effects To Protect Climate-Threatened Species. The agency's objective should be to support the bridge function of the ESA and to reduce the adverse impacts on species from human adaptation to climate change. Where a species weakened by climate change is also threatened by other anthropogenic sources, such as loss of habitat, and where the agency reasonably believes addressing the non-climate threats will help carry the species through the climate change transition, the agency should use Section 7 and Section 9 regulatory powers to the extent necessary. In particular, where human adaptation to climate change exacerbates threats to a species, the agency should aggressively employ its regulatory presence through Section 7 consultations and enforcement of the Section 9 take prohibition. The agency also must monitor the impacts of human adaptation on species that face no direct or secondary ecological threat from climate change and employ Section 7 and Section 9 powers accordingly. Clearly, however, innovative approaches will be needed, such as market-based incentives and regional planning efforts, to facilitate human adaptation measures as much as species can tolerate.

Designing Conservation and Recovery Initiatives. The agency's objective should be to get as many species with a long-term chance at survival and recovery through the transition to the other side of climate change as is realistically possible. The agency must initially differentiate between species that are unlikely to survive climate change under any circumstances and those that are likely to benefit from assistance in their home ecosystems. Agency resources should not be wasted in developing recovery plans or other conservation measures for non-recoverable species. For species that appear likely to withstand climate change under the ESA's protection, recovery plans should identify the expected intensity of assistance required to manage or respond to primary and secondary ecological effects. Conservation measures for species that require intensive assistance, particularly in Section 10 HCPs, should be designed around adaptive management techniques that involve ample monitoring and considerable room for adjustment of management actions in order to account for the possibility that continuing climate change will alter the effectiveness of those actions.

Species Trade-Offs. The agency's objective should be to not contribute to ecological reshuffling through its species management efforts. Where the measures described above are complicated by species trade-offs – when helping one may harm another – the agency should adopt an ecosystem-based management approach modeled on promoting long-term species diversity and ecosystem multi-functionality.[234] When ecological models do not point to a particular management action to serve those goals, general default priorities, such as assisting top-level predators and resisting induced invasions, may help mediate between species in conflict.

Dealing with the Doomed. The agency's objective should be to avoid accelerating the decline of species who stand no chance of surviving climate change, but not to take measures on their behalf which could pose threats to other species. Under this standard, assisted migration should be employed for such a species only if the FWS has assembled conclusive evidence of the extinction threat, a quantitative model showing the likely success of assisted migration for the species with de minimis anticipated effects on other species, and an assisted migration management plan including long term monitoring and active adaptive management.[235] Human adaptation measures that could accelerate the extinction of the species, which could cascade to affect other

[234] Maximizing biodiversity will assist the ecosystems of the future, whatever pattern they assume, in establishing and maintaining resilience. *See* Andy Hector & Robert Bagchi, *Biodiversity and Ecosystem Multifunctionality*, 448 NATURE 188, 188 (2007).

[235] This approach is what McLachlan et al. refer to as "constrained assisted migration," as opposed to aggressive use of assisted migration at one extreme and total prohibition of the practice at the other extreme. *See* Jason S. McLachlan et al., *A Framework for Debate of Assisted Migration in an Era of Climate Change*, 21 CONSERVATION BIOLOGY 297, 299 (2007).

species, should be regulated under Section 7 and Section 9 as for any other listed species.

CONCLUSION

The "pit-bull" has met its match, but sometimes old dogs can learn new tricks. It is sobering to find that ecological reshuffling is inevitable and to realize that the ESA can't do anything about it. Yet this is precisely what leads me to my proposal that the statute be employed in a more focused manner in the decades leading to our no-analog future. What the statute has done best is stop the decline of imperiled species brought under its protective wings, and it has done so in the face of problems as intractable as urbanization and invasive species. The ESA has not solved urban sprawl or invasive species – it has helped species deal with them. Likewise, we must find a way for the ESA to help species deal with the effects of climate change, not its causes. The statute provides this flexibility – the means to proactively identify the threat of climate change and focus on helping those species that can be helped.

My proposal is unlikely to satisfy strong supporters of the ESA or its strong critics. The former are likely to believe the "pit bull" has found its ultimate calling in climate change. If there is any statute that can wrestle greenhouse gas emissions to the ground (i.e., to 1990 levels), they might think it is the ESA and its unrelenting biocentric mission, whereas my proposal keeps the statute at bay. The latter will object to my proposal's aggressive call for species listings, which is based on wholesale adoption of the premise of human-induced climate change, and to its continued use of the statute as a regulatory weapon against habitat loss and other non-climate threats to climate-threatened species.

Both views doom the ESA. Of course, that may be the intent and hope of the statute's critics, with or without climate change. But adopting the strong version of the ESA in the climate change era, in which the FWS charges hard after greenhouse gas emissions, would play right into the critics' hands – the statute is neither designed to regulate something so ubiquitous as greenhouse gas emissions nor so sacrosanct as to survive the political battle attempting to do so would ignite. Support for the ESA, therefore, must be tempered by practical and political reality if the ESA itself is to survive climate change. The trade-off I propose – standing back from greenhouse gas emissions but staying fully engaged in regulating non-climate threats, particularly those stemming from human adaptation to climate change – is the plan the ESA needs in order to build the bridge for species into the no-analog future.

Senator INHOFE. In this article, Professor Ruhl states "accurate prediction of planet change effects on local ecological conditions is for now, and perhaps always will be, beyond the capacity of ecological models." In essence, we can't scientifically establish a direct causal link from a CO2 molecule in Oklahoma or in Wyoming or in China to a direct effect on a polar bear in Alaska. We can't say which molecule is responsible. So how do you know who is the culprit? And how do we regulate their activity under the ESA?

I look forward to hearing from Bill Horn, a former Assistant Secretary at Fish and Wildlife and Parks in the Reagan administration, on this point. I would ask him to make some comments in his opening statement relative to this, if he would, please.

Finally, when I was Chairman of this Committee, we heard testimony before the Committee that the Act's strict timelines make it nearly impossible for the scientists to do a thorough job. The Act's terms, such as foreseeable future, on which the polar bear decision rests, pose complex problems for decisionmakers.

The Director of the Service testified in January that he needed extra time to review additional science before making a final decision on the polar bear. While every deadline should be met, I believe it is most important, given the implications of the polar bear listing, that we get this right the first time.

I look forward to the hearing, but since we have a little bit of extra time, Madam Chairman, and anticipating some criticism of Secretary Kempthorne, and of course we were here back when he was a member of this Committee. He has not shirked his duty to appear. In fact, he has offered to appear before the Committee as soon as the decision as made, as you stated.

The listing decision is in litigation. Kempthorne is a named defendant. One of the plaintiffs, the Center for Biological Diversity, is on the second panel. I am sure they will comment about this. There is a concern that comments and questions or documents relevant to the lawsuit would be brought up at the hearing.

Quite frankly, I talked to him yesterday, and I said I think you are right in not doing it. I recommended that he not.

And since we are quoting the Bible, I quickly asked for mine, for Romans 1:25, because I couldn't remember it verbatim, but I have it in front of me now: "They exchanged the truth of God for a lie, and worshiped and served created things, rather than the Creator, who is forever praised. Amen."

Senator BOXER. Would you repeat that please?

Senator INHOFE. Yes. "They exchanged the truth of God for a lie, and worshiped and served the created things, rather than the Creator, who is forever praised."

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Good morning. This is our second hearing in 3 months on the polar bear. The focus of this hearing is on the Department of the Interior's failure to meet its court-ordered and statutory deadlines for making a listing decision and the subsequent lawsuit brought by environmental groups. The decision is overdue by 90 days and many of my Democratic colleagues are outraged by the delay.

I firmly believe that statutory and court-ordered deadlines should be met. However, this is not the first time that the Fish and Wildlife Service has missed one of these deadlines. For example, in July 1998, the Clinton administration proposed

to list the Canadian Lynx as threatened under ESA. The final rule was published in March 2000—exceeding the statutory 1-year deadline by more than 250 days. It is my understanding that from 1998–2000, the prior administration had a 10 percent success rate in getting listing decisions made within the 1-year statutory window. So this is not an unprecedented occurrence, nor is it unique to the Bush administration.

It is very telling that my Democratic colleagues have chosen this missed deadline over which to get so upset. And the fact that we have had two hearings on a single listing decision reinforces my belief that listing the polar bear is not about protecting the bear, but about using the ESA to achieve global warming policy that special interest groups cannot otherwise achieve through the legislative process. Worldwide polar bear population numbers are at or near all-time highs, especially in comparison to 40–50 years ago. A majority of populations are considered stable, some are increasing. I worry that we have spent, and will continue to spend, too much time and money examining a healthy species and manufacturing ways to predict its demise, when there are hundreds of species legitimately on the list that need these scarce department resources.

The ESA is simply not equipped to regulate economy-wide greenhouse gases, nor does the Fish and Wildlife Service have the expertise to be a pollution control agency. The regulatory tools of the ESA function best when at-risk species are faced with local, tangible threats. Greenhouse gas emissions are not local. Without objection, I would like to enter in the record a law review article written by Florida State Law School professor JB Ruhl entitled "Climate Change and The Endangered Species Act." In his article, Professor Ruhl states, "Accurate prediction of climate change effects on local ecological conditions is, for now (and perhaps always will be) beyond the capacity of ecological models." In essence, we can't scientifically establish a direct causal link from a CO_2 molecule in Oklahoma or in Wyoming or in China to a direct effect on a polar bear in Alaska. We can't say which molecule is responsible. So how do you know who the culprit is and how do you regulate their activity under ESA? I look forward to hearing from Bill Horn, a former Assistant Secretary for Fish, Wildlife and Parks in the Reagan administration on this point.

Finally, when I was Chairman, we heard testimony before the committee that the Act's strict timelines make it nearly impossible for the scientists to do a thorough job. And, the Act's terms, such as "foreseeable future"—on which the polar bear decision rests—pose complex problems for decisionmakers. The Director of the Service testified in January that he needed extra time to review additional science before making the final decision on the polar bear. While every deadline should be met, I believe it is most important, given the implications of a polar bear listing, that we get this right the first time. I look forward to hearing from our witnesses.

Senator BOXER. Yes, liars should not be praised. You are right about that.

Senator INHOFE. Yes.

Senator BOXER. Senator Barrasso.

OPENING STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM THE STATE OF WYOMING

Senator BARRASSO. Thank you very much, Madam Chairman. I appreciate your holding this hearing.

We should all care for the polar bears, and hope that our international treaties and our laws aid the polar bear whenever possible. The polar bear is a spectacular creature. It is spectacular because it has been resilient and adaptive. Polar bears have persisted and evolved for thousands upon thousands of years during periods of extreme changes to their ecosystem.

Madam Chairman, I do have serious concerns about the possible listing of the polar bear as threatened under the Endangered Species Act. Quite simply, the Endangered Species Act cannot reverse climate change. Perhaps some stand-alone legislation passed by Congress in conjunction with a comprehensive international agreement could, but not the Endangered Species Act. Any attempt to make the Endangered Species Act regulate emissions from across the Country to protect the polar bears, and any other Arctic species

for that matter, are misguided. Those attempts, if successful, would be disastrous to folks all across the Country.

My primary concern is this. If the polar bear is listed under the rationale that global warming could cause a decline, then thousands of other species will follow. How can we possibly preclude any species on the planet from being listed under this rationale? The consequences to our society would be dramatic and devastating. Virtually every human activity that involves the release of carbon into the atmosphere would have to be regulated by the Federal Government: driving to work, harvesting corn for ethanol production, building a new road. Whole cities could be sued for not restricting the number of cars that can be on the road within the city limits.

In addition, some have speculated that any Federal action, whether it is building a new power plant, repairing a road—any Federal action—would be subject to this proposed standard by asking the question, does the activity contribute to global warming.

The Endangered Species Act listing could potentially go beyond the scope of Lieberman-Warner into areas that the bill never intended to regulate in the first place. We would have to put caps on all ethanol production, homebuilding, recreational boat use, road construction, just to name a few. There would be no area of the economy left untouched.

Is this where we want to go with the Endangered Species Act? I think the answer is no. And if it not the case, what assurances can you give me and my constituents that every activity that they engage in at the State level, the local level, or even the private level will not get caught up in the new interpretation of the Endangered Species Act?

Thank you, Madam Chairman. I look forward to the hearing.

Senator BOXER. Let me just say a couple of things. I am going to put in the record, without objection, a report, or just one particular page, page two of the USGS Science Strategy to Support U.S. Fish and Wildlife Service Polar Bear Listing Decision. In it, it says, "Our modelings suggest that realization of the sea ice future, which is currently projected, would mean loss equivalent to two-thirds of the world's current polar bear population by mid-century." I think that is important to note, that that is a USGS finding.

[The referenced document follows:]

and Polar Basin Divergent Ecoregions by 45 years from present, and in the Polar Basin Convergent Ecoregion by 75 years from present. The BN model projected high non-zero probabilities that Archipelago polar bears could occur at smaller numbers than now through the end of the century. Declines in ice habitat were the overriding factors determining all model outcomes. Although management of human activities could forestall extinction in the Archipelago and Polar Basin Convergent ecoregions, it could not qualitatively alter the prognosis of extinction for the Polar Basin Divergent and Seasonal Ecoregions. Similarly, model results indicated that sea ice conditions would have to be substantially better than even the most conservative GCM projections to result in a qualitatively different outcome for any of the ecoregions. Our modeling suggests that realization of the sea ice future which is currently projected, would mean loss of ≈ 2/3 of the world's current polar bear population by mid-century.

Introduction

Study Objective

Polar bears depend upon sea ice for access to their prey and for other aspects of their life history (Stirling and Øritsland 1995; Stirling and Lunn 1997; Amstrup 2003). Observed declines in sea ice availability have been associated with reduced body condition, reproduction, survival, and population size for polar bears in parts of their range (Stirling et al. 1999; Obbard et al. 2006; Stirling and Parkinson 2006; Regehr et al. 2007b). Observed (Comiso 2006) and projected (Holland et al. 2006) sea ice declines have led to the hypothesis that the future welfare of polar bears range-wide may be diminished, and to the U.S. Fish and Wildlife Service (FWS) proposal to list the polar bear as a threatened species under the Endangered Species Act (U.S. Fish and Wildlife Service 2007). The classification as a "threatened species" requires determination that it is likely the polar bear will become an endangered species within the "foreseeable future" throughout all or a significant portion of its range. An "endangered species" is any species that is in danger of extinction throughout all or a significant portion of its range. To help inform the final listing decision, the FWS requested that the U.S. Geological Survey (USGS) conduct additional analyses of polar bears and their sea ice habitats. Between February and August 2007, USGS and collaborators developed nine reports targeting specific questions considered especially informative to the final decision. This report, one of the nine, builds upon the other eight reports and uses other current information on polar bears to forecast the status of polar bears occurring in different parts of the Arctic at three future periods in the 21st-century.

We use the best available information and knowledge, including that derived from new studies requested by the FWS, to forecast the future status of polar bears in each of 4 ecoregions (Figure 1). We present our forecast in a "compared to now" setting where projections for the decade of 2045-2055, 2070-2080, and 2090-2100 are compared to the "present" period of 1996-2006. For added perspective we also look back to the decade of 1985-1995. Hence, we examined five time periods in total. Our view of the present and past are based on sea ice conditions derived from satellite data. Our future forecasts are based largely on information derived from general circulation model (GCM) projections of the extent and spatiotemporal distribution of sea ice.

Background biology

Polar bears occur throughout portions of the Northern Hemisphere where the sea is ice-covered for all or much of the year. Polar bear genetics indicate that the species branched off from brown bears (*Ursus arctos*) and invaded

Senator BOXER. Also, I did mention that in Secretary Kempthorne's letter, he cited the fact that under the Clinton administration there was a delay. Well, I want to say if someone else breaks the law, that is not a reason for you to break the law. If I know someone who breaks the law, it is not a reason for me to break the law.

I also think that it is in fact a slap at the oversight responsibility of the Senate if all of a sudden members of Cabinets, I don't care if they are Democrats or Republicans, refuse to come up until they have already made their decision, when we have a chance to really go back and forth and discuss it and share information in a public setting. I just think this is a horrible precedent. Mr. Johnson did it with us on the California waiver. He wouldn't come back until after the decision was made, and now we have it here.

I hope that this will not become the norm, because believe me, Administrations both Republican and Democratic don't enjoy coming up here. I know it is not always pleasant, but it is part of their responsibility.

I also have to say to Senator Barrasso, I found your comments fascinating and confusing because what you are saying is, if the polar bear is threatened due to climate change, and all of a sudden the Endangered Species Act is going to be triggered when we find a species that is threatened by climate change, what a disaster this would be. I would like to challenge you by saying, what a disaster it would be if we did nothing when God's creatures are disappearing off the Earth, whatever the reason. We have to get to the cause and we have to stop greenhouse gas emissions.

What if my friend found out that human life itself was threatened by climate change? What if we found out human life was threatened, which we are, by the way finding out, because certainly we know there will be refugees. Is he going to sit here and say, well, this is terrible; we can't take any steps to protect my constituents' human life because it would hurt our economy?

I mean, the whole thing makes no sense when there are no people left, when you can't grow because you are not doing it in an environmentally sensitive way you destroy this very economy, and by the way this very planet. It seems to me that is the worst thing we can do.

So I think following your logic, sir, we would do nothing about anything because in the short term it might say to one of your constituents, you know, maybe you need to perhaps consider buying a more fuel-efficient car, rather than not have a hospitable planet.

Senator BARRASSO. Well, Madam Chairman, my concern of course is that the greatest producer of greenhouse gas in the world is not our Country, but China. And with the international concerns in our Committee, I have been proposing making the investments in the technology to then have them used globally to reduce the amount of carbon dioxide and deal with it that way, rather than just stifling the United States and its efforts.

Senator BOXER. Well, I might say, I understand my friend feels that way. I could say, speaking for my State, which has been on the forefront of the environment, we have led the way in high-tech, venture capitalism, incredible change in our thrust after the cold war. It is extraordinary. The best per capita use of energy, and we

have a bipartisan agreement that when you do the right thing for the environment, you really help the economy. That is from, you know, our Governor down to our Democratic legislature.

So I don't think that Senator Warner, Senator Lieberman, Senator Boxer and all the other people who voted for this bill are voting to do something to hurt America. I think we believe that it will in fact make America a leader in global warming, and we are going to test this out on the floor come June 2d, but we will engage in that debate.

Senator INHOFE. Let me get in on this discussion for one comment, Madam Chairman.

Senator BOXER. Sure.

Senator INHOFE. I think what Senator Barrasso is bringing up is very legitimate. Whether it is the Lieberman-Warner bill or any of the other bills or approaches that merely try to address the problem in this Country, and they have an economic devastating effect on this Country that drives—and there is no question about this—jobs to areas where they don't have this problem, such as China. And we are experiencing it now.

I would suggest that, which we won't; it is not going to pass anyway, so it doesn't make much difference. But if it were to pass——

Senator BOXER. You didn't think it would pass the Committee either?

Senator INHOFE. Oh, I did, too. Are you kidding? With your 11 to 8 majority? I had no doubt. In fact, the Committee took 9 hours and it could have been done in 15 minutes and it would have been a better use of everyone's time, I think.

But the fact is that if you are successful in passing something like Lieberman-Warner, and driving those jobs to places where they don't have any emission controls or restrictions, it would have the effect of increasing the global CO2 on this planet. I think people have to realize that, and that is one of the many reasons that this legislation will not pass.

Senator BOXER. Well, speaking for Senators Lieberman and Warner, Bingaman and Specter, we have in this bill a provision of the bipartisan Bingaman-Specter bill which does deal with this whole issue of imports from countries that don't have the same rules.

But I have to tell you, there is no way that I am sitting back and letting China lead the world on this. That would be an outrage for our Country. We are the leader. We have always been the leader. We are going to absolutely address this issue on the floor of the Senate. It is already in the bill, and we could even tighten it.

But anyway, let's move on and hear our witnesses. The majority witnesses are Mr. Inkley and Ms. Siegel. Mr. Horn is the Republican witness.

Will you take your seats? And we will go just down the line. We are very happy that you are here. I am disappointed we don't have the Administration here, but we are going to listen to you all. We will start with Dr. Inkley. We will give you 7 minutes instead of 5 minutes because we only have one panel, so 7 minutes each.

STATEMENT OF DOUGLAS B. INKLEY, SENIOR SCIENTIST, NATIONAL WILDLIFE FEDERATION

Mr. INKLEY. Good morning, Madam Chairman. I am Dr. Doug Inkley, the Senior Scientist for the National Wildlife Federation. I can tell you that on behalf of the National Wildlife Federation's four million members and supporters, we do greatly appreciate the opportunity to be here.

Thank you, Senator Inhofe, for being here.

And thank you, Senator Barrasso. As a graduate of the University of Wyoming, I am pleased to see that you are here today.

The National Wildlife Federation is actually here today because we are greatly concerned about climate change and its impact on the polar bear. I have personally had the privilege of viewing more than 40 polar bears in the wild. It is indeed a very magnificent creature and it has a very unique lifestyle of living virtually on top of the Arctic Ocean on a thin layer of ice.

The National Wildlife Federation supports the U.S. Fish and Wildlife Service's proposal of January, 2007 to list the polar bear as a threatened species. Since that proposal was first put out, the evidence has become even more overwhelming than it originally was. The USGS, United States Geological Survey, in September, 2007 released nine scientific studies and came to the conclusion that fully two-thirds of the polar bear population in the world is likely to be gone by the year 2050 if we continue business as usual. That would include all of the polar bears in Alaska.

In fact, that decline has already begun. We know that in the western Hudson Bay population near Churchill, Manitoba that the polar bears are already declining because of the melting of the ice. We know that in the United States up in the Beaufort Sea, the polar bears are already declining there as well. It is harder to know exactly what is happening in the Chukchi Sea because there is a lot of information that is missing about that population. It has not been studied intensively since the 1990's.

We must do everything that we can to minimize the potential harm to polar bears and their habitat. This includes, first and foremost, reducing global warming pollution, but it is also important to avoid other potentially harmful activities to these species that are threatened. Those activities could include things such as oil and gas exploration, as has been proposed in the Chukchi Sea. We are disappointed, the National Wildlife Federation is, that the Administration has chosen to go ahead with the oil and gas leasing in the Chukchi Sea without the benefit of the additional peer-review process that would go on through the Endangered Species Act protections.

It is troubling to me that the Administration has concluded in its proposal to list the species as a threatened species, and apparently Senator Kempthorne restated, you said in the letter yesterday, that there will be no significant impact of oil and gas on polar bears in the Chukchi Sea. Well, this is in direct contradiction to another branch of the Department of Interior, and that is the Minerals Management Service. It states in its final environmental impact statement that if an offshore oil spill occurs, a significant impact to polar bills could result. I don't know how to resolve these two differences. On the one hand, the Administration is saying there

will be an impact, and on the other hand, it is saying there will not be an impact.

The polar bear really is already skating on thin ice. Every day that the Administration delays in taking action to list the species as a threatened species makes the situation all the more precarious.

The National Wildlife Federation is also here today because we are concerned about climate change and its impact on our Nation's and our world's plant and animal species. The Intergovernmental Panel on Climate Change has concluded that if we continue business as usual in terms of greenhouse gas emissions, some 20 percent to 30 percent of the species around the world could move closer to the edge of extinction within the lifetime of children born today. That is exceedingly rapid.

Already, the elkhorn and the staghorn coral have been listed, partly because of the impacts of climate change. They were the first species ever under the Endangered Species Act to be listed because of climate change. Now, we are looking at the possibility of listing the polar bear. As I already indicated, the evidence to do that is overwhelming. Just last week, the National Marine Fisheries Service said it is examining the status of four species of seals in the Arctic Ocean to determine if they should also be listed under the Endangered Species Act because of the rapid melting of the Arctic ice.

Each one of these species is really like a fire alarm going off. We can pretend that we don't hear the fire alarm. We can pretend that the fire isn't real, but in fact something is amiss, and if we continue to ignore it, we will do more harm than good. Instead of ignoring the fire alarm, as indicated by these many species that are now needing to be listed because of global warming, instead the appropriate action is to put out the fire by reducing greenhouse gas emissions, the root cause of the problem.

Last, and certainly not least, the National Wildlife Federation is here today because we are greatly concerned about climate change and its impact on all of the many natural resources which we humans are critically dependent upon: our water supply, our food supply, our wood supply, the diverse ecosystems that provide so many goods and services to us as human beings. To continue along the same path of greenhouse gas emissions is a serious risk to our well being as humans, to our economy, and to our wildlife species. These are not risks that the members of the National Wildlife Federation are willing to take.

In closing, I would like to say that the National Wildlife Federation urges Congress to quickly take action to address climate change by limiting our carbon emissions through a mandatory cap-and-trade program to achieve a 2-percent annual reduction. Further, that legislation should invest in America's future by including dedicated funding for the conservation of natural resources affected by climate change.

If action is not taken soon to address this underlying issue of climate change that is causing the endangerment of wildlife, I fear that my own experience with the polar bears is not something that our grandchildren will be able to see. It is my concern that the only

polar bears they ever see will be behind bars or simply pictures in a book.

Thank you very much, Madam Chairman.

[The prepared statement of Mr. Inkley follows:]

TESTIMONY SUBMITTED

BY

DOUGLAS B. INKLEY, PH.D.
SENIOR SCIENTIST
NATIONAL WILDLIFE FEDERATION

PREPARED BY

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TO THE

SENATE ENVIRONMENT AND PUBLIC WORKS
COMMITTEE

POLAR BEAR LISTING HEARING

APRIL 2, 2008

The National Wildlife Federation (NWF) appreciates this opportunity to testify before the Senate Environment and Public Works Committee on the issue of climate change and the conservation of polar bears. The National Wildlife Federation is America's largest wildlife conservation organization, representing more than 4 million members and supporters throughout the United States, including nearly 750,000 hunters and anglers. The National Wildlife Federation includes 48 affiliated state and territorial conservation organizations, which in turn support hundreds of local clubs across the nation. We are a non-partisan organization, and our membership mirrors the political diversity of Americans everywhere.

I am Doug Inkley, the National Wildlife Federation's Senior Scientist and a Certified Wildlife Biologist (by The Wildlife Society). I am responsible for helping to ensure that NWF's conservation policies are based on sound science. In this capacity I have been engaged in a diversity of fish and wildlife conservation issues including wetlands, endangered species, National Wildlife Refuges, conservation funding and many others. In the last decade my attention has increasingly turned to demonstrating the urgency of addressing climate change as the scientific evidence has grown exponentially and become virtually irrefutable. I have traveled from the Arctic to the equator to Antarctica. In all of these places, and in fact around the world, the effects of climate change on our natural resources are already evident.

Climate change is an enduring, significant, and complex problem facing humans and wildlife. It is now well established that the Earth has warmed over the past century, due mostly to the emissions of greenhouse gases from human activities[i], and that this warming has impacted wildlife and habitats in important ways[ii,iii,iv]. More serious climate impacts on wildlife, including polar bears, are expected this century, especially if significant steps are not taken to reduce greenhouse gas emissions and to help wildlife cope with changing conditions.

This testimony first addresses the current state of the science on climate change and the influence of climate change on the Arctic ice cap, upon which the polar bear depends. This is followed by a review of the status of the polar bear and the merit of listing it as a threatened species. Finally, we conclude with mention of the implications of climate change for other species.

Collaborating in the preparation of this testimony were Dr. Doug Inkley, Dr. Amanda Staudt, Dr. Sterling Miller and John Kostyack, Esq. Dr. Inkley was the lead author in The Wildlife Society's technical review "Global Climate Change and Wildlife in North America. Dr. Staudt is NWF's Global Warming Scientist. She completed her Ph.D. at Harvard University in climatology and worked at the National Academy of Sciences prior to joining NWF. Dr. Miller is a renowned biologist who, before joining NWF, worked for the Alaska Department and Game and Fish as their grizzly bear biologist. Furthermore, Dr. Miller is the former President of the International Association for Bear Research and Management. All are the authors of peer-reviewed publications in their respective fields. Mr. Kostyack is an attorney and NWF's Executive Director for

Wildlife and Global Warming, with extensive experience in endangered species law and policy.

The Scientific Consensus on Climate Change

The Earth has warmed by about 1.4°F over the past century[v]. This observed warming, along with other global climate changes, led the Intergovernmental Panel on Climate Change (IPCC) to state in its 2007 report that:

> **"Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level"** [vi]

This conclusion, based on decades of peer-reviewed scientific research, is especially remarkable in that the IPCC report represents an unprecedented scientific collaboration by more than 2,500 scientists worldwide.

Fossil fuel burning, large-scale deforestation, and other human activities are responsible for most of the warming over the past century. These activities emit greenhouse gases, such as carbon dioxide (CO_2), to the atmosphere. The current levels of atmospheric CO_2 is 383 ppm[vii], higher than anytime in at least 650,000 years, during which the value did not exceed about 300 ppm.[viii] For these and other reasons, the 2007 IPCC report concludes that there is:

> **"very high confidence (90%) that the global average net effect of human activities since 1750 has been one of warming."**

The warming accelerated in recent decades as greenhouse gas emissions grew. The IPCC reported that 11 of the 12 years from 1995–2006 ranked among the 12 warmest years in the instrumental record of global surface temperature (since 1850). NASA data indicate that 2007 was tied for the second warmest on record[ix].

Scientists have explored many other factors, including the Earth's orbit, variation in solar output, volcanic activity, and known periodic climatic cycles ranging from a few years (i.e. the El Niño/La Niña cycle) to decades (regular oscillations in the sun). Although all of these can, have, and will continue to influence the earth's climate, none of them can account for the current rapid rise in temperatures. Simply put, the scientific evidence that the earth is being rapidly warmed by human-caused greenhouse gas emissions is overwhelming.

The IPCC report warns of more rapid warming in coming decades if we continue to use fossil fuels such as oil and coal as intensively as we do today. Global warming is accelerating because pollution is building up in the planet's thin atmosphere at a faster rate as we use more and more fossil fuels. Moreover, we have not yet seen the full effects of the pollution we have already pumped into the air. By the end of this century, if we continue "business as usual" dependence on fossil fuels, the scientists' consensus

'best estimate' is that temperatures will increase 7 degrees Fahrenheit above the changes we have already seen (with a range of 4 to 11 degrees, based on the report's 'Fossil-Intensive' emissions scenario).

Arctic Sea Ice

The Arctic is covered by a relatively thin layer of floating ice. This ice pack is in constant motion, drifting at the whim of ocean currents and prevailing winds. Influenced extensively by the seasons, sea ice expands greatly in area during the long, dark winters, and recedes during the summer in an annual cycle.

Sea ice is critical to the survival of polar bears because it provides the platform from which they can catch seals, their primary prey. So dependent are polar bears on sea ice, it is not surprising that wherever sea ice does not exist for significant portions of the year, there simply are no polar bears.

Through the use of satellites and other means, scientists have been able to accurately monitor the status and extent of Arctic sea ice for decades. In the Arctic Ocean, the area of summer sea ice declined 9.8 percent per decade since 1978, with a 32 percent thinning of the remaining ice from the 1960s and 1970s to the 1990s in some local areas. Significant areas of fast ice (connected to land and forming ice shelves) have broken up, including the 300-mile Ellesmere Ice Shelf along Ellesmere Island in northern Canada.

In the summer of 2007 scientists reported a record Arctic ice melt. The increase in ice melt over the long term (1979-2000) average was an area equivalent to the size of Alaska and Texas combined.[x] The remaining ice was an incredible 39% below the long term average. These unexpected findings combined with recent ice melt data such as the previous record ice melt in 2005, necessitate that scientists adjust their models of summer sea ice decline. Instead of IPCC projections for the disappearance of late-summer sea ice by the latter part of the 21st century, scientists now believe this unprecedented event will occur much sooner. In contrast to a 2006 projection that summer sea ice in the Arctic may virtually disappear entirely by about 2040[xi] one NASA scientist now projects a possible loss of summer sea ice by as early as 2012[xii].

Following the record Arctic summer ice melt in 2007, the 2008 winter was colder than the long-term average in some regions of the Arctic.[xiii] These colder temperatures caused more new sea ice to form this winter than in each of the last three winters. Despite this welcome increase in winter ice, the sea-ice extent this winter is still 2.2% less than the long-term average. Furthermore, older or multi-year sea ice has continued to decline because of the long-term global warming trend and because of ice flowing out of the Arctic. Multi-year ice made up 50-60 percent of the winter Arctic ice as recently as the 1980s. This year (2008), multi-year ice has declined to less than 30 percent of the winter Arctic ice.

Climate Change and Polar Bears

To understand the importance of climate change to polar bears, we must first understand the polar bear's life history. As suggested by its scientific name (*Ursus maritimus*), the polar bear is actually a marine mammal that spends far more time at sea than it does on land. Polar bears are, in fact, classified as marine mammals under the Marine Mammal Protection Act.

Polar bears evolved from brown (grizzly) bears (*Ursus arctos horribilis*), a terrestrial species that still lives on land adjacent to the Arctic oceans. The terrestrial habitat for brown bears is marginal in these extreme northern latitudes and this is reflected in these populations having the lowest densities (1-2 bears/1000 km^2) and among the lowest reproductive rates of any brown bear population in the world. Perhaps because conditions were so marginal on land, some brown bears began to forage out on the sea ice and learned how to kill the abundant seals that utilize the arctic ice cap. Over the course of time, these evolved into polar bears that are highly specialized in their foraging habits, relying almost exclusively in most areas on seals for food. The diet of brown bears includes a wide variety of foods from berries to caribou calves. Generalist species such as the brown bear are more adaptable to changes in their environment because when one food becomes scarce, they can shift to other foods. On the other hand, specialized species such as the polar bear are highly vulnerable to changes in their environment because they lack other species to shift to for food. This specialization makes polar bears much more vulnerable to extinction than the brown bears from which they derived.

Superbly adapted to its icy habitats, the polar bear's primary hunting technique is to capture seals when they surface at a breathing hole in the ice. Polar bears also capture seals by sniffing out their snow-covered pupping dens in the ice before seal pups are mature enough to swim. Because seals are much better swimmers, polar bears are unable to take them in open water. The polar bear's dependence on Arctic ice is obvious.

In marked contrast to black bears and brown bears which hibernate during the winter because their food sources are unavailable, most polar bears are active year-round because they are able to hunt for seals on the ice all year. The only polar bears that den during the winter are pregnant females; they den so that they can give birth to their tiny cubs in a secure environment unexposed to the severe artic winter. These females emerge from their dens in the spring when their cubs are large enough to survive. Male, non-pregnant female, and subadult polar bears do not den and continue to hunt for seals all winter.

This pattern is somewhat different in the areas at the southern limit of the polar bear's range, such as Hudson Bay. In these areas the ice in not available for polar bears to forage for seals during the summer. As a consequence, they are confined to land for the summer. With little opportunity to catch prey, they may go months essentially without eating, until the ice freezes in the fall and they can commence hunting for seals again.

The population of polar bears worldwide is estimated at 20,000 to 25,000 and changes in population abundance associated with climate change have not been documented so far for most populations. In 2005, of the 13 polar bear populations along Canada and Greenland, one was reported to be increasing, five were declining, and two were severely depleted from over-harvesting but being managed to increase the population. The remaining five were reported as stable. However, already there is evidence of the impact of climate change on polar bears via the decline in ice.

In just 20 years the ice-free period in Hudson Bay has increased by an average 20 days, leaving nearly three weeks less time each year for the bears to hunt for seals on the ice. The ice is freezing later in the fall, but it is the earlier breakup of the ice in the spring that is particularly problematic for polar bears in these southern areas. This is because spring is the time when seals give birth to their pups and polar bears rely on this relative abundance of food for the bulk of their annual nutrition, and to see them through the long summer when they cannot hunt. As a result, polar bears in western areas of Hudson Bay are on average skinnier and have lower reproductive rates than when the ice persisted throughout the seals birthing period. As average bear weight has dropped by 15%, reproduction has declined, and the population is down more than 20%.[xiv] The impact of climate change on polar bears in these southern latitudes foreshadows what will happen as the sea ice continues to decline in more northern latitudes.

Some of the best habitat for polar bears in the Arctic Ocean is fast ice (attached to shore) or ice that can be reached with a short swim from land. Because these relatively shallow water areas on the continental shelf are more productive than deeper ocean waters further offshore, they provide abundant prey for seals. However, as the ice cap shrinks and moves further and further from the shore, the remaining ice is over the deeper less-productive areas. There is already evidence that ringed seal populations are declining as the ice retreats from shallow, productive coastal areas. Receding ice can affect polar bears by both reducing populations of its primary prey and requiring polar bears to swim great distances from shore to ice. Although excellent swimmers, this crossing becomes increasingly hazardous as the distance increases and as waves become higher due to the longer fetch for winds across the land/sea ice gap. In the Beaufort Sea off Alaska's northern coast, fewer cubs are now surviving beyond their first year, which is probably a consequence of reduced food available to their mothers and increased risk of mortality from drowning and other threats. The number of cubs has dropped more than 50% from 61 cubs per 100 adult females from 1967 through1989 to just 25 cubs per 100 adult females from 1990 through 2006.[xv]

New studies released in September 2007 by the U.S. Geological Survey reveal that the rapid decline in summer sea ice poses a very serious threat to the polar bear[xvi]. These studies led government scientists to the conservative conclusion that fully two-thirds of the world's polar bears, including all polar bears in the United States, will disappear by 2050, due to ice loss. Although excellent swimmers, the projections for retreat of ice 300 to 500 mile of the coast by 2050 will be just too far for polar bears to swim.

Listing of the Polar Bear as a Threatened Species under ESA

The Endangered Species Act (ESA), enacted in 1973, is the nation's primary tool for conserving imperiled plants and animals. It imposes a duty on the Secretaries of Interior and Commerce to list a species as threatened if, based on five criteria, it is found to be at risk of becoming endangered in the foreseeable future; a species is considered endangered if it is at risk of becoming extinct in the foreseeable future[xvii]. The five applicable criteria are threats to the species' habitat, disease or predation, overuse, inadequate legal protection and "other natural or man-made factors."

Listing decisions must be made based on the best available scientific data available and are to be made "without reference to possible economic or other impacts of such determination[xviii]." In other words, the decision is to be based purely on the scientifically-determined status and trends of the species and threats to the species and its habitat, not on the political or economic consequences of the listing.

Once a species is listed, the ESA requires that the Service designate or identify "critical habitat" that is essential to the conservation of that species, and it requires that all federal agencies ensure that the actions they permit, fund, or carry out do not destroy or adversely modify this habitat. The Service is required to designate this critical habitat within one year of listing. Any proponent of a federal project must consult with the Service to ensure that the project does not "jeopardize" the existence of the species in the wild or adversely modify its critical habitat. If the Service finds that a proposed federal project will jeopardize a species or adversely modify its critical habitat, the agency project proponent and the Service must work to design an alternative approach to the project that avoids violating the ESA. It is very rare for a project to be terminated or withdrawn due to jeopardy.

The ESA's ultimate goal is to recover threatened and endangered species to the point where they no longer need the law's protections. After a species is listed, the Service is required to develop a recovery plan, which must provide objective, measurable criteria that, if satisfied, would lead to recovery of the species. In essence, it provides a blueprint for federal, state, tribal and private cooperation in the conservation of a listed species and its habitat.

The process of listing the polar bear was initiated on February 17, 2005 when the Center for Biological Diversity first petitioned the U.S. Fish and Wildlife Service to list the polar bear as a threatened species under the ESA. Subsequently, and facing a court-imposed deadline, the Service proposed on January 9, 2007 to list the species as threatened[xix]. The Service was required by the ESA to issue a final listing decision twelve months thereafter, a deadline that the Service missed nearly three months ago.

The scientific basis for listing the polar bear as a threatened species is overwhelming, as presented in the Service's proposal to list the species. Although seemingly far from the disturbance of mankind, loss of habitat --the rapid decline in Arctic ice-- from climate change is the primary threat to the polar bear. As noted by Secretary of the Interior Dirk Kempthorne, "we are concerned that the polar bears' habitat may literally be melting[xx].

Listing the polar bear as threatened under the Endangered Species Act will provide the polar bear with the legal protections it will need if it is to survive climate change. While the continued rapid decline in Arctic ice seems inevitable for the foreseeable future, immediate action to list the species will provide the means for the Service to develop needed plans and implement actions to reduce other threats to the polar bear. These threats include oil and gas development.

The polar bear, and in fact the entire Arctic ecosystem, face serious threats from the development of oil and gas in the Arctic. One need look only as far as the March 24, 1989, grounding of the Exxon Valdez and subsequent spill of over 11 million gallons of crude oil to understand the potential impacts of oil spills in the Arctic. Nearly 20 years later oil can still be found and some species have yet to fully recover.[xxi]

A large oil spill in the Chukchi Sea or other polar bear habitat would be extremely difficult to clean up due to both the remote location and rough seas. Such a spill could have long-term effects on the polar bear food chain (zooplankton and phytoplankton, shellfish and other invertebrates, and seals[xxii]), thereby affecting overall food availability. More directly, polar bears would be imperiled by hypothermia from oil destroying the insulating qualities of their thick fur, which is essential for maintaining body temperature in their frigid environment. When soiled by oil, polar bears are also prone to the toxic effects of oil ingestion from grooming.

Another concern is the potential impact of offshore platforms and the greatly increased human activities associated with oil and gas development. Polar bears and their prey may avoid newly developed areas that would otherwise be suitable habitat. Female polar bears are particularly threatened by disturbance when denning.[xxiii]

Listing of the polar bear would engage the Service in evaluating oil and gas development plans and their potential harm to polar bears. Through mandatory ESA consultations, the Service would identify methods of eliminating or minimizing such harmful impacts. Unfortunately, delay in the listing decision has raised suspicions that the Bush Administration was seeking to avoid scrutiny of oil and gas leases in polar bear habitat under the Endangered Species Act when it proceeded to sell oil and gas leases in the Chukchi Sea on February 6, 2008.

The recovery plan for the polar bear must address all the stressors to the polar bear, including both oil and gas development within its habitat, as well as climate change, the leading threat to the species' existence. Because the solutions to climate change are far beyond the expertise of the Service, the Service will need to enlist the assistance of other agencies. Funding must also be provided under the ESA to enable additional research and monitoring of polar bears and the seals they hunt. This is especially important in the Chukchi Sea where relatively little is known about the polar bear population and the sea ice is both retreating and thinning.

Ultimately, the survival of the polar bear will require more than just U.S. action under the ESA: it will require global action by all the nations of the world to reduce the emissions of greenhouse gases that are causing the climate to warm. Delay in listing the polar bear

as a threatened species only puts the polar bear at greater risk, makes the challenge of recovery more difficult, and continues to deny the reality of climate change and its wide-ranging impacts.

Climate Change and Wildlife

Unfortunately, the challenges facing the polar bear are only the tip of the iceberg — a sign of the cascade of species that will likely become imperiled from climate change. In its 2007 report, the IPCC stated that 20-30% of plant and animal species worldwide are "likely to be at increased risk of extinction if increases in average global temperatures exceed 2.2-4.0° F (converted from °C) above current levels." Further temperature increases would imperil even more species.

Already, species are being listed under the ESA because of imperilment from climate change. In 2007 the National Oceanic & Atmospheric Administration listed elkhorn and staghorn coral as the first species 'threatened' in part because of global warming. Just last week the National Marine Fisheries Service (NMFS) announced they will undertake a status review of the ribbon seal in response to a petition to list it as a threatened species[xxiv]. NMFS will also review the status of bearded, spotted and ringed seals for possible listing, because like the ribbon seal, they are also affected by changes in Arctic ice conditions.

Unfortunately, the evidence is accumulating every day that climate change is already affecting us in our own backyards. In northwestern Minnesota, the population of several thousand heat-stressed moose has declined to fewer than 100 animals. In the West, critical snowpack that supplies cold water for trout streams is declining, leaving fish, anglers and these ecosystems potentially high and dry. The forest landscape is being changed dramatically by unprecedented fires and insect infestations intensified by global warming. As sea levels rise, coastal wetlands and the rich habitat provided there are being submerged.

Other examples include:

- The Pacific coast marine ecosystem is being dramatically affected by climate change. Zooplankton – the base of the marine food web – have declined 70% there, putting virtually every marine species in that ecosystem at risk. Fish larvae have declined by 50%, and seabirds have declined by 30% in less than 30 years.
- Amphibians around the world are already declining due primarily to disease that may be associated with climate change.
- An indicator of what could happen to many species, 80% of historical populations of the Edith's checkerspot butterfly in the southern end of the species' range in California and Mexico have disappeared due to the combined effects of climate change and habitat fragmentation.

Projections for future effects to wildlife species due to climate change are also foreboding:

- Scientists believe that a majority of coral reefs around the world will face extensive coral bleaching within the next 20-40 years if climate changes continues unabated.
- The breeding habitats of many Arctic shorebirds and waterfowl are expected to decline by up to 50% based on global temperature increases of about 1.1 degrees Fahrenheit.
- Nearly 50% of critical salt marsh and 84% of tidal flats along the coast of Florida could be lost with just a 15-inch rise in sea level.
- The prairie pothole region of the northern Great Plains, which annually produces 50% or more of the continent's waterfowl, is threatened with a dramatic loss of critical wetlands as temperatures rises and soil moisture declines.
- In the Apalachicola Bay of Florida, crabs, shrimp, oysters and flounder may be unable to survive past this century due to rising temperatures making the area unsuitable for them.
- Invasive species problems will be exacerbated as habitat disturbance from climate change enhances invasive species' ability to 'out-compete' native populations. As the freeze zone moves northward with climate change, invasive species such as fire ants are also expected to move northward.

Climate change will also affect humans in a multitude of ways because of the many services from our natural resources that we are dependent upon. These include water, wood, food and much more. Unless climate change is addressed, we can expect major disruptions to the supply of these essential natural resources.

Conclusion

The U.S. Fish and Wildlife Service is obligated by the Endangered Species Act to quickly move forward to list the polar bear as a threatened species. With this action they can then develop a recovery plan and thereby improve the prospects of the polar bear. It would be a shame if the only polar bears our grandchildren will ever see are behind bars or merely pictures in a book, rather than roaming free on the Arctic ice pack that is essential to their survival.

Looking more broadly at the plight of the polar bear and all wildlife, National Wildlife Federation believes that Congress must act swiftly to pass comprehensive global warming legislation that tackles global warming at the root cause: emissions of greenhouse gases. Last month nearly 700 hunting and fishing organizations across the nation joined with National Wildlife Federation to urge Congress to pass legislation that reduces greenhouse gas emissions by 2% annually and provides dedicated funding to fish and wildlife impacted by climate change (Attachment A). In January more than 600 biological scientists made a similar request to Congress (Attachment B).

National Wildlife Federation applauds the leadership of many members of the Senate Environment and Public Works Committee for reporting a comprehensive climate bill out of committee for the first time ever. The Climate Security Act (S. 2191) is a good starting point for action by the full Senate to pass legislation that reduces emissions by two percent annually, provides dedicated funding to protect fish, wildlife and ecosystems impacted by climate change, and ensures fair treatment of consumers, particularly low-income families. The National Wildlife Federation urges Congress to debate, strengthen and pass this measure.

Thank you, again, for this opportunity to testify and for your attention to climate change. There is no more important conservation issue for our children's future than global warming.

Attachment A (separate document) Hunter/Angler's Letter to Congress 2/12/2008
Attachment B (separate document) Scientists' Letter to Congress 1/29/2008

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[xvii] 50 C.F.R. § 424.11(b).

[xviii] See previous endnote

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RESPONSES BY DOUGLAS B. INKLEY TO ADDITIONAL QUESTIONS FROM SENATOR BOXER

Question 1. As a scientist who has studied polar bears in the wild and is familiar with the latest peer reviewed scientific research, do you agree with Mr. Horn's assertions that polar bear populations are healthy and sustainable?" and "What evidence is there that polar bears are already seeing the results of climate change?"

Response. The total polar bear population is estimated at about 20,000 or so animals across their entire range, with recent increases in some areas due to improved management restricting excessive take. Canadian researchers Ian Stirling and Andrew Derocher reported that of the 13 polar bear populations in Canada/Greenland, five were declining and two others were severely depleted due to over-harvest but are being managed for recovery. Five populations were stable and one which was increasing.[1]

While the current population level gives the illusion of general stability, a closer examination reveals that in fact some polar bear populations are not healthy. In the Western Hudson Bay the annual average ice cover period has decreased nearly 3 weeks injust.20 years, providing less time for polar bears to hunt and gain weight, and longer summer fasting periods. The resulting decline in average bear weight has reduced cub survival and the overall population.[2] As a result of loss of sea ice from climate change,[3] USGS scientists have projected that 2/3 of the world polar bear population, including all U.S. polar bears, are likely to be gone by 2050.[4] It is impossible to avoid the conclusion that notwithstanding the number of polar bears today, signs of decline are already evident and the population is not sustainable.

Question 2. Do you agree with Mr. Horn's assertion that 50 years is "genuinely unforeseeable future" and too long a period to be considered when listing species?"

Response. The determination of "foreseeable future" should be based on the reality of how long a particular action will affect a species, not an arbitrary and unscientifically based number. The emission of carbon dioxide clearly will have significant and measurable effects on our environment for at least 50 years and beyond because of its longevity in the atmosphere and its warming of the atmosphere. Ignoring this long-term but very real impact would circumvent requirements of the Endangered Species Act (ESA) to use the best available science in determining the status sofa species. Furthermore, the ESA has no provisions allowing scientific assessments to categorically exclude or ignore particular types of impacts.

Another factor in determining "foreseeable future" is the life history of the particular species under consideration. Some species live for many decades (whales) or even centuries (trees), and others require specific habitats that may take centuries to develop. Successful conservation of these types of species must take into account any and all factors that are likely to affect the species. In the case of the polar bear, ignoring the foreseeable consequences of climate change would be nothing less than willful neglect, and a prescription for extinction.

Senator BOXER. Thank you, Doctor, very much.

Mr. Horn.

STATEMENT OF WILLIAM P. HORN, BIRCH, HORTON, BITTNER AND CHEROT

Mr. HORN. Good morning, Madam Chair. Thank you.

My name is William Horn. I appreciate the opportunity to appear today. My testimony reflects my prior tenure as Assistant Secretary of Fish, Wildlife and Parks at Interior under President

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[1]Stirling, I. and A.E. Derocher. 2007. Melting Under Pressure -The real scoop on climate wanning andpolar bears. The Wildlife Professional. Fall, 2007. The Wildlife Society.

[2]Regehr, E. V., N. J. Lunn, I. Stirling, and S. C. Amstrup. 2007b in press. Effects of earlier sea ice breakup on survival and population size of polar bears in Western Hudson Bay. Journal of Wildlife Management. 71(8).

[3]The University Corporation for Atmospheric Research, Abrupt Ice Retreat Could Produce Ice-Free Arctic Summers by 2040 http://www.ucar.edu/news/releases/2006/arctic. shtml (Dec. 11, 2006). Sea ice may be gone by 2012, scientist says. Dramatic rise in Arctic melting prompts worry Associated Press. Wednesday, December 12, 2007 http://www.nasa.gov/topics/earth/features/seaice conditions feature.html.

[4]USGS Science Strategy to Support U.S. Fish and Wildlife Service Polar Bear Listing Decision Forecasting the Range-wide Status of Polar Bears at Selected Times in the 2151 Century Steven C. Amstrup, Bruce G. Marcot, and David C. Douglas. 2007.

Reagan, and is also on behalf of the United States Sportsmen's Alliance.

Our position is that it would be a mistake to list as threatened the presently healthy and sustainable polar bear populations. This action will produce a variety of adverse consequences including a precedent that opens Pandora's box in the form of a cascade of other unwarranted listings that will diminish resources available for bona fide wildlife conservation and recovery, prompting new rounds of litigation and judicial activism that will enormously expand ESA's reach, and harming existing successful polar bear conservation programs in Canada where 13 of 19 sustainable polar bear populations are presently found.

The listing of presently healthy species exhibiting no present trajectory toward endangerment based on hemispheric models, forecasting problems 50 years in the future is a radical new approach for implementation under the ESA. It pushes the legal term "foreseeability" well over the horizon. It is predicated on highly uncertain intervening events where it is difficult, if not impossible, to tie those events directly to specific on-the-ground circumstances or specific projects in the lower 48 States.

The listing of many otherwise healthy species will be one of the outcomes of going down this track. By stretching the ESA and listing such species, finite monetary and staff resources will be diverted from conservation of species facing bona fide imminent threats and where the professional wildlife managers at the Fish and Wildlife Service are actually capable of taking conservation actions vis-a-vis those species. That, in my opinion, is bad conservation strategy and bad policy.

ESA defines a threatened species as one likely to become endangered within the foreseeable future. For 35 years, foreseeability has meant imminent adverse effects expected or predicted to occur within a few years, or adverse population trajectories expected to continue or worsen absent major changes. In addition, the concept of foreseeability in our legal system has always included notions of proximity and imminence. The polar bear listing would obliterate these concepts and fundamentally recast ESA.

For example, if climate change occurs and has some of the predicted impacts in other areas of North America, it follow then that presently healthy species that may be adversely impacted by such changes 50 years or more from now must be listed today under the ESA. That is Pandora's box in the form of a cascade of listings that will have enormous consequences.

Polar bear listing will also expand ESA's regulatory scope. The predicate of listing is that the greenhouse gas emissions are triggering melting of Arctic Sea ice upon which the bears depend. Yet, ESA provides, and the Fish and Wildlife Service certainly does not possess, any authority or expertise to regulate such emissions on a national, hemispheric or global basis. Nonetheless, the agency will be pressed via its Section 7 consultation requirements well beyond its expertise and capabilities to become the uber-regulator, if you will, of our Nation's greenhouse gas-emitting electrical and transportation systems. I don't think Congress ever intended that when it enacted the statute in 1973.

Any activity or set of activities that individually or cumulatively results in greenhouse gas emissions will likely be subject to Section 7 consultation. This will cause Fish and Wildlife to wrestle with extremely difficult causation or linkage issues between specific actions and forecast Arctic climate change. When a new or expanded highway is to be built, what contribution, if any, to Arctic ice melting will be made by greenhouse gas emissions attributable to that project? What kind of evaluation must Fish and Wildlife be able to conduct for a new power plant for it to fulfill its consultation obligations regarding that power plant's prospective effects on Arctic Sea ice melting and polar bears?

Any such connections would be highly attenuated at best, and Fish and Wildlife Service's wildlife professionals, no matter how intelligent or well trained, are not in a position to make empirically sustainable connections between specific projects, hemispheric warming, and harm to the polar bears.

That yields two alternatives. Fish and Wildlife can make no connections or linkages so that the listing of the polar bear will not, in turn, trigger any mandated reductions in domestic gas emissions, or all such emissions, especially cumulatively, are connected to Arctic ice melting so all emission-causing activities become subject to Fish and Wildlife review under Section 7.

In the first case, polar bear listing is a mere gesture. It does nothing to address the root issue that is being discussed by some of the other witnesses. In the second case, Fish and Wildlife Service is forced to be the new regulator of domestic greenhouse gas emissions, a task which it is ill-suited and frankly cannot perform.

Let me just conclude with a comment on listing delays. Delays have been endemic in the listing process for at least the last 15 to 20 years. That has been especially the case since the listing process is increasingly driven by third-party petitions and repeated court litigation. I think it is safe to say that during the Clinton administration, Secretary Babbitt wrestled with an absolute avalanche of lawsuits that put the Service well behind the eight-ball in cases such as the lynx, which were 250 days behind schedule. These types of delays, particularly the one we are seeing right now, are nothing new and they frankly are part and parcel of the litigation-driven listing process that presently afflicts the program.

Let me conclude by saying that we are convinced that pushing the Fish and Wildlife Service into this broad regulatory arena via listing of the polar bear does not serve tangible wildlife conservation. It is a role that FWS was never intended to fulfill. Practically, funds are barely available today to run the refuge system, the migratory bird program, the fisheries programs, places where the Service and its wildlife professionals are fully capable of doing an on-the-ground job providing tangible conservation benefits to an array of fish and wildlife species.

We fear that forcing FWS into this expanded air emissions regulator role will cost a ton of money, take a lot of staff, it has to come from somewhere, and our fear is that the agency's traditional and effective refuge, bird and fisheries programs are likely to be stripped and diminished and harmed, and that is not good public policy.

Thank you very much.

[The prepared statement of Mr. Horn follows:]

STATEMENT
OF
WILLIAM P HORN
BEFORE THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
REGARDING THE
ENDANGERED SPECIES ACT AND PROPOSED LISTING OF THE POLAR BEAR
AS A THREATENED SPECIES

April 2, 2008

Madam Chairman: My name is William P Horn and I appreciate the opportunity to appear before the Committee to discuss the Endangered Species Act (ESA), polar bears, and the adverse wildlife conservation consequences that will arise if the healthy polar bear populations are listed as a threatened species. This testimony reflects my prior tenure as Assistant Secretary of the Interior for Fish, Wildlife and Parks in 1985-1988 (responsible for the ESA program) and experience serving on the Board of Environmental Sciences and Toxicology of the National Academy of Sciences. It is also on behalf of the United States Sportsmen's Alliance (USSA).

It would be a mistake to list the presently healthy and sustainable polar bear populations as a threatened species under the ESA. Such action will produce a variety of adverse consequences including (1) creating an ESA listing precedent that opens Pandora's Box in the form of other unwarranted listings that will diminish resources available for bona fide wildlife conservation and recovery efforts, (2) setting the stage for new rounds of litigation and judicial activism to turn the ESA into a regulatory monster of unprecedented proportions, and (3) harming existing successful polar bear conservation and management programs. Each of these specific topics will be discussed in turn below.

USSA is committed to effective scientific based wildlife management. Since the days of Teddy Roosevelt, the sporting community has worked with its federal and state partners to develop the successful North American Wildlife Conservation Model. It is similarly committed to conserving the polar bear, as well as other species, through the continuation of presently successful and effective conservation programs and ensuring that the ESA remains focused on offsetting the present and imminent impacts of discrete human activities that adversely threaten our fish and wildlife resources.

Adverse Listing Precedent – A decision to list a presently healthy species – exhibiting no present trajectory toward endangerment – based on large scale hemispheric models forecasting problems 50 years in the future is a radical departure from the language of the ESA. It pushes the decision horizon far into the genuinely unseeable future, is predicated on uncertain intervening events where it is difficult if not impossible to tie those events directly to specific on-the-ground situations, and will likely precipitate the subsequent listing of an array of otherwise healthy species which might also be forecast to face problems a half century or more from now. By stretching the ESA and encompassing under its umbrella an unknown number of such species, finite monetary and staff resources will be further divided and resources diminished and diverted from conservation and recovery of species facing bona fide imminent threats and where

FWS is actually capable of conserving such species. That is bad conservation strategy and bad policy.

The ESA specifies that an "endangered species" is one is "in danger of extinction" and a "threatened species" is one "likely to become endangered within the foreseeable future." 16. U.S.C. § 1532(20). For the past 35 years, in the ESA context, foreseeability has meant imminent adverse effects expected or predicted to occur within a few years. Foreseeability has also incorporated a present adverse population trajectory that is expected to continue or worsen absent some changes in conservation practices. In addition, the concept of "foreseeability" in our legal system has almost always included notions of proximity or imminence. The lawyers, including Members of Congress, who drafted and enacted the ESA in 1973, would have been fully cognizant of those established principles regarding "foreseeability" when that term was incorporated into the statute.

The proposed polar bear listing would obliterate these concepts of imminence and proximity. Indeed, FWS has acknowledged that the forecast problems for the polar bear are unlikely to arise until 45 to 50 years from now. In the meantime, and especially in the imminent, proximate and genuinely foreseeable future, polar bear populations are expected to remain healthy and sustainable. No present adverse population trajectory now exists. Rather, an uncertain forecast large scale intervening event (i.e., climate change) is predicted by some models to manifest itself in shrinking Arctic Sea ice and at some point in the future change the trajectory of polar bear populations. So the bears present a unique new policy and legal question: is "foreseeable" now extended to mean model forecasts 50 years hence which represent a fundamental change in a species present healthy population trajectory?

Obviously proponents of listing want to push "foreseeability" out an unprecedented degree with substantial consequences for other species. There is no doubt that listing the polar bear on the basis of forecast Arctic sea ice shrinkage a half century from now will necessitate the listing of other Arctic species similarly dependent on the present state of the Arctic ecology. Interest groups have already "connected the dots" and have filed listing petitions for other Arctic species such as walrus and ribbon seals. Last Thursday NOAA announced that it will consider listing four Bering Sea seal species as endangered or threatened based on forecast sea ice shrinkage. On a broader scale, climate change is predicted to usher in significant ecological changes in other areas of North America. Is each presently healthy species that may be adversely impacted by such ecological changes – 50 years or more from now – to be listed today under the ESA?

It was only 30 years ago that the dominant climate concern was the advent of another ice age. Action in the mid-1970's based on the accepted model predictions of that era would have had FWS listing temperate species which would be impacted by cooling temperatures, advancing glaciers, and attendant ecological changes. Even today it is recognized that "the envelope of uncertainty in climate projections has not narrowed appreciably over the last 30 years."[1] FWS acknowledges that the Arctic climate models are uncertain, natural variability causes uncertainties, and the resultant model forecasts are uncertain. These limitations prevent detailed

[1] Why is Climate Sensitivity So Unpredictable" 318 Science 629 (2007).

forecasts of climate models beyond about a decade. Furthermore, it is very difficult to extrapolate and accurately predict specific on-the-ground ecological and species impacts from broad scale climate models with a global or hemispheric focus. These factors persuade me that attempts to make species specific forecasts 50 years hence, especially when that represents a reversal of present species health or population growth, are not "foreseeable" as a matter of law or policy.

Once these established "foreseeability" sideboards are blown away by a polar bear listing, I anticipate a cascade of petitions to list a wide variety of species that could be impacted by climate change. Obviously, Arctic species might likely be at the top of this list but Antarctic species (e.g., penguins) probably qualify for listing under the looming polar bear precedent. These prospective listings will be based on predicted global or hemispheric changes in climate arising from increases in greenhouse gas emissions.

A New Regulatory Monster – Listing today's healthy polar bear populations as threatened will open the gate to new rounds of litigation and judicial activism that will likely turn the ESA into a regulatory monster of unprecedented proportions. The predicate of the listing is that greenhouse gas emissions are triggering melting of the Arctic Sea ice habitat upon which the polar bears depend. Yet ESA provides – and FWS possesses – no authority or expertise to regulate such emissions on a national, hemispheric, or global basis. Clearly, FWS cannot tell the governments of China or India to stop building new coal fired power plants. A polar bear listing will also trigger a sequence of events in which FWS is compelled to expand the scope of its regulatory activities into realms (e.g., air emissions) where it cannot be effective as a matter of fact or law. The agency will be pressed well beyond its expertise and resources to become the uberregulator of our nation's greenhouse gas emitting electrical and transportation systems. That will detract from focus on areas and species where FWS can be effective and conserve genuinely at-risk species.

It is a given that some interest group will advance the argument that actions which emit greenhouse gas emissions constitute a prohibited "taking" of the listed polar bear under section 9 of the ESA (16 U.S.C. § 1538). The same interests will insist that FWS be "consulted" under section 7 of the ESA (16 U.S.C. § 1536) regarding any federal agency action that will result in any increase of greenhouse gas emissions. If the historic trajectory of ESA and the courts continues, a variety of private citizen or state actions will likely be found to be illegal takings of listed polar bears.

These conclusions re "takings" are based on a series of ESA federal court cases in which federal courts have held states and local governments liable merely for allowing private parties to engage in activities which occasionally result in inadvertent unintentional taking of endangered or threatened species. To give just three examples, the federal courts have held a state fishing regulator liable for the acts of fishermen whose nets occasionally entangle protected whales.[2] They have held counties liable for not prohibiting driving on beaches, where private drivers

[2] Strahan v. Coxe, 127 F.3d 155 (1st Cir. 1998).

occasionally disturb the nests of protected turtles.[3] And a State has been found culpable of "taking" when it allowed trapping and some trappers accidentally caught a few listed (i.e., protected) lynx.[4] Under these precedents, activists will have the upper hand in getting federal courts to hold state pollution control agencies, transportation officials and others liable for allowing the emission of gasses in their areas and liable for harming polar bears.

USSA is a party defendant in two cases in federal district court in which animal rights activists mounted this same theory to try to hold state wildlife regulators liable for not banning trapping. The theory of these cases is that, without a State trapping license, private trappers would not be trapping any animals and so would not occasionally accidentally catch a protected Canada lynx. The States of Maine and Minnesota are the primary defendants in those cases even though they don't engage in trapping and do engage in extensive voluntary efforts to help trappers avoid lynx and work closely with the FWS to conserve the lynx population.

Some no doubt will argue that the Supreme Court in the Sweet Home case decided that an entity (a person or a state) is guilty of a "take" only when its action is the "proximate cause" of harm or damage to the listed species. The whale, beach driving, and Minnesota lynx cases have all held that not prohibiting an activity at least in some circumstances amounts to proximately causing take by private parties engaged in the activity. Indeed, on Monday (March 30) the Minnesota court opined that the "proximate cause" aspect of Sweet Home is merely non-binding dicta. Under this line of reasoning, state environmental agencies and local building inspectors who do not prohibit greenhouse gas emissions may well found to be a similar proximate cause. Furthermore, since the polar bear listing blows apart traditional notions of foreseeability, I certainly would not advise any client to expect to be protected from citizens' suits on polar bear takings by traditional notions of proximate cause.

A polar bear listing based on the greenhouse gas predicate will also expand enormously the scope of FWS consultations. Any activity, or set of activities, that individually or cumulatively result in greenhouse gas emissions will likely be subject to section 7 consultation. Indeed, a California U.S. District Court has already directed FWS to incorporate climate change issues into its ESA consultations.[5] In dealing with either takings allegations or consultations for listed polar bears, FWS will also wrestle with extremely difficult causation issues or linkages between specific actions and Arctic climate change. When a new or expanded highway is to be built, what contribution, if any, to Arctic ice melting will be made by attendant increases in greenhouse gas emissions specifically attributable to the project? What kind of evaluation must FWS be able to conduct for a new domestic greenhouse gas emitting coal or gas electric power plant to be able to "consult" regarding its effects on the polar bear? Heretofore, the ESA has been focused on largely discrete activities that impact directly species habitats (e.g., water diversions, housing construction, logging). Those connections are direct and capable of being evaluated by fish and wildlife professionals. In contrast, for listed polar bears the connections will be highly attenuated between specific actions within the U.S. and Arctic climate leading to

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[3] Loggerhead Turtle v. Volusia County, 896 F.Supp. 1170 (M.D. Fla. 1995), other aspects of case reviewed, 148 F.3d 1231 (11th Cir. 1998).

[4] Animal Protection Institute v. Holsten, 0:06-cv-3776, Order March 30, 2008.

[5] 506 F. Supp. 2d 322 (E.D. Cal. 2007).

sea ice shrinkage leading to impacts on polar bears. Wildlife professionals, no matter how intelligent or well trained, cannot make empirically sustainable connections for specific projects or activities.

For the ESA, that yields two alternative outcomes: (1) FWS can make no connections/linkages so that listing the polar bear will have no effects on domestic greenhouse emissions or (2) all such emissions, especially cumulatively, are connected to climate change so all emission-causing activities are subject to FWS review. In the first case, polar bear listing is a mere gesture with no real regulatory benefits contributing to conservation. In the second, FWS is forced to be the new uberregulator of domestic greenhouse gas emissions.

Of course, as previously noted, FWS has no expertise in the air emissions realm and it would require huge infusions of money and staff for it to acquire such expertise. That also begs the fundamental question: did Congress intend FWS to become THE greenhouse gas emission regulator via the ESA? Once the polar bear is listed, activists will no doubt pursue litigation to make this happen regardless of what Congress intended in 1973. We are convinced that pushing FWS into this regulatory realm, via listing the polar bear, does not serve wildlife conservation. Funds are barely available today to administer the National Wildlife Refuge system or run the migratory bird program. Forcing FWS into this expanded role will require the money to come from somewhere and we fear that the agency's traditional refuge, migratory bird and fisheries programs will be the first to suffer.

Listing Will Harm Existing Polar Bear Conservation – It is well established that polar bear populations are at or near record highs, have increased substantially since the 1960s, and sustain carefully managed subsistence and sport hunting programs. The latter programs, conducted primarily in Canada, generate important local income and ensure that Native communities are vested in polar bear conservation. The resultant partnership between these communities and Canadian wildlife officials has yielded effective scientific bear conservation and management resulting in improved sustainability of 11 of 12 polar bear populations in Canada.

Most the participants in these hunting programs are U.S. citizens who are now allowed to hunt in Canada and bring back the bear trophies pursuant to a special provision of the Marine Mammal Protection Act (MMPA). When enacted in 1972, the MMPA barred sport hunting of polar bears in the United States (i.e., Alaska) and also barred the import of trophies from Canada and elsewhere. It became evident in the 1980's that this ban on imports was hurting Canada's bear conservation and management. So Congress amended the MMPA in 1994 allowing trophy imports from Canada if the U.S. Fish and Wildlife Service (FWS) determined that "Canada has a sport hunting program based on scientifically sound quotas ensuring the maintenance of the affected population stock at a sustainable level." 16 U.S.C. § 1374(c)(5)(A). The hunting program is an integral element of bear conservation and management.

Listing all polar bears as threatened, as presently proposed, will terminate this effective program. The MMPA defines as "depleted" any species which is listed under the ESA. 16 U.S.C. § 1362(1)(C). It will therefore be illegal for FWS to make the "sustainable" finding for the polar bear if ,as a matter of law, ESA listing renders it a "depleted" species. Even if FWS

made such an effort, I am absolutely sure one of the radical animal rights groups will jump immediately into court to challenge that finding and succeed.

Crippling the most tangible polar bear conservation program will be the immediate consequence of an ESA listing. For this reason, Canadian and indigenous government wildlife officials strongly oppose the proposed listing. We note too that the Alaska Department of Fish and Game, which has its own polar bear programs and cooperates with Canada, similarly opposes the listing. Policy makers ought to listen to the recommendations of those on-the-ground wildlife professionals who deal with polar bear conservation on a daily basis.

Senator BOXER. Thank you, sir, very much.
Ms. Siegel.

STATEMENT OF KASSIE R. SIEGEL, DIRECTOR OF THE CLIMATE, AIR AND ENERGY PROGRAM, CENTER FOR BIOLOGICAL DIVERSITY

Ms. SIEGEL. Thank you so much, Madam Chairman and members of the Committee, for the opportunity to be here today, and thank you so much for your leadership on global warming and polar bear conservation.

Polar bears are poised to become one of global warming's first victims, and polar bears need our help. Because the Endangered Species Act is our strongest and most successful law for the protection of plants and animals on the brink of extinction, the Center for Biological Diversity filed a petition to list the polar bear under the Act because of global warming back in February, 2005.

Congress has added the strict deadlines to the listing process to ensure that it is completed in no more than 2 years. The Bush administration has missed every single deadline in the listing process. The Administration's failure to make the first two required findings on the petition was resolved by a lawsuit brought by the Center for Biological Diversity, NRDC and Greenpeace in 2005. As a result of a consent decree a court order—in that case, the Administration proposed to list the polar bear as a threatened species on January 9th, 2007. That proposal triggered a mandatory deadline to publish a final listing determination for the polar bear in the Federal Register no later than January 9th of this year.

On January 7th, the Fish and Wildlife Service Director announced they would not meet the deadline, but intended to issue a decision within 30 days. After an additional 60 days went by without action, our groups again went back to court to enforce the deadline. Just this morning, we have filed our court motion in that case asking the judge to set a hearing for May 8th and to order Secretary Kempthorne to issue the final listing decision within 1 week of that date. Had the Administration followed the law in the first place, the polar bear would have been listed in February 2007. Instead, we have had to obtain court orders for every step of the process. There is still time to save the polar bear if we act quickly, but the window of opportunity to act is closing while the Administration continues to block progress.

We need three essential steps. First, we need to list the polar bear under the Endangered Species Act. Second, we need to protect the Arctic and the species most at risk there from further direct impacts like oil and gas development and like oil spills. And third, we need new Federal legislation that caps and rapidly reduces greenhouse gas emissions in this Country overall, like carbon dioxide of course, but also including a full-court press on other pollutants like methane and black carbon that have shorter atmospheric lifetimes and a huge warming impact in the Arctic.

The Secretary of Interior with direct influence over the first of these two steps is doing the exact opposite. On February 6, the Minerals Management Service sold off millions of acres of polar bear habitat in the Chukchi Sea to the highest oil company bidder in Chukchi lease sale 193. Had the polar bear been listed prior to

February 6th as the law required, that sale could not have gone forward absent substantial additional review on the impacts to polar bears under the Endangered Species Act. By illegally delaying the polar bear decision, the Interior Department avoided its duty to analyze the impacts to polar bears prior to handing out entitlements to oil companies, and these impacts are devastating for polar bears.

There is a 40 percent chance of a major oil spill over the life of this project. Polar bears that come into contact with oil will attempt to groom themselves to remove the oil. They will ingest it and they will die. There is no way to effectively cleanup spilled oil and broken ice conditions, and the Chukchi Sea is one of the most remote, extreme and inaccessible environments on the planet. We have no way to deal with a major oil spill in this area.

By holding the sale prior to listing the polar bear, the Interior Department lost one of its most important management tools, to affirmatively protect and recover wildlife, the Section 7 consultation, in which the agencies must ensure that their actions do not jeopardize a listed species or adversely modify its critical habitat. It is not for a political appointee to predetermine the outcome of this process, but rather to let the scientists do their job and do the analysis. It wasn't done.

We don't believe that the required findings under the Endangered Species Act for Chukchi sale 193 to go forward could have been lawfully made had the polar bear been listed. But had the Fish and Wildlife Service done so, that decision would have been subject to judicial review ensuring accountability. Instead, the Interior Department held up the listing and rammed through the lease sale, setting up the potential for an expensive taxpayer buy-out of these leases. We are also in court challenging Chukchi sale 193 and we certainly hope to have it overturned. But the fact remains that these leases should never have been listed in the first place.

The more rapid than expected melting of the Arctic demands an accelerated response. There was less ice in the Arctic in September, 2007 than more than half the world's leading climate models project would be there in 2050. This requires a precautionary approach. We support a moratorium on oil development throughout the Arctic. While there are many reasons that the Chukchi sale 193 should not go forward, at a minimum this and other oil development in polar bear habitat should not proceed until the polar bear is listed, its critical habitat is designated, a recovery plan is in place, and then only if the agencies can affirmatively demonstrate that these activities are truly compatible with polar bear conservation.

Thank you so much.

[The prepared statement of Ms. Siegel follows:]

Testimony of Kassie Siegel
Climate, Air, and Energy Program Director
Center for Biological Diversity

To the U.S. Senate Committee on Environment and Public Works

April 2, 2008 Hearing:
Oversight on the Listing Decision for the Polar Bear under the Endangered Species Act

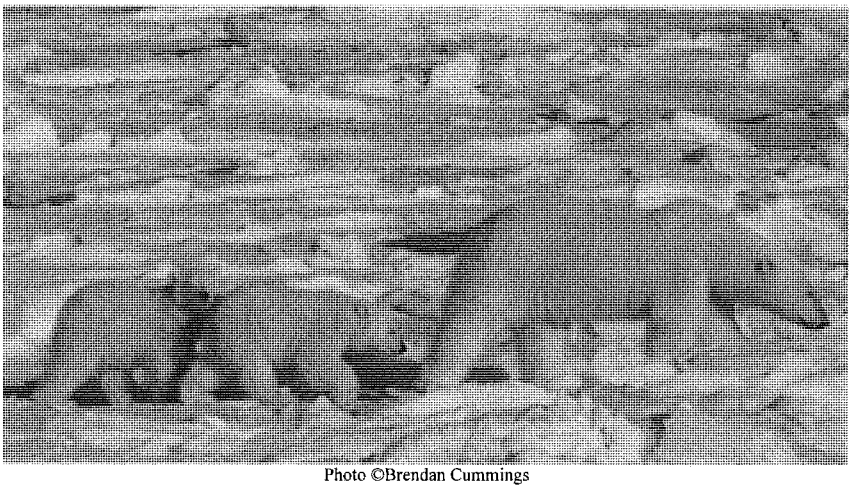

Photo ©Brendan Cummings

September 21, 1979 **September 14, 2007**

Courtesy NASA/Goddard Space Flight Center Scientific Visualization Studio

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EXECUTIVE SUMMARY

On February 16, 2005, the same day that the Kyoto Protocol entered into force without the participation of the United States, the Center for Biological Diversity petitioned the Secretary of the Interior and U.S. Fish and Wildlife Service to list the polar bear as a threatened or endangered species under the Endangered Species Act due to global warming.

The Endangered Species Act requires all listing decisions to be made solely on the basis of the "best available science." Unfortunately for the polar bear, the "best available science," and in fact *all* available science relating to global warming, sea ice, and polar bears, indicates the species faces global extinction in the wild by century's end and complete extirpation from the United States by mid-century. The polar bear unequivocally meets the criteria for listing as endangered under the Endangered Species Act. Nevertheless, the Department of Interior has illegally delayed protection of the polar bear at every turn and has recently auctioned off some of the species' most important habitat in the United States to the highest oil company bidder. This is simply unacceptable.

Since the petition was filed to list the species under the Endangered Species Act more than three years ago, new reports detailing polar bear drownings, cannibalism, starvation, and population declines have been published. Impacts predicted for the coming decades have already occurred, with 5 of the 19 populations now considered to be declining. In September 2007, sea ice extent shrank to a record one million square miles below the average summer sea ice extent of the past several decades, reaching levels not predicted to occur until mid-century. Some scientists have recently stated that if the rate of melting observed in 2007 continues, Arctic summer sea ice could be lost in as little as five years. The status of the polar bear has grown more dire, and, with it, the need for protection all the more compelling.

The accelerated melting of the Arctic requires an accelerated response from the federal government. Instead, the Department of Interior has continued business-as-usual policies of foot-dragging, political interference, and illegal delay in Endangered Species Act decision-making. The Bush administration has missed every statutory deadline in the Endangered Species Act listing process for the polar bear. Had the administration complied with the law, the species would have been afforded the full protections of the Endangered Species Act in February 2007. The proposed listing rule was almost eleven months overdue, and a final rule is now nearly three months late. The Center for Biological Diversity, Greenpeace, and NRDC ended the first round of delays with a lawsuit in 2005, and on March 10, 2008, filed a second lawsuit to compel a final listing decision for the polar bear.

Moreover, it has been almost two years since the Department of Interior has protected *any* domestic species under the statute, and Secretary Kempthorne has failed to protect a *single* domestic species in his entire tenure as Secretary. Secretary Kempthorne has, in effect, instituted a policy of non-implementation of this most important of wildlife laws.

In contrast to the Department of Interior's wholesale practice of delaying protection for species under the Endangered Species Act, the Department has shown no such hesitation in authorizing oil and gas development in endangered species habitat. Nowhere is this contrast more apparent than in the conflicting positions of the Department with regard to polar bear critical habitat

designation and oil leasing in the Beaufort and Chukchi seas. Under the Endangered Species Act, absent rare circumstances where sufficient information is lacking, critical habitat is required to be designated concurrently with listing. In the proposed listing rule for the polar bear, the Department invoked this exception, stating that a "careful assessment of the designation of critical marine areas will require additional time and evaluation" and "there is a degree of uncertainty at this time as to which specific areas in Alaska might be essential to the conservation of the species and thus meet a key aspect of the definition of critical habitat." In other words, the Department will delay critical habitat designation because not enough is known about what areas are essential for the species.

Notwithstanding the fact that the Department purportedly lacks information on what areas in the Chukchi and Beaufort Sea are essential to the polar bear, on June 29, 2007, Secretary Kempthorne approved a five-year oil and gas leasing program that would authorize five separate lease sales in polar bear habitat in the Chukchi and Beaufort seas. Under this program, virtually all offshore habitat for the polar bear in the United States is subject to leasing and development. Lease sale 193 in the Chukchi Sea is the first such sale under this program. It defies logic that the Department could lack sufficient information on the polar bear to protect its critical habitat, yet could simultaneously claim to have sufficient information to authorize the wholesale leasing away of this habitat to the oil industry. While there are many sound reasons the lease sales in the Chukchi Sea must be rescinded, the failure to identify and protect polar bear critical habitat in and of itself provides more than sufficient grounds to do so.

The situation in the Arctic has reached a critical threshold. The scientific evidence supports a broad moratorium on all fossil fuel extraction activities in the Arctic. Yet the only thing keeping pace with the rapid melting of the sea ice is the breakneck speed with which the Department of Interior, both on land and at sea, is authorizing oil and gas development in the region. The brakes must be put on such activity, while greenhouse gas reduction efforts must be accelerated. By delaying Endangered Species Act listing and offering oil leases in the Chukchi Sea, the Department is doing the very opposite.

The Department of Interior must immediately finalize the listing proposal for the polar bear, promptly initiate and complete the process of designating critical habitat, and convene a recovery team to develop a comprehensive recovery plan for the species. Moreover, the Department must refrain from any further oil and gas leasing, exploration and development in polar bear habitat until the designation of critical habitat and the completion of a recovery plan, and it should only resume such activities if it can affirmatively demonstrate these activities would be compatible with the survival and recovery of the species. The Chukchi Sea lease sale meets none of these criteria and should not have been allowed to proceed.

While the situation facing the polar bear is grim, it is not yet hopeless. The good news is that the things we have to do to reduce greenhouse gas emissions and protect the polar bear – things like increasing energy efficiency and fuel economy, switching from fossil fuels to renewables and changing our land use and transportation patterns – can all improve our quality of life, benefit our economy, and improve our national security. The barriers to saving the polar bear and solving the climate crisis are political, not technological, and the time for Congressional action is now.

I. Unlawful Delay and Political Interference in the Endangered Species Act Listing Process for the Polar Bear

The Endangered Species Act is our nation's strongest and most successful law for the protection of plants and animals on the brink of extinction. The Endangered Species Act is administered by the Secretary of the Interior, who has delegated responsibility to the U.S. Fish and Wildlife Service (FWS), and the Secretary of Commerce, who has delegated responsibility to the National Marine Fisheries Service/NOAA Fisheries (NMFS). The Fish and Wildlife Service generally has jurisdiction over terrestrial species, and also over the polar bear and walrus, while NMFS has jurisdiction over most marine species.

Because imperiled wildlife will not receive any regulatory protection until officially added to the lists of "threatened" or "endangered" species, Congress has added firm deadlines to the listing process to ensure that the entire process is completed in no more than two years. The Endangered Species Act listing process can be initiated by the agency itself, or by a petition from any person or organization to list a species.

For the past seven years, the Bush administration has implemented the Endangered Species Act in a manner that undermines, minimizes and eviscerates fundamental protections for the nation's most imperiled wildlife. Political appointees in the administration have consistently interfered in the scientific process with the express purpose of limiting protections for endangered species. They have delayed decisions, bullied government scientists, violated the law, and ignored public concern for the conservation of wildlife. As noted in the Part I of this testimony, all of these elements have been present in the effort to list the polar bear. Part II places the polar bear situation in a broader Endangered Species Act implementation context through a review of the administration's obstruction and interference in three critical aspects of implementation of the Endangered Species Act: protection of new species as threatened or endangered, designation of critical habitat, and development and implementation of recovery plans. The administration's malfeasance in these areas has already led to the extinction of species. Further interference in the listing process for the polar bear should not be tolerated.

A. The Endangered Species Act Listing Process for the Polar Bear

The listing process for the polar bear was initiated by a petition filed by the Center for Biological Diversity on February 16, 2005. If the administration had complied with the law, the species would have been listed and had critical habitat designated in February 2007. The listing process has already dragged out for over three years, due to repeated unlawful delays by the administration. A detailed timeline of the listing process is as follows:

Endangered Species Act Protection for the Polar Bear: A Timeline

February 16, 2005: The Center for Biological Diversity submits a scientific petition to the Secretary of Interior and U.S. Fish and Wildlife Service (collectively, "the Secretary") seeking listing of the polar bear as threatened or endangered under the Endangered Species Act due to global warming. The Secretary receives the petition on February 17, 2005.

May 18, 2005: The first finding on the petition, known as a "90-day" finding, is due on May 18, 2005, 90 days from receipt of the petition. Because the statute contains a qualifier that this deadline is to be met within 90 days "to the maximum extent practicable," courts have treated the 90-day deadline as somewhat flexible, but in no instance can the 90-day finding be delayed so long that compliance with the deadline for the second required, or "12-month," finding becomes impossible. The Secretary does not make a 90-day finding on the petition by May 18, 2005.

July 5, 2005: The Center for Biological Diversity, along with Greenpeace and the Natural Resource Defense Council (NRDC), send a letter to the Secretary adding the latter two groups to the petition.

October 11, 2005: The Center for Biological Diversity, Greenpeace, and NRDC ("petitioners") send a "60-day notice of intent to sue" to the Secretary for failing to make a "90-day" finding on the petition. This notice is required to be sent at least 60 days prior to filing suit to enforce a statutory deadline under the Endangered Species Act listing provisions.

December 15, 2005: Petitioners file suit against the Secretary for the continuing failure to make a "90-day" finding on the petition ("first lawsuit").

January 18, 2006: Petitioners file a court motion seeking a judicial order compelling the Secretary to issue the overdue 90-day finding. A court hearing is set for March 1, 2006.

February 9, 2006: The Secretary issues a positive "90-day" finding on the polar bear petition, and commences a full scientific review of the status of the species.

February 17, 2006: The second required finding on the petition, known as the "12-month finding" is due under the law by February 17, 2006. Given there is only a week between the issuance of the "90-day" finding and the deadline for the "12-month" finding, the petitioners and agency enter into settlement negotiations to agree on a timeline for making the "12-month" finding.

July 5, 2006: A consent decree is entered in the lawsuit which requires the Secretary to issue the "12-month" finding on the petition by December 27, 2006. This resolves the first lawsuit.

December 27, 2006: The Secretary announces a positive "12-month finding" on the petition, and indicates it will propose to list the polar bear as threatened under the Endangered Species Act.

January 9, 2007: The proposal to list the polar bear as threatened is published in the Federal Register, triggering a statutory deadline of January 9, 2008 to publish a final listing decision for the species. The Secretary opens a public comment period on the proposal that runs through April 9, 2007.

September 7, 2007: The U.S. Geological Survey (USGS) releases a series of nine reports conducted for the listing process at the request of the U.S. Fish and Wildlife Service. The USGS concludes that two-thirds of the world's polar bears, including all of the bears in Alaska, will be extinct by 2050 under "business as usual" greenhouse gas emissions.

September 20, 2007: The Secretary re-opens the comment period on the proposal through October 5, 2007 to receive comments on the USGS reports.

December 14, 2007: The Alaska regional office of the Fish and Wildlife Service transmits its recommended final listing decision to Washington, D.C. headquarters of the Service.

January 7, 2008: Fish and Wildlife Service Director Dale Hall announces that the agency will not meet the January 9, 2008 deadline for a final listing determination, but intends to issue the final listing determination within 30 days.

January 9, 2008: Petitioners file the required "60 day notice of intent to sue" against the Secretary for missing the deadline for a final listing determination.

March 10, 2008: Petitioners file suit against the Secretary for the continuing failure to issue a final listing determination for the polar bear ("second lawsuit").

April 2, 2008: Petitioners intend to file a legal motion on or around this date (the earliest allowed by the Federal Rules of Civil Procedure) seeking a court order compelling the Secretary to issue a final listing decision.

May 8, 2008: First available date for a court hearing on the illegal delay in issuing the polar bear decision.

B. The Delay in Issuing the Polar Bear Decision is Illegal

The listing process timeline above for the polar bear reveals the repeated foot-dragging and illegal delay by the Secretary. If the Secretary had complied with the law, the species would have been listed and had critical habitat designated in February 2007. The Secretary's current flouting of the legal deadline for a final listing decision is only the most recent example of illegal delay with regard to the polar bear. The publication of the proposed rule to list the polar bear under the ESA in the Federal Register on January 9, 2007 triggered the Secretary's mandatory duty to publish the final listing decision no later than January 9, 2008. 16 U.S.C. § 1533(b)(6). Given FWS scientists in Alaska sent a final rule package to headquarters in Washington, D.C. in mid-December, the final listing decision has now been held up in Washington, D.C. for over three and half months. There is absolutely no justification for the delay.

Courts have repeatedly held that the ESA's listing deadlines are mandatory and cannot be extended. For example: "the language of the ESA regarding the deadlines for action could hardly be more clear.... within the one-year period beginning on the date on which the proposed regulation is published, the Secretary must publish a final regulation, withdraw the proposed regulation, or give notice that the one-year period is being extended." *Oregon Natural Resources Council v. Kantor*, 99 F.3d 334, 338-39 (9th Cir. 1996) (Internal quotations omitted).

While the statute provides for a possible one-time extension of the deadline of no more than six months in cases where there is a "substantial disagreement regarding the sufficiency or accuracy of the available data" pertaining to the listing decision, 16 U.S.C. § 1533((b)(6)(B), Director Hall has explicitly stated that the agency is not invoking this exception. Indeed, the

agency could not lawfully do so, as there is no credible scientific disagreement relating to the data on which the polar bear listing decision is based.

As such, the delay in issuing a final listing decision for the polar bear is flatly illegal. It was precisely for the purpose of ending listing delays such as this one that Congress passed the 1982 ESA amendments which added the current deadlines.

> As the legislative history of the ESA and its subsequent amendments demonstrate, Congress from the outset recognized that timeliness in the listing process is essential. *See, e.g.*, S. Rep. No. 93-307 (1973), *reprinted in* 1973 U.S.C.C.A.N. 2989, 2991 (noting the inadequacies of earlier legislation). During subsequent revisions of the ESA, Congress expressed particular concern for species that had languished for years in "status reviews." H.R. Conf. Rep. No. 97-835, at 21 (1982), *reprinted in* 1982 U.S.C.C.A.N. 2860, 2862. In order to "force action on listing and delisting proposals," *id.*, Congress amended the ESA's petition process expressly to provide certain mandatory deadlines by which the Secretary must act on a petition. Pub. L. 97-304 § 2(a)(2), 96 Stat. 1411, 1412 (1992) (amending 16 U.S.C. § 1533(b)(3) to include the 90-day and 12-month finding requirements).

Center for Biological Diversity v. Norton, 254 F.3d 833, 839-840 (9th Cir. 2001).

This is why the Center for Biological Diversity, Greenpeace, and NRDC have asked the District Court in the current lawsuit to order the Secretary to issue the final listing determination in short order.

C. Political Interference in the Polar Bear Decision

The fact that the polar bear decision has been held up in Washington for over 3 ½ months in direct violation of the statutory deadline is the most recent and obvious example of political interference in the listing process for the polar bear. Political meddling is apparent, however, in ways that go beyond the delays themselves. The first evidence of interference was revealed following the announcement of the proposal to list the polar bear in December, 2006. The listing proposal was based on a scientific report prepared by FWS scientists entitled "Range-wide Status Review of the Polar Bear (*Ursus maritimus*)" (Schliebe et al. 2006, "Status Review"). The listing proposal and the Status Review are extremely similar, and in fact, large portions are identical or nearly identical, which makes sense since the Status Review is the basis for the proposed rule. However, nearly all of the many references to anthropogenic greenhouse gas emissions and global warming in the Status Review were deleted from the proposed rule. This appears to be a systematic attempt by the Bush administration to stifle discussion of these critically important topics. Incorrect and misleading statements from Secretary Kempthorne and Director Hall also reveal improprieties, as discussed below.

A listing proposal by law must examine the five Endangered Species Act listing factors:

1. The present or threatened destruction, modification, or curtailment of its habitat or range;
2. Overutilization for commercial, recreational, scientific, or educational purposes;

3. Disease or predation;
4. The inadequacy of existing regulatory mechanisms;
5. Other natural or manmade factors affecting its continued survival.

15 U.S.C. § 1533(a).

The first factor requires identification of the cause of endangerment; the fourth requires an examination of existing regulations related to that cause. The polar bear listing proposal, however, appears unique among the thousands of listing decisions issued over the last 33 years in completely failing to identify the cause of the polar bear's imperilment. It presents a comprehensive analysis of past and current sea ice melt, but conspicuously fails to identify what is causing the Arctic to warm so dramatically. There is no discussion of global warming or greenhouse gases.

Similarly, while the proposal discusses all relevant national and international regulations and efforts regarding hunting, oil and gas drilling, toxic contamination and disturbance, it does not discuss any national or international greenhouse gas regulations or initiatives. It correctly concludes that "...there are no known regulatory mechanisms currently in place at the national or international level effectively addressing threats to polar bear habitat," but does not elaborate.

In his opening statement at the December 27th press conference, Secretary Kempthorne stated that global warming and its causes are "beyond the scope" of the government's efforts to protect the polar bear via the Endangered Species Act:

> "While the proposal to list the species as threatened cites the threat of receding sea ice, it does not include a scientific analysis of the causes of climate change. That analysis is beyond the scope of the Endangered Species Act review process which focuses on information about the polar bear and its habitat conditions including reducing ice (FWS 2006:3)."

Secretary Kempthorne clearly told the media that FWS scientists *did not* analyze the causes of global warming or the adequacy of the administration's greenhouse gas emissions policy. Director Hall went so far as to thrice state that the scientists *could not* do so because they lacked the expertise:

> "Sir, to be honest with you, we don't have the expertise in the Fish & Wildlife Service to make those kinds analysis [sic]. We're biologists by trade and so, we deal with the fact they're out on the landscape. And in this case, we're dealing with the fact of reducing ice and that's what we're able to analyze (FWS 2006:16-17)."

The Status Review had of course been completed before the press conference, but was not released to the public or the media until several weeks afterward. The Status Review states:

> "The purpose of the status review/assessment is to obtain, synthesize, and evaluate the best available scientific and commercial data on the status of the polar bear and threats thereto. Information in the status assessment is to form the

> basis for the next finding the Act requires the Service to make, the 12-month finding [i.e. the proposal] that the petitioned action is either: (1) warranted; (2) not warranted; or (3) warranted but precluded."

Much of the listing proposal was cut and pasted out of the Status Review and the two documents are structured very similarly. They differ, however, in that the Status Review contains the exact analyses that Secretary Kempthorne and Director Hall claimed were not and could not be performed by the FWS. It appears that these officials may have systematically censored all references to global warming, greenhouse gases, and the administration's failed emission policies out of the listing proposal, and then told the media that the analyses had never been conducted. Table 1 displays the number of times that keywords relating to global warming were used in the Status Review, compared to the number of times they were used in the Proposed Rule. The Status Review includes four references to CO_2, nine to greenhouse gases, 20 to global warming, and 24 to emissions. All of these were excluded from the listing proposal. Seventy-four of the 83 references to climate change were also deleted.

Table 1: Number of Keyword References in the Status Review and Proposed Rule
Source: Center for Biological Diversity Analysis of the Status Review and Proposed Rule.

Keyword(s)	Status Review	Proposed Rule
Climate Change	83	9
Greenhouse or Green House	9	0
CO_2	4	0
Emissions (in relationship to greenhouse gases)	24	0
Global Warming	20	0
Kyoto	4	0
United Nations Framework Convention on Climate Change or UNFCCC	15	0
White House	1	0
IPCC	17	3
U.S. Climate Change Science Program	1	0

The proposed rule itself states: "Further, the analysis conducted for the polar bear status assessment and proposed rule has been a significant and jointly-coordinated effort of fiscal, intellectual, and other resources among the Service and the USGS, NASA, species experts, and experts in other fields such as contaminants." 72 Fed. Reg. 1096. FWS scientists clearly have the expertise to conduct inter-disciplinary analyses and to coordinate with their colleagues at NASA and other agencies who have additional expertise in climate science and other fields relevant to the polar bear status review. For the Director of the FWS to suggest that agency

scientists "[lack] the expertise" to conduct the high quality, thorough, and impressive analysis they had just completed is exceptionally strange behavior at best.

To fulfill the Endangered Species Act mandate to determine if existing regulatory mechanisms are adequate to protect the species, the Status Review has a section entitled "Mechanisms to Regulate Climate Change." It examines the 1992 United Nations Framework Convention on Climate Change, finding that "To date, the goals set by the Framework have not been met." It examined the 1997 Kyoto Protocol, finding that it would only "slightly reduce the rate of growth of emissions and would only make a small contribution to stabilizing the level of emissions in the atmosphere." It also concluded that "mechanisms for enforcement of emission reductions have not yet been tested and there are no financial penalties or automatic consequences for failing to meet Kyoto targets." Domestically, it concludes that the strategy developed by the White House Office of Science Technology and Policy will actually allow continued increases in greenhouse gas emissions because while "emissions intensity could decrease the total emissions would still increase."

The listing proposal changed the name of this section to "Mechanisms To Regulate Sea Ice Recession," shortened it to a single paragraph and deleted all references to greenhouse gas policies. The section now reads in total:

> "Regulatory mechanisms directed specifically at managing threats to polar bears exist in all of the range states where the species occurs, as well as between (bilateral and multilateral) range states. There are no known regulatory mechanisms effectively addressing reductions in sea ice habitat at this time."

Sea ice recession by definition can not be regulated. Its cause — greenhouse gases — can be regulated, but the Bush administration has steadfastly opposed all such efforts to do so, and apparently excised the scientists' analysis prior to publication of the proposed rule. Saying that polar bears are threatened by sea ice recession without discussing global warming is like saying a species that is threatened by hunting is threatened by "rapidly flying bits of lead" and that there are no known regulatory mechanisms regulating "flying bits of lead," without discussing hunting.

The Status Review contains a section entitled "Projected Changes in Arctic Climate" which after examining the detrimental impacts likely to occur from continued global warming, states that the "warming trend would change considerably if actions were taken soon enough to keep the atmospheric gases from increasing (Schliebe et al. 2006:67)." The listing proposal changed the name of this section to "Projected Changes in Sea Ice Cover" and removed the reference to limiting greenhouse gas emissions or altering the current trajectory of warming.

While the Status Review explains Arctic warming in relationship to carbon emissions (see, e.g. Schliebe et al. 2006: 66: "The globally averaged surface temperature is projected to increase by somewhere between 1.4 and 5.8° C over the period 1990 to 2100 depending on model parameters and the assumptions made on future CO2 emissions"), the listing proposal does not discuss the cause of Arctic warming.

Around the same time as the proposed rule was announced, the administration also attempted to block scientists traveling abroad from discussing polar bears, sea ice, or climate change (FWS 2007). A March 2, 2007 email from Richard Hannon, Acting Alaska Regional Director to Alaska Region Staff, stated:

> Please be advised that all foreign travel requests (SF 1175 requests) and any future travel requests involving or potentially involving climate change, sea ice, and/or polar bears will also require a memorandum from the Regional Director to the Director indicating who'll be the official spokesman on the trip and the one responding to questions on these issues, particularly polar bears, including a statement of assurance that these individuals understand the Administration's position on these issues (FWS 2007).

In sum, while the proposed rule accurately determined that the polar bear qualifies for listing under the Endangered Species Act, inappropriate intrusion of politics into the listing process is readily apparent.

D. Failure to Propose Critical Habitat for the Polar Bear

Understanding that it is not possible to protect plants and animals without protecting the areas where they live, Congress provided for the protection of species' critical habitat. Critical habitat, or the areas "essential to the conservation of the species" that "may require special management considerations or protection," provides substantial additional protection to listed species and must be designated at the time a species is listed. 16 U.S.C. § 1533(b)(6)(C). A final critical habitat designation may only be delayed if the agency finds that designation would be "not prudent" or "not determinable."

The proposed rule to list the polar bear stated that critical habitat designation was "not determinable," stating as follows:

> ...in general the identification of specific physical and biological features and specific geographic areas for consideration as critical habitat is complicated and the future values of these habitats may change in a rapidly changing environment. The polar sea ice provides an essential conservation function for the key life history functions for hunting, feeding, travel, and nuturing [sic] cubs. That essential habitat is projected to be significantly reduced within the next 45 years, and some projections forecast complete absence of sea ice during summer months in shorter time frames. A careful assessment of the designation of critical marine areas will require additional time and evaluation. In addition, near-shore and terrestrial habitats may qualify as critical habitat; however a careful assessment will require additional time and evaluation. Therefore, there is a degree of uncertainty at this time as to which specific areas in Alaska might be essential to the conservation of the species and thus meet a key aspect of the definition of critical habitat. Consequently, the designation of critical habitat for the polar bear is not determinable at this time...If the listing of the polar bear becomes final, we will then consider whether to propose the designation of critical habitat."

72 Fed. Reg. 1096-1097.

It is highly improper to deny the polar bear the additional protections of critical habitat based on the rapid warming of the Arctic, the very factor that endangers the species in the first place. What's worse, however, is that at the same time the FWS states that it does *not know enough to determine what areas are critical to the survival of the polar bear and which are not*, the FWS aided another Interior Department agency, the Minerals Management Service, in its rush to sell off millions of acres of prime polar bear habitat in the Chukchi Sea for oil and gas development. If the FWS cannot yet determine whether the Chukchi Sea habitat is critical to the survival of the polar bear, it cannot possibly determine that sacrificing the area to oil and gas development will not jeopardize the species survival. Yet by running roughshod over the requirements of the Endangered Species Act and other environmental laws, this is exactly what the agency has done. Part III examines this and other real-world consequences of the listing delay. Part II places the listing delay in a broader context of pervasive political interference in the Endangered Species Act listing process.

II. The Administration's Unlawful Delay of the Endangered Species Act Listing Process for the Polar Bear fits a Pattern of Political Interference in the Listing Program

For the past seven years, the Bush administration has implemented the Endangered Species Act in a manner that undermines, minimizes and eviscerates fundamental protections for the nation's most imperiled wildlife. Political appointees in the administration have consistently interfered in the scientific process with the express purpose of limiting protections for endangered species. They have delayed decisions, bullied government scientists, violated the law, and ignored public concern for the conservation of wildlife. The following discussion reviews the administration's obstruction and interference in three critical aspects of implementation of the Endangered Species Act: protection of new species as endangered, designation of critical habitat, and development and implementation of recovery plans. The administration's malfeasance in these areas has already led to the extinction of species. Further interference in the listing process for the polar bear should not be tolerated.

A. The Bush Administration has Essentially Halted Protection of New Species as Threatened or Endangered

Listing of species as threatened or endangered is the keystone of the U.S. Endangered Species Act because it is only after species are listed that they receive the substantial protections provided by the Act. Over the past 7 years under the Bush administration, listing of species has dropped to the lowest level since the Act was passed and far below any other administration (Table 2). Since the administration took over in 2001, it has listed just 59 species for a rate of eight species per year. By comparison, the Clinton administration listed 522 species for a rate of 65 species per year and the first Bush administration listed 231 species for a rate of 58 species per year.

Table 2: Endangered Species Act Listings by Administration (includes both Fish and Wildlife and National Marine Fisheries Service Listings).

			LISTING INITIATION			
	Total Listings	Annual Listings	Citizen	Citizen %	Agency	Agency %
Nixon/Ford	47	16	38	81%	9	19%
Carter	124	31	89	72%	35	28%
Reagan	255	32	178	70%	77	30%
Bush I	231	58	179	77%	52	23%
Clinton	522	65	441	84%	81	16%
Bush II	59	8	59	100%	0	0%

The slow pace of listing under the Bush administration is not due to the lack of imperiled species or requests for action; scientists, organizations and individuals have submitted petitions to list approximately 1,000 species during the Bush administration. The administration has issued listing decisions on less than 100 of these.

This refusal to list species or even respond to petitions is also not due to a refusal by Congress to fund the listing program, since Congress has consistently increased the listing budget and provided the Interior Department with the funds it has requested:

Table 3: Department of Interior Endangered Species Act Listing Budget and Funding, 2002-2008 (in thousands of US dollars)

	2002	2003	2004	2005	2006	2007	2008
DOI listing budget	3,000	3,007	3,235	4,893	5,131	5,243	8,337
% of DOI request	106%	100%	99%	93%	97%	100%	100%

Secretary of the Interior Dirk Kempthorne, appointed on May 26, 2006, has essentially shut down the listing process all together. On April 2, 2008, the FWS will not have listed a single new species in the U.S. for *693 days*, the longest such delay in the history of the Endangered Species Act. The second longest delay was in 1981, when then Secretary of the Interior James Watt went 382 days without protecting a new species. In response to this shorter delay, Congress quickly responded by amending the Act in 1982 to include firm deadlines for protecting species.

This sharp drop in the number and rate of species listings is not due to a shortage in the number of deserving species. To the contrary, there are currently about 280 species that are candidates for listing that have, on average, been waiting nearly 19 years for protection.[1] Many of these species, including the elfin woods warbler, mountain yellow-legged frog, and New England cottontail rabbit, are on the brink of extinction.

[1] The FWS began keeping lists of species that warrant review in 1974 and candidate lists in 1980. Prior to 1996, the agency had several categories of candidate species (e.g. C1, C2, C3) based on the available information. Because all of these categories required additional action on the part of the agency, we have calculated wait time based on the first date a species was added regardless of category. In 1996, only category 1 species were maintained on the candidate list.

The consequences of delayed protection are severe, allowing species to decline, making recovery more costly and difficult, and in a number of cases, resulting in species extinction. Indeed, at least 25 species have become extinct after being recognized as a candidate species (Suckling et al. 2004). One of these extinctions was announced as recently as October, 2006, when the FWS concluded that there are "no extant wild individuals and there is no material in genetic storage" of the Hawaiian plant "Haha" (*Cyanea eleeleensis*) and thus that the species "appears to be extinct."[2] Another species extinction on Bush's watch is the summer-run of the Lake Sammamish Kokonee, which formerly lived in Washington State's second largest lake, and is now believed to be extinct after the administration ignored a petition to emergency list the population (Greenwald 2007). A Hawaiian bird called the Akikiki or Kauai creeper, which is only found on the island of Kauai primarily in the Alakai Swamp, may also be nearing extinction (Greenwald 2007).

In the few cases where the administration has been forced to make decisions about whether to protect candidate species by court orders, it has reversed previous determinations and denied the species protection, including decisions over the Montana fluvial arctic grayling, Gunnison sage grouse and others (Greenwald 2007).

Lack of funding and litigation are not to blame for the administration's poor record protecting species, as this has occurred despite increases in funding for the listing program (Table 3). FWS officials have repeatedly claimed the reason they are not protecting more species, particularly candidate species, is because they are flooded by litigation and court orders to conduct other listing activities. Under the Clinton Administration, however, the agency completed substantially more listing determinations under court order and still managed to complete hundreds of non-court ordered listing determinations. In reality, the administration is making so little progress protecting new species because of the opposition of political appointees in the Department of Interior, who have slowed decision making with multiple reviews and edits and bullied agency scientists to reverse their conclusions. Documents obtained by the Center for Biological Diversity and others through the Freedom of Information Act reveal that Department of Interior officials interfered with – and in many cases, reversed – FWS biologists' recommendations to list species as "threatened" or "endangered" under the Act, including decisions concerning Gunnison sage-grouse, greater sage-grouse, Mexican garter snake, marbled murrelet, Delta smelt, wolverine, trumpeter swan, Gunnison's prairie dog, white-tailed prairie dog, and roundtail chub.

Delay and interference have effectively closed the gates to protection of new species under the Endangered Species Act. The political interference is also demonstrated by a survey of FWS biologists conducted by the Union of Concerned Scientists. The survey found that nearly half of all respondents whose work is related to endangered species scientific findings (44 percent) reported that they "have been directed, for non-scientific reasons, to refrain from making jeopardy or other findings that are protective of species" (UCS 2005).

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[2] U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates or Proposed for Listing as Endangered or Threatened, Federal Register: September 12, 2006, Volume 71, Number 176, Page 53806

Political pressure and bullying of agency scientists to reverse their conclusions to protect species was also documented in a report by the Inspector General of the Department of Interior, which found that then Assistant Secretary of Fish, Wildlife and Parks Julie MacDonald, who has no biological training, rode roughshod over numerous decisions by agency scientists concerning protection of the nation's endangered species (OIG 2007). The report also found that MacDonald violated federal rules by sending internal documents to industry lobbyists (OIG 2007).

In the Inspector General report, numerous former and current high level staff of the FWS stated that MacDonald's interference in scientific decisions concerning endangered species was pervasive, aggressive, designed to limit protection and exposed the agency to litigation over poorly supported and politically motivated decisions (OIG 2007). The former director of endangered species, for example, concluded that MacDonald "regularly bypassed managers to speak directly with field staff, often intimidating and bullying them into producing documents that had the desired effect" and that "the overall effect was to minimize the Endangered Species Act as much as possible or ensnare it in court litigation, which often happened" (OIG 2007).

Following release of the Inspector General report, Ms. MacDonald resigned and the FWS stated its intention to review Endangered Species Act determinations for eight species for political interference. Following that review, the FWS stated its intention to "revise" decisions relating to seven of the species, but made no firm commitment to do so, making statements including that the work will be undertaken "as funding becomes available."[3] This inadequate response has not addressed the problem. The Center for Biological Diversity has identified at least 55 species where political interference appears to have occurred, and which the administration has refused to address.

Political interference from the Bush administration has repeatedly been overturned by Courts. In one case in which the administration was under a court order to make a final listing determination for the California tiger salamander, the FWS sought and received additional time from the Court to meet the deadline. In later overturning the reclassification of two populations of the salamander from "endangered" to "threatened," the Court noted that the extension had been used instead simply for political interference.

> While FWS argued that it needed the extension to resolve a factual discrepancy over the extent of any decrease in grazing land for the Central California tiger salamander, it is now evident, upon review of the transcript of the hearing and the administrative record, that FWS was simply buying time to draft a final rule that also incorporated the down-listing of the Santa Barbara County and Sonoma County tiger salamander populations.[4]

In sum, despite increased funding and hundreds of species in need of immediate protection, the Bush administration has engineered a near shutdown in protection of new species as threatened or endangered under the Endangered Species Act. The unlawful delay in the polar

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[3] Letter from Kenneth Stansell, Acting Director, U.S. Fish and Wildlife Service, to the Honorable Nick J. Rahall, II, Chairman, Committee on Natural Resources, House of Representatives, dated Nov. 23, 2007.

[4] August 19, 2005 Order in *Center for Biological Diversity et al. v. U.S. Fish and Wildlife Service et al.*, No. 04-4324 (WHA) (N. Dist. Cal.)

bear listing decision fits this pattern of political interference and raises concerns that political appointees are using the delay to tamper with the conclusions of agency scientists.

B. The Bush Administration has Slashed Critical Habitat Designations and Interfered in Recovery Planning

One of the most important protections for many listed threatened and endangered species is the designation of critical habitat. A recent study found that listed species that had critical habitat for two or more years were more than twice as likely to have an improving status and less than half as likely to be declining than listed species without critical habitat (Taylor et al. 2007).

Throughout much of the late 1980s and 1990s, the FWS did not routinely designate critical habitat for listed species, despite a clear statutory mandate. Beginning in the late 1990s conservation organizations began suing to obtain critical habitat for species before being barred by the statute of limitations. Unfortunately, the great majority of these designations have been under the direction of the Bush Administration. Unable to stop the flow of court orders to designate and protect critical habitat areas, the Bush Administration has resorted to drastically scaling back the size of critical habitats.

In general, proposed critical habitats were developed by field-level staff who are familiar with the particular species in question and have been fairly inclusive of species habitat. Proposed critical habitat under the Bush administration at the time of a 2007 analysis included nearly 120 million acres with an average of over 310,000 acres per species. Final critical habitats, however, included only just over 48 million acres with an average of only 125,000 acres per species. On average, critical habitats were reduced by 70% between the proposed and final rules. In total, 90% of all critical habitats were reduced between proposed and final and 14 were canceled all together. Only four were increased and only for a total of 18,544 acres.

In many cases, excluding large tracts of land has made critical habitats practically useless. In 2001, political appointees in Washington DC ordered local FWS biologists to remove 8.9 million acres of proposed critical habitat from the Mexican spotted owl. The result was a designation that excluded 95% of all known owls, 80% of owl habitat, and virtually all areas under threat of logging. An agency biologist objected: "the designation would make no biological sense if the [U.S. Forest Services land] was excluded since these lands are the most essential for the owl." Two years later a federal court agreed, calling the designation "nonsensical."

Another essential protection afforded listed species is the recovery plan, developed by teams of expert scientists and land managers to detail the necessary actions to recover species to the point at which they no longer require the protection of the Endangered Species Act. Recovery plans involve compilation of extensive and highly specific information related to the threats to and status of the species in question, and thus by necessity, recovery teams have historically operated with a fair degree of independence. Recovery plans provide important guidance to federal land management agencies, who must ensure that their actions are consistent with the survival and recovery of threatened and endangered species.

The Bush administration has completed fewer recovery plans than the previous three administrations, has interfered with development of recovery plans to an unprecedented degree, and has ignored recovery plan criteria in a rush to strip species of protection. To date, the Bush Administration has completed just 100 recovery plans, compared to 577 under the Clinton administration and 174 under the first Bush administration.

The administration has also repeatedly interfered in the recovery planning process. For example, in 2004, the Apache Trout Recovery Team, which consists of a diverse group of professional biologists, developed a draft revised recovery plan based on many months of deliberation and consideration of the best available scientific information. This plan, however, did not allow for delisting the species fast enough for then southwest regional director of the FWS Dale Hall, who unbeknownst to team members worked with officials of Arizona Game and Fish to substantially revise the plan. In order to speed delisting of the trout, the new plan lowered population targets, and removed requirements to replicate different genetic lineages.

In response to the revised plan, three respected members of the recovery team sent a letter to Mr. Hall, concluding:

> As members of the Apache Trout Recovery Team (Team), we are writing you to express our dissent with the ongoing revision of the Apache Trout Recovery Plan. Specifically, we do not believe that the Plan's revised recovery strategies and objectives are sufficient to allow the species to be delisted. We have expressed to the Team our reservations about the Plan's adequacy toward recovering Apache trout on several occasions, yet the Plan continues toward finalization despite our stated concerns. Because our views apparently will not be incorporated into the final Plan, we wanted to make you aware of alternative approaches to the recovery process that are based on the best scientific information available... We believe that implementation of the revised Plan as currently written will not conserve Apache trout according to provisions outlined in ESA, and will eventually result in its further genetic degradation and possible extinction.[5]

Following his decision to ignore recovery team scientists and lower the recovery criteria for the rare Apache Trout, Mr. Hall was promoted to Director of the FWS.

Other species for which interference in the recovery planning process have been documented include the northern spotted owl, West Virginia flying squirrel, Florida manatee, gray wolf, Yellowstone population of the grizzly bear, Gila trout, and marbled murrelet (Greenwald 2007).

Given the administration's widespread practice of illegal political interference in Endangered Species Act decision-making, it is no surprise that the listing process for the polar bear has also been subject to illegal delays and interference.

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[5] Letter from Apache trout recovery team members, Robert Clarkson, Jerry Ward and Alex Puglisi to Regional Director Dale Hall, U.S. Fish and Wildlife Service, March 9, 2005.

III. The Administration's Delay has Deprived the Polar Bear of the Substantial Protections it would Receive from Endangered Species Act Listing and Allowed the Administration to Auction off Prime Polar Bear Habitat for Oil and Gas Development

The Endangered Species Act is our nation's safety net for plants and animals on the brink of extinction, and our strongest and best law for the protection of imperiled wildlife. The administration's lengthy delay in issuing a final listing decision deprives the polar bear of desperately needed protections afforded by the statue. While the listing process itself has benefited the species by raising awareness of its plight and generating new scientific information we would not otherwise have had, the polar bear will not receive the regulatory protection it needs and deserves under the Endangered Species Act until it is formally listed as threatened or endangered. The administration's delay has both deprived the species of this protection and allowed the administration to affirmatively rush through harmful activities, such as the Chukchi Lease Sale 193, which would likely not have been able to proceed had the polar bear been listed.

A. Regulatory Protections under the Endangered Species Act

While the listing process has already been beneficial for the polar bear in terms of generating both scientific research and public concern regarding the species' plight, the polar bear will not receive any regulatory protection until the listing process is complete. Once this occurs, an array of statutory protections will apply.

Two of the primary Endangered Species Act regulatory mechanisms are contained in Sections 7 and 9 of the statute. 16 U.S.C. §§ 1536, 1538. Section 7 directs all federal agencies to "insure through consultation" with FWS (or NMFS in the case of marine species) that all actions authorized, funded, or carried out by such agencies are "not likely to jeopardize the continued existence" or "result in the destruction or adverse modification" of "critical habitat" of any listed species." 16 U.S.C. § 1536(a)(2).

In contrast to the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321-4375, which requires only informed agency decision-making and not a particular result, and is therefore strictly procedural, Section 7 of the ESA contains both procedural ("through consultation") and substantive ("insure" the action does not "jeopardize") mandates for federal agencies. As such, the statute can force analysis through the consultation process of the environmental effects of a given project and, if the project is determined to jeopardize a listed species or adversely modify its critical habitat, trigger modification or cancellation of the project so as to avoid such impacts.

Consultation under Section 7 results in the preparation of a biological opinion by FWS that determines if the proposed action is likely to jeopardize the continued existence of a listed species or adversely modify its critical habitat. If the action is determined to jeopardize a species or adversely modify its critical habitat, FWS must provide "reasonable and prudent alternatives" that would allow the action to proceed in a manner that avoids jeopardy and adverse modification. In making the jeopardy and adverse modification determinations, FWS must utilize the "best available science." 16 U.S.C. § 1536(a)(2).

As exemplified in the seminal case *Tennessee Valley Authority v. Hill*, 437 U.S. 153 (1978), the Section 7 consultation process is the heart of the ESA. The Supreme Court stated that Section 7 "admits of no exception," and affords endangered species "the highest of priorities." 437 U.S. at 173-174. Through the Section 7 process, federal agencies should examine the direct, indirect, and cumulative impacts of any action that may impact the polar bear. This includes not only actions that directly harm polar bears or their habitat, but also large sources of anthropogenic greenhouse gas emissions which contribute to global warming. While Bush administration officials have stated that global warming is "beyond the scope" of the Endangered Species Act, there is no reason greenhouse gas emissions which harm polar bears should be treated any differently than pesticides that harm salmon or logging that harms owls.

Section 7 consultation is required for "any action [that] may affect listed species or critical habitat." 50 C.F.R. § 402.14. Agency "action" is defined in the ESA's implementing regulations to include "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. Examples include, but are not limited to: .... *actions directly or indirectly causing modifications to the land, water, or air.*" 50 C.F.R. § 402.02 (emphasis added).

This regulatory definition of "action" is sufficiently broad to encompass actions that result in greenhouse gas emissions, as it would be hard to argue that such emissions are not "causing modification to the land, water, or air." Many federal agency actions result in greenhouse gas emissions that are sufficiently large that they "may affect" the polar bear.

Because the goal of Section 7 consultation is to avoid jeopardizing any listed species, the regulatory definition of "jeopardy" offers some guidance as to how the consultation requirement for a greenhouse gas emitting action may be interpreted. To "jeopardize" a species means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce *appreciably* the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02 (emphasis added). If an action "appreciably" contributed to global warming, that action could then be found to jeopardize a listed species. "Appreciably" is defined in the Oxford English Dictionary as being "to the degree that can be estimated," while something is "appreciable" if it is "large or important enough to be noticed."[6] So if an action contributes an appreciable amount of greenhouse gas emissions to the atmosphere, that action should undergo the consultation process.

While many federal actions may not contribute appreciable amounts of greenhouse gases to the atmosphere, many clearly do so. For example, the corporate average fuel economy (CAFE) standards for sport utility vehicles and light trucks are set via regulation by the National Highway Transportation Safety Administration. Since the transportation sector represents a large component of United States greenhouse gas emissions, the volume of greenhouse gases represented by this single rulemaking are certainly "appreciable." Similarly, the Minerals Management Service approves offshore oil and gas leasing which will result in billions of barrels of oil, the lifecycle of the production and use of which is certainly "appreciable." The

[6] Oxford English Dictionary online, http:www.askoxford.com/concise_oed/appreciable?view=uk.

greenhouse gas emissions from numerous other actions, ranging from the approval of new coal-fired power plants, oil shale leasing programs, or limestone mines for cement manufacturing, and scores of other projects are individually and cumulatively having an appreciable effect on the atmosphere. These are all agency "actions" as defined by the ESA, which "may affect" listed species, and therefore trigger the consultation requirements of Section 7.

The vast majority of federal agencies are not yet consulting on the impacts of greenhouse gas emissions and global warming on ESA-listed species. This may be changing, however. The Supervisor of the New Mexico Ecological Services Field Office of FWS, for example, recently requested additional information relating to the formal Section 7 consultation on the Desert Rock coal fired power plant proposed in New Mexico:

> The estimated annual carbon dioxide emissions [of the coal fired power plant] is 12.7 million tons....The recent summary of the United Nation's Intergovernmental Panel on Climate Change 4th assessment report calls the evidence of climate warming "unequivocal" and expresses over 90% confidence that most observed warming is due to human influence. Because this project directly and cumulatively contributes to increased concentrations of green house gases which have been identified as a principle driver of climate change, please provide an analysis of a) the potential effects of climate change on the hydrology and water resources of the San Juan River basin; specifically address in your analysis the results of modeling of future water availability; and b) the effects of any changes in hydrology and water resources of the San Juan River basin on Colorado pikeminnow, razorback sucker, bald eagle, and Southwest willow flycatcher.[7]

And while Section 7 of the Endangered Species Act is certainly not a complete solution to global warming, the law has an important role to play. As Justice Stevens wrote in Massachusetts v. EPA, 127 S. Ct. 1438 (2007), "Agencies, like legislatures, do not generally resolve massive problems in one fell swoop, but instead whittle away over time, refining their approach as circumstances change and they develop a more nuanced understanding of how best to proceed." Section 7 consultation will provide an important opportunity for agencies to analyze the cumulative impact of the greenhouse gas emissions of their actions on the polar bear, and to incorporate measures to reduce or eliminate those emissions.

While Section 7 only applies to federal actions and agencies, the prohibitions of Section 9 apply far more broadly, reaching the actions of private entities and corporations. Section 9 prohibits the "take" of listed species, which includes "harming" and "harassing" members of the species in addition to simply killing them directly. Both the legislative history and case law support "the broadest possible" reading of "take." *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687, 704-05 (1995). Section 9 will clearly apply to direct impacts to polar bears and their habitat; it remains to be seen how and if Section 9 will be applied to greenhouse gas emissions.

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[7] July 2, 2007 Memorandum to Regional Director, Navajo Regional Office, Bureau of Indian Affairs, Gallup, New Mexico from Supervisor, New Mexico Ecological Services Field Office, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

In addition to the prohibitions of Sections 7 and 9, global warming will be implicated in virtually every other aspect related to the listing of the polar bear. Critical habitat will have to be designated for the species. Sea ice is obviously essential to the species' survival so such areas will ultimately have to be designated as critical habitat. The ESA also requires that a recovery plan for the polar bear be prepared and *implemented.* There is no hope for recovery, much less survival, of the polar bear absent substantial reductions in greenhouse gas emissions. Any legally adequate recovery plan must therefore include mandates to reduce such emissions.

B. Had the Polar Bear been Listed under the Act by January 9, 2008, the Chukchi Lease Sale 193 Could not Have Proceeded Absent Additional Environmental Review on the Impacts to Polar Bears

At the same time that one Interior Department agency, the FWS, failed to meet the mandatory, legally enforceable deadline for a final polar bear listing decision, another Interior Department agency, the MMS, auctioned off millions of acres of prime polar bear habitat to oil companies for oil and gas development in the Chukchi Sea. The Chukchi Lease Sale 193, described below, is a federal action which more than meets the threshold that it "may affect" ESA listed species and therefore undergo the Section 7 consultation process. Rather than undertake a good faith analysis of the impacts of Chukchi Lease Sale 193 on the polar bear, the administration instead evaded its duty to do so by illegally delaying the polar bear listing until after the Lease Sale was completed. The administration deliberately handed out entitlements to oil companies for activities incompatible with polar bear conservation in prime polar bear habitat prior to analyzing their impacts on the species.

1. The Offshore Oil and Gas Leasing Process and Chukchi Sale 193

Offshore oil and gas leasing is carried out pursuant to the Outer Continental Shelf Lands Act, 43 U.S.C. §§1331-56 ("OCSLA"), which authorizes the Secretary of the Interior to grant leases for the exploration, development, and production of oil and gas resources from the submerged lands of the United States outer continental shelf. OCSLA establishes a five-step process for oil and gas development on the outer continental shelf. First, under Section 18, the Secretary must adopt a five-year leasing program that sets forth a proposed schedule of lease sales. 43 U.S.C. §1344. Second, the Secretary may then sell any lease to the "highest responsible qualified bidder." *Id.* at §1337. Third, lease holders conduct oil and gas exploration pursuant to an approved exploration plan. *Id.* at §1340. This is followed by development and production of the oil and gas found. *Id.* at §1351. The fifth and final step of the OCSLA process is sale of the recovered oil and gas. *Id.* at §1353.

The most recent five-year plan covers the years 2007-2012 and went into effect on July 1, 2007. The 2007-2012 Outer Continental Shelf Oil and Gas Leasing Program is the culmination of the administration's energy policy, furthering our national addiction to fossil fuels, contributing to global warming, and at the same time directly despoiling the habitat of polar bears and other imperiled wildlife. The program schedules 21 lease sales in eight planning areas across the nation; 12 sales are scheduled for the Gulf of Mexico, eight off the coast of Alaska, and one off the coast of Virginia. A total of five sales, including Chukchi Sale 193, are

scheduled for the heart of polar bear habitat in the Chukchi and Beaufort Seas, our nations "Polar Bear Seas."

The Chukchi Lease Sale 193 was the first lease sale held under the 2007-2012 Outer Continental Shelf Oil and Gas Leasing Program. On February 6, 2008, the MMS offered thirty million acres of prime polar bear habitat to oil companies for leasing, and received $2.7 billion in high bids. The MMS wrote in its February 27, 2008 Leasing and Environment Weekly Report: "In February, we received approval from the Department of Justice and Fair Trade Commission to issue the Sale 193 leases. The SOL sent its Certification of Lease Instrument for 60 lease forms on Feb. 27, 2008."

The Center, along with a coalition of Alaska Native and conservation organizations has challenged the decision to hold the Chukchi lease sale. *Native Village of Point Hope, et al. v. Kempthorne, et al.*, 08-cv-00004-RRB. The lawsuit, filed shortly before the lease sale, challenges the inadequacy of the environmental documents conducted under the National Environmental Policy Act (NEPA) and under the ESA (for species other than the polar bear, which, of course, is not yet listed). A favorable court decision could invalidate the sale and the leases, and avoid an expensive taxpayer buy-out of the leases and windfall profit for the oil companies. However, by illegally delaying the polar bear listing decision to hold the sale without analyzing the impacts of the sale on polar bears under the Endangered Species Act, the administration has deprived the polar bear of the protection it needs and deserves today, and has set up a future train wreck that may require yet another expensive taxpayer buy out of the oil company leases.

2. Overview of Impacts of the Chukchi Lease Sale 193

The Chukchi Sea is one of the most remote, extreme, and little studied areas of the planet. There is much about the ecology of the area that is still unknown to science. For example, there is no reliable population estimate for the Chukchi Sea population of polar bears, nor is there a reliable population estimate for ringed seals, spotted seals, ribbon seals, or bearded seals, or for many other species. Yet the information that is available indicates that we have every reason to be extremely concerned about the impact of oil and gas development on the polar bear and the marine environment.

According to the MMS's own EIS for Chukchi Lease Sale 193, there is a 40% chance of a large oil spill over the lifetime of the oil and gas activities to be carried out under the lease sale (MMS 2007: IV-20).[8] Polar bears that come into contact with oil will generally groom themselves in an attempt to clean the oil, will ingest it, and will die. For those few polar bears that do not die immediately, or that are subject to smaller concentrations of oil, they "would be very susceptible to the effects of bioaccumulation of contaminant associated with spilled oil, which would affect the bears' reproduction, survival, and immune systems ...and suppress the recovery of polar bear populations due to reduced fitness of surviving animals" (MMS 2007: IV-167).

[8]The 95% Confidence Interval is 27-54% chance of a major oil spill.

Oil and gas development will impact polar bears in multiple ways in addition to oil spills. For example, seismic activities may disturb polar bears and/or their prey and could cause them to abandon an area all together. MMS acknowledges that some of these potential impacts, such as seismic activities in open water, simply have not been studied (MMS 2007: IV-164). These activities may interact with global warming in a cumulative and synergistic fashion. While a healthy bear population may be able to withstand some disturbance, for a population already stressed due to global warming, melting sea ice, and changing food availability, additional disturbance and energetic costs could be extremely harmful and could cause the death of individual bears, contributing to a population decline.

Oil and gas development activities will also increase human-bear interactions, which often prove fatal to the bears. The MMS admits that developments along the Alaskan Arctic coast "undoubtedly will increase the number of polar bear – human conflicts that occur" and that "even with the best mitigation measures in place, it is certain that that some bears will be harassed or killed as a result of industrial activities in their habitat" (MMS 2007: IV-164).

Despite this information on the adverse impacts of oil development in the Chukchi Sea on the polar bear, the Department of Interior illegally delayed the polar bear listing decision while rushing to approve the Chukchi Lease Sale 193, thus avoiding its duty to ensure that the oil and gas activities will not jeopardize the continued existence of the polar bear.

3. The Consequences of the Listing Delay

The primary consequence of holding the lease sale prior to listing is that the procedural and substantive obligations of Section 7 of the ESA, which might preclude leasing in the first instance, were not be applied until after rights had already been transferred to the highest oil company bidders.

Section 7(a)(2) requires that:

> Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure 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 of such species.

At the completion of consultation FWS issues a biological opinion that concludes whether or not the action is likely to jeopardize the species (or adversely modify any designated critical habitat).

During the course of consultation, Section 7(d) prohibits both agencies (e.g. MMS) and permittees (e.g. the oil companies) from making "irreversible and irretrievable" commitments of resources.

> After initiation of consultation required under subsection (a)(2) of this section, the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which

> has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2) of this section.

In sum, if the lease sale had been held after the polar bear were listed under the Endangered Species Act, the MMS could not lawfully have accepted bid or issued the leases until after it had completed consultation with FWS and received a no-jeopardy biological opinion. We do not believe that the lease sale as proposed could lawfully receive a no-jeopardy opinion (see "jeopardy" definition, *supra*). Certainly as a procedural matter, because FWS has stated that it doesn't have enough information to designate the polar bear's critical habitat (areas that are essential to the survival and recovery of the species), FWS cannot at the same time affirmatively conclude that turning a huge swath of habitat into an oil and gas production zone will *not* jeopardize the species.

Because the sale was held prior to listing, only the requirements for a conference opinion applied.

> Each Federal agency shall confer with the Secretary on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed.

16 USC § 1536(a)(4).

Critically important, the prohibition of irreversible and irretrievable commitment of resources does not apply for proposed species.

> This paragraph does not require a limitation on the commitment of resources as described in subsection (d) of this section.

16 USC § 1536(a)(4).

In other words, even if the lease sales would ultimately result in jeopardy to the polar bear, MMS is not precluded from issuing them if the bear is not yet listed.

Once the bear is listed the provisions requiring reinitiation of consultation would apply because the sale has already occurred.

> Reinitiation of formal consultation is required and shall be requested by the Federal Agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and:
>
> ...
>
> (d) If a new species is listed or critical habitat designated that may be affected by the identified action.

50 CFR § 402.16. The key term here is "discretionary." We believe the Secretary retains discretion over the leases and would need to enter into consultation on the effects of the lease sale. However, under the Bush administration, federal agencies have consistently taken the position that an action is complete once a permit or lease is issued and therefore reinitiation of

consultation is not required. It is therefore not certain that consultation on the impacts of the lease sale will happen once the polar bear is listed.

Even if MMS and FWS do in fact reinitiate consultation over the Chukchi Lease Sale 193 when the bear is listed, it is an open question whether MMS would cancel or suspend the leases if there is a jeopardy finding. OCSLA states that MMS can suspend a lease if there is

> a threat of serious, irreparable, or immediate harm or damage to life (including fish and other aquatic life), ...or to the marine, coastal, or human environment.

43 USC § 1334(a)(1)(B). While we believe a jeopardy finding would meet this criteria we are unaware of MMS ever suspending a lease sale for reasons of a jeopardy finding. Following suspension, MMS can only cancel a lease for such reasons after 5 year of suspension, and after a hearing, with the lessee entitled to compensation. 43 USC § 1334(a)(2)(B) & (C).

While eventual listing of the polar bear would trigger ESA review of later stages of the oil development process (exploration and development) and might require retrospective review of the already-held leasing process, the key distinction is that lease rights will have already been passed to oil company bidders and such leases can only be suspended and ultimately cancelled after a lengthy and costly process to the federal government, a process that to our knowledge has never been invoked for ESA reasons.

By holding the lease sale prior to conducting a review of the impacts to polar bears, the agencies also lost the flexibility to exclude some areas entirely from the leasing. The administration thus created precisely the "bureaucratic steamroller" that the ESA and our other environmental laws are designed to avoid. If the FWS were to go back and reinitiate consultation on the impact to the polar bear, and were to find that the oil and gas activities would jeopardize the polar bear, then those leases would have to be suspended and then likely bought back from the oil companies at great expense to the American taxpayers.

In sum, had the polar bear been listed prior to the lease sale, the sale could not have gone forward until the FWS had demonstrated that the sale would not jeopardize the continued existence of the species. Moreover, the final outcome of the consultation process would be judicially reviewable, ensuring accountability and compliance with the substantive standards of the ESA.

C. The Endangered Species Act Provides Broader Protections than the Marine Mammal Protection Act

The Secretary has asserted that the delay in ESA listing for the polar bear is of little consequence as the species is adequately protected under the Marine Mammal Protection Act (MMPA). While the MMPA provides significant protection for the polar bear, ESA protections are more far reaching and ultimately likely to be much more effective.

In brief, the primary protection the MMPA provides is a prohibition against the unpermitted "take" (i.e. intentional killing or unintentional harassment) of marine mammals. This prohibition is similar to the ESA's Section 9 take prohibition. Authorization to allow take

of polar bears and other marine mammals is provided for in the MMPA pursuant to incidental harassment authorizations (IHAs) or 5–year incidental take regulations.

Permits to allow take are freely given by FWS to the oil industry. FWS has issued an IHA for polar bears to Shell for seismic surveys in the Chukchi Sea in 2007 and in 2006 issued a set of regulations issuing in essence a blank check for take of polar bears from *all* oil industry activities in the Beaufort Sea. Such regulations could not lawfully have been issued if the bear were already ESA listed.

The MMPA also has no procedural requirement akin to Section 7 of the ESA that requires agencies to affirmatively look at the impacts of their activities on marine mammals or to avoid jeopardy. The MMPA has no requirement to protect critical habitat. The MMPA has no requirement to develop a recovery plan for a species. Significantly, the MMPA does not have a citizen suit provision, so enforcement is left entirely to FWS. This is no academic matter as from March 2005 until August 2006 no operative MMPA take authorizations for oil and gas operations existed in the Beaufort Sea in Alaska but industry activities resulting in take of polar bears continued with no enforcement from FWS.

The MMPA, while an important conservation statute, simply is insufficient to protect the polar bear from both the direct impacts of the oil industry in its habitat, and from the impacts of greenhouse gas emissions on its sea ice habitat. The ESA, properly implemented, can help address both these threats.

IV. Absent Endangered Species Act Protection and Rapid Action to Reduce Greenhouse Gas Emissions, Polar Bears will Become Extinct

While the Bush administration illegally delays the polar bear listing decision, our window of opportunity to save these magnificent animals is closing. While there is still time to slow Arctic warming and give this species back its future, the urgency of the need for action cannot be overstated. The remainder of this paper sets forth the current and future impact of global warming on the polar bear. For a full description of actions in additional to Endangered Species Act listing necessary to save polar bears, please see the Center for Biological Diversity Report *Not Too Late to Save the Polar Bear: A Rapid Action Plan to Address the Arctic Meltdown.*[9]

A. Observations of Global Warming Impacts to the Polar Bear to Date

Polar bears are among the most ice-dependent of all Arctic species and require sea-ice habitat for survival (Regehr et al. 2007; Derocher et al. 2004). Polar bears need sea ice as a platform from which to hunt ringed seals and other prey, to make seasonal migrations between

[9] Available at http://www.biologicaldiversity.org/publications/papers/ArcticMeltdown.pdf

the sea ice and their terrestrial denning areas, and for other essential behaviors such as mating (*Id.*) Unfortunately, the sea ice upon which polar bears depend is rapidly melting away.

Global warming is impacting the Arctic earlier and more intensely than any other area of the planet. In parts of Alaska and western Canada, winter temperatures have increased by as much as 3.5° C in the past 30 years (Rozenzweig et al. 2007). Over the next 100 years, under a moderate emissions scenario, annual average temperatures in the Arctic are projected to rise an additional 3-5° C over land and up to 7° C over the oceans (Meehl et al. 2007).

As early as 1972, scientists noted that the polar bear could be adversely impacted by warming via changes in the sea ice and snow cover (Lentfer 1972:169). Canadian researchers were the first to document changes in polar bear parameters such as declining body condition, lowered reproductive rates, and reduced cub survival in the Western Hudson Bay population throughout the late 1980's and early 1990's (Stirling and Derocher 1993). Over the next decade and beyond, these researchers and their colleagues have continued to document the relationships between climate, sea ice, and polar bear physiological and demographic parameters. Stirling et al. (1999) established the link between global warming and reduced polar bear physical and reproductive parameters, including body condition and natality.

A 2004 peer-reviewed analysis by three of the world's foremost experts on the species, *Polar bears in a warming climate* (Derocher et al. 2004:163), concluded that "it is unlikely that polar bears will survive as a species if the sea ice disappears completely as has been predicted by some." Even short of complete disappearance of sea ice, Derocher et al. (2004) predicted a cascade of impacts to polar bears from global warming that will affect virtually every aspect of the species' existence, in most cases leading to reduced body condition and consequently reduced reproduction or survival:

- The timing of ice formation and break-up will determine how long and how efficiently polar bears can hunt seals. A reduction in the hunting season caused by delayed ice formation and earlier break-up will mean reduced fat stores, reduced body condition, and therefore reduced survival and reproduction.

- Reductions in sea ice will in some areas result in increased distances between the ice edge and land. This will make it more difficult for female bears that den on land to reach their preferred denning areas. Bears will face the energetic trade-off of either leaving the sea ice earlier when it is closer to land or traveling further to reach denning areas. In either case, the result is reduced fat stores and likely reduced survival and reproduction.

- Reductions in sea-ice thickness and concentration will likely increase the energetic costs of traveling as moving through fragmented sea ice and open water is more energy intensive than walking across consolidated sea ice.

- Reduced sea-ice extent will likely result in reductions in the availability of ice-dependent prey such as ringed seals, as prey numbers decrease or are concentrated on ice too far from land for polar bears to reach.

- Global warming will likely increase the rates of human/bear interactions, as greater portions of the Arctic become more accessible to people and as polar bears are forced to spend more time on land waiting for ice formation. Increased human/bear interactions will almost certainly lead to increased polar bear mortality.

- The combined effects of these impacts of global warming on individual bears' reproduction and survival are likely to ultimately translate into impacts on polar bear populations. Impacts will be most severe on female reproductive rates and juvenile survival. In time, reduction in these key demographic factors will translate into population declines and extirpations (*Id.*).

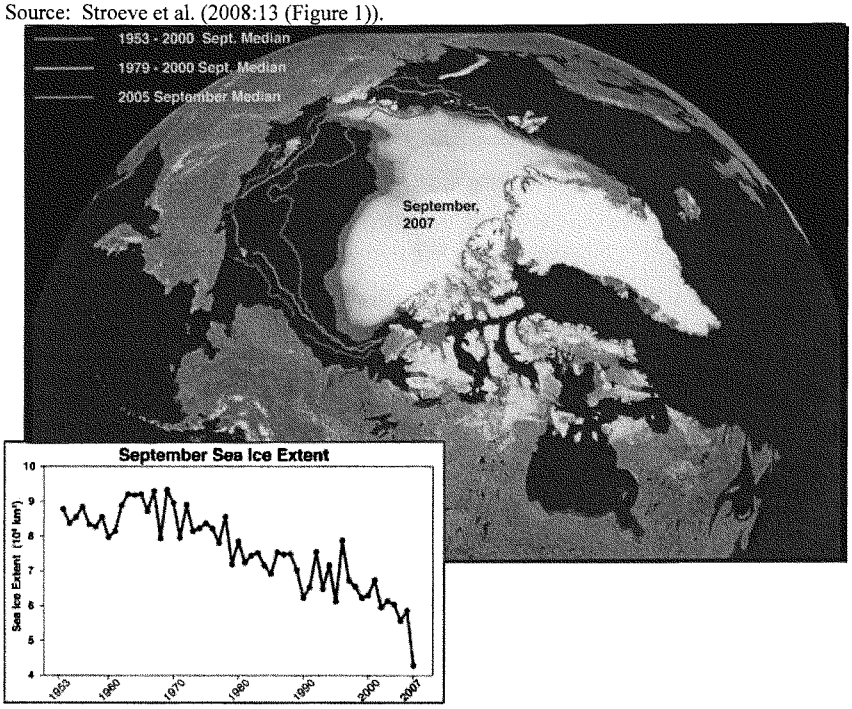
Summarizing the various likely impacts of global warming on the polar bear, Derocher et al. (2004:172) come to the following sobering conclusion:

> In contrast to many terrestrial and most marine species that may be able to shift northward as the climate warms, polar bears are constrained in that the very existence of their habitat is changing and there is limited scope for a northward shift in distribution. Due to the long generation time of polar bears and the current pace of climate warming, we believe it unlikely that polar bears will be able to respond in an evolutionary sense. Given the complexity of ecosystem dynamics, predictions are uncertain but we conclude that the future persistence of polar bears is tenuous. (emphasis added).

Since 2004, several dramatic trends have emerged. First, the Arctic sea ice melt has accelerated far beyond what was predicted even just several years ago, and second, impacts to polar bear populations have increasingly been documented, including both those that were predicted by Derocher et al. (2004) and additional impacts that were not expected.

This rapid warming of the Arctic is reflected in the devastating melt of the Arctic sea ice, which is highly sensitive to temperature changes. Summer sea-ice extent reached an unpredicted and stunning new record minimum in 2007 (Stroeve et al. 2008; NSIDC 2007a,b; Figure 1)

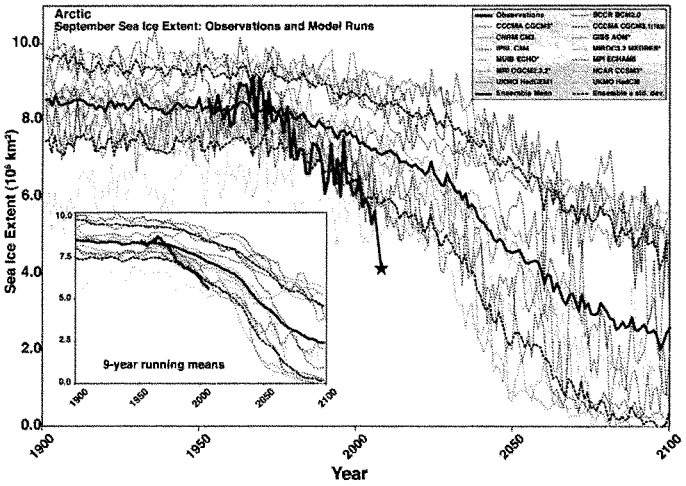
Figure 1: Sea ice concentration for September 2007, along with Arctic Ocean median extent from1953 to 2000 (red curve), from 1979 to 2000 (orange curve), and for September 2005 (green curve). September ice extent time series from 1953 to 2007 is shown at the bottom.
Source: Stroeve et al. (2008:13 (Figure 1)).



At 1.63 million square miles, the minimum sea-ice extent on September 16, 2007 was about one million square miles[10] below the average minimum sea ice extent between 1979 and 2000 (NSIDC 2007a), and 50% lower than conditions in the 1950s to the 1970s (Stroeve et al. 2008). The 2007 minimum was lower than the sea-ice extent most climate models predict would not be reached until 2050 or later (Figure 2). Leading sea ice researchers now believe that the Arctic could be completely ice free in the summer as early as 2012 (Borenstein 2007) or 2030 (Stroeve et al. 2008).

[10] One million square miles is equal to about the area of Alaska and Texas combined.

Figure 2: Arctic Summer Sea Ice Extent: Observations Compared to Model Runs
Source: After DeWeaver (2007); Stroeve et al. (2007).



Since 2004 scientists have also documented increasing impacts to polar bears. The Western Hudson Bay polar bear population has now declined by 22% — from 1,194 bears in 1987 to 935 bears in 2004 (Aars et al. 2006). The researchers attribute this decline to "increased natural mortality associated with earlier sea ice breakup and to the continued harvest of approximately 40 polar bears per year (Lunn et al. 2002), which at some point ceased to be sustainable" and found no support for alternative explanations (Regehr et al. 2007:2680). Regehr et al. (2007) predict that the more northerly polar bear populations will experience declines similar to those observed in Western Hudson Bay.

The Southern Beaufort Sea population is now also classified by the Polar Bear Specialist Group ("PBSG") as declining (Aars et al. 2006:34). The population was estimated at 1,800 bears in 1986 and at 1,526 bears between 2001-2006 (Aars et al. 2006).[11] The Southern Beaufort Sea population has also experienced statistically significant declines in cub survival, cub skull size, and adult male weight and skull size, the same types of declines observed in Western Hudson Bay prior to the population decline (Regehr et al. 2006).

Regehr et al. (2006:14) report several instances of polar bear starvation in the Southern Beaufort Sea population in the spring of 2006:

[11] While the overlap of the more recent study's confidence interval with the previous point estimate prohibits an unequivocal statistical conclusion that he sub-population has declined, multiple lines of evidence indicate a population in decline (Aars et al. 2006).

In spring of 2006, three adult female polar bears and one yearling were found dead. Two of these females and the yearling had depleted their lipid stores and apparently starved to death. Although the third adult female was too heavily scavenged to determine a cause of death, her death appeared unusual because prime age females have had very high survival rates in the past (Amstrup and Durner, 1995).

Figure 3: Polar Bear in the Final Stages of Starvation
(Photo by Heiko Wittenborn).

Figure 3 shows a polar bear in the final stages of starvation. This photo was taken on September 4, 2007 on the Caniapiscau River in Canada, 160 km inland from Ungava Bay. While we cannot say for sure that this bear starved to death as a direct result of global warming, as we do not know the bear's history or origin, we do know that global warming will increase the number of bears that suffer this fate.

Polar bear experts have also observed evidence of male polar bears killing and consuming two adult female polar bears and one yearling male in early spring 2004 (Amstrup et al. 2006). These experts state

> During 24 years of research on polar bears in the southern Beaufort Sea region of northern Alaska and 34 years in northwestern Canada, we have not seen other incidents of polar bears stalking, killing, and eating other polar bears. We hypothesize that nutritional stresses related to the longer ice-free seasons that have occurred in the Beaufort Sea in recent years may have led to the cannibalism incidents we observed in 2004 (Amstrup et al. 2006).

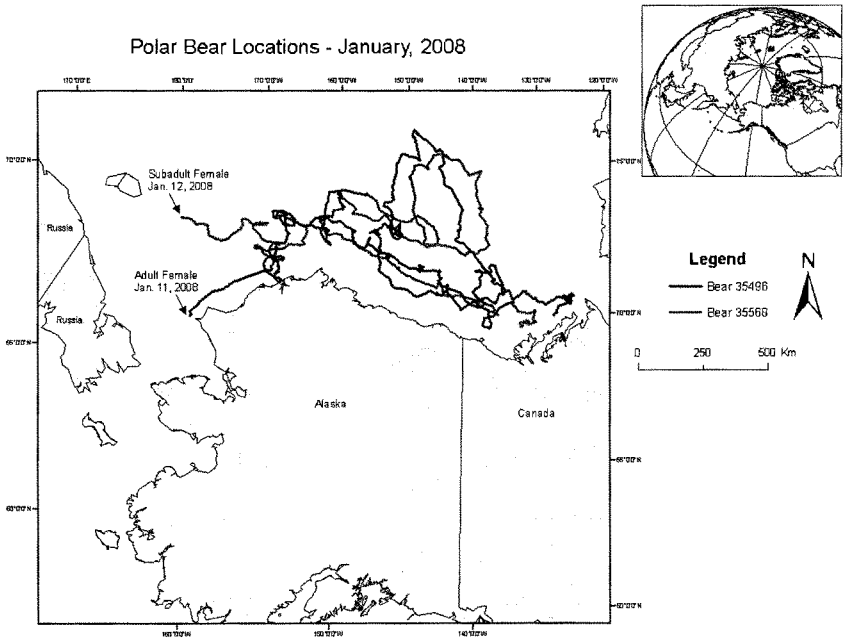
Stone and Derocher (2007) reported an additional incident of polar bear cannibalism in summer 2006 in Svalbard, Norway. An adult male bear in poor physical condition killed and ate a seven month old cub while both the polar bear mother and zodiacs full of tourists watched (Stone and Derocher 2007). The authors ascribe the incident to nutritional stress (Stone and Derocher 2007).

Impacts that were not previously predicted have been observed as well. In 2004, researchers with the U.S. Minerals Management Service observed the carcasses of four bears that had drowned in the Beaufort Sea during a period of high winds and rough seas between 10 and 13 September 2004 (Monnett and Gleason 2006). Because these scientists were able to observe only a relatively small area during their aerial surveys, they estimate via spatial extrapolation that 27 bears may have died during this time period (Monnett and Gleason 2006). Lone females and females with cubs may also be particularly prone to mortality during long-distance travel in open water, leading to "rather serious population-level implications" (Monnett and Gleason 2006). They conclude

> Our observations of higher numbers of swimming polar bears in open water than previously supposed should be considered by analysts and managers relative to marine transportation, ice-breaking, oil and gas development and other potential activities in open water (Monnett and Gleason 2006).

While the scientific publication process often leads to a delay between the observation of impacts and the transmission of that information to the public, media, and decisionmakers, it is apparent that further changes, both those previously predicted and those not anticipated, continue to occur. For example, this year researchers tracking radio collared bears in Canada have observed movements on a scale that is unprecedented, including the movement of bears from the Canadian portion of the Southern Beaufort Sea population into the Chukchi Sea (A. Derocher, pers.com.; Figure 4). While it is too early for scientists to draw firm conclusions from these preliminary observations (A. Derocher, pers. com.), this is further evidence of an ecosystem and species undergoing rapid change. One of the world's leading polar bear scientists stated on 14 January 2008 "My sense is that the 'traditional' movement patterns aren't possible now given the massive melt this past summer" (A. Derocher, pers. com.).

Figure 4: Selected Locations of Bears 35496 and 35568 through 12 January 2008
Source: Andrew Derocher, unpubl. data.



In 2007, the U.S. Fish and Wildlife Service ("FWS") requested that the Department of Interior's U.S. Geological Survey (USGS) address a series of research questions relating to the status of the polar bear. The FWS asked the USGS to do the following in support of the listing process: (1) develop population projections for the Southern Beaufort Sea polar bear population and analyze existing data on two polar bear populations in Canada; (2) evaluate northern hemisphere sea-ice projections, as they relate to polar bear sea-ice habitats and potential future distribution of polar bears; and (3) model future range-wide polar bear populations by developing a synthesis of the range of likely numerical and spatial responses to sea-ice projections. The USGS produced nine administrative reports addressing these questions and in doing so significantly advanced the understanding of sea-ice loss and its implications for polar bears.

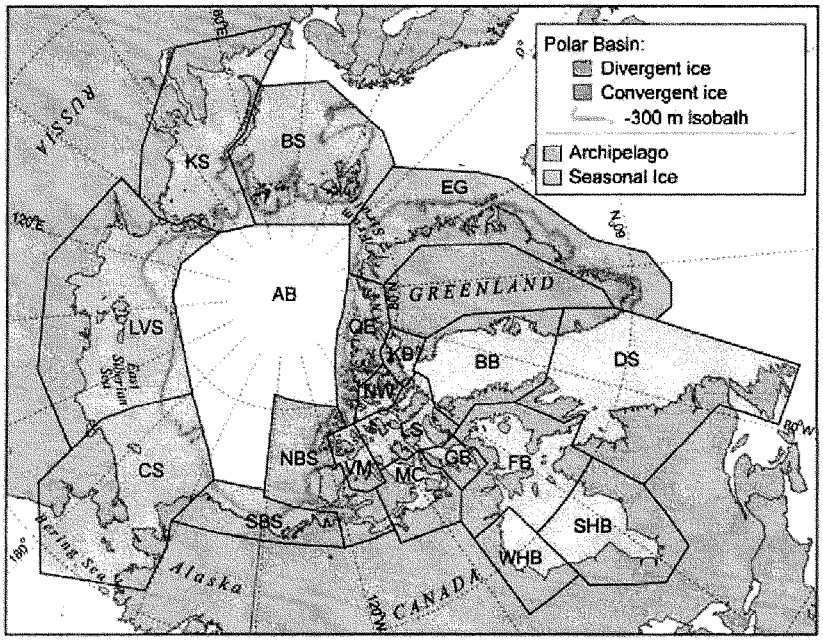
To address the question of the future status of the polar bear in a warming Arctic, the USGS conducted polar bear population modeling based on 10 general circulation models ("GCMs," or "climate models") that most accurately simulate future ice conditions (Amstrup et

[12] See http://ice-glaces.ec.gc.ca/App/WsvPageDsp.cfm?id=11892&Lang=eng.

al. 2007). The USGS used the Intergovernmental Panel on Climate Change ("IPCC") A1B "business as usual" scenario of future emissions to run the climate models (Amstrup et al. 2007). In the A1B scenario, atmospheric carbon dioxide concentrations reach 717 parts per million by 2100.

> The USGS divided the world's polar bear populations into four ecological regions:
>
> The (1) Seasonal Ice Ecoregion which includes Hudson Bay, and occurs mainly at the southern extreme of the polar bear range, (2) the Archipelago Ecoregion of the Canadian Arctic, (3) the Polar Basin Divergent Ecoregion where ice is formed and then advected away from near-shore areas, and (4) the Polar Basin Convergent Ecoregion where sea ice formed elsewhere tends to collect against the shore (Amstrup et al. 2007:1).

Figure 5: Map of Polar Bear Ecoregions used by USGS
Source: Amstrup et al. (2007:82).



The USGS projected the future range-wide status of polar bears using both a deterministic model of past, current, and future polar bear carrying capacity which assumed a linear relationship between bear density and annual average sea ice extent," and a Bayesian network model that

combined "empirical data, interpretations of data, and professional judgment into a probabilistic framework" (Amstrup et al. 2007:1). The deterministic model did not include seasonal changes in ice availability or other stressors, and thus provided an optimistic view of the impact of sea ice loss on polar bear populations (Amstrup et al. 2007). The Bayesian network model did incorporate information about annual and seasonal sea ice loss as well as other population stressors and thus provides a more realistic projection of future impacts (Amstrup et al. 2007). The "overall outcome" of the Bayesian network model was "a statement of the relative probabilities that the population in each ecoregion would be larger than now, same as now, smaller, rare, or extinct" (Amstrup et al. 2007:15). The results of the USGS study are profoundly disturbing.

The USGS projects that polar bears will be extinct in the Seasonal Ice and Divergent Ice ecoregions by the middle of this century (Amstrup et al. 2007). These two ecoregions account for two thirds of the world's polar bears, including all of the bears in Alaska. The "good news" is that polar bears may survive in the high Canadian Archipelago and portions of the Convergent Ice ecoregion through the end of this century. However, their extinction risk is still extremely high: over 40% in the Archipelago and over 70% in Northwest Greenland (Amstrup et al. 2007:66-67 (Table 8)). Moreover, the most likely outcome for each of these ecoregions by the end of this century is also extinction (*Id.*).

Table 4 displays a subset of the output from the USGS Bayesian Network model. Projections are given only for the ensemble mean ("middle of the road") sea ice projections of the 10 climate models used. The most likely (or "dominant") outcome and the probability of extinction at year 45 and year 100 for reach of the four ecoregions are displayed.

Table 4: **Most Likely Modeled Outcome and Probability of Extinction for Each of the Four Polar Bear Ecoregions Based on the Ensemble Mean Projections of the 10 Climate Models** (Source: Amstrup et al. (2007:66-67 (Table 8)).

Ecoregion	Time Period	Most Likely Outcome[a]	Probability of Extinction
Seasonal Ice	Year 45	**EXTINCT**	77.19%
	Year 100	**EXTINCT**	88.15%
Divergent Ice	Year 45	**EXTINCT**	80.33%
	Year 100	**EXTINCT**	83.89%
Convergent Ice	Year 45	**EXTINCT**	35.06%
	Year 100	**EXTINCT**	77.30%
Archipelago	Year 45	SMALLER	10.56%
	Year 100	**EXTINCT**	41.07%

[a] Outcome possibilities for the model are "larger than now," "same as now," "smaller," "rare," or "extinct."

In addition, the USGS emphasizes that because all of the available climate models have to date underestimated the actual observed sea-ice loss, the assessment of risk to the polar bear may be conservative (*e.g.* Amstrup et al. 2007:34,36). Perhaps most worrisome is the

observation that part of an area in the Canadian Archipelago expected to provide an icy refuge for the polar bear in 2100 lost its ice in the summer of 2007 (Amstrup et al. 2007:35,96).

The USGS projections of polar bear extinction risk are based on the IPCC A1B "business as usual" scenario, near the center of the distribution of all IPCC scenarios, in which atmospheric carbon dioxide concentrations reach 717 parts per million by 2100 (Nakićenović 2000). If future emissions meet or exceed the A1B scenario, the eventual extinction of polar bears is virtually guaranteed, as extinction risk will exceed 40% even in the high Canadian Archipelago in 2100, and warming will continue after 2100. The USGS reports, however, do not address the question of how much polar bear extinction risk can be reduced if greenhouse gas emissions are curtailed significantly below those assumed in the A1B scenario. Decreasing greenhouse gas emissions substantially can limit the Arctic sea-ice melt and therefore lower extinction risk for the polar bear.

While not explicitly making an Endangered Species Act listing recommendation, the information contained in the USGS reports, together with the substantial body of relevant peer reviewed literature and additional data and observations, definitively answers the question of whether the polar bear is in fact in danger of extinction and therefore warrants the protections of the Act with an emphatic "yes."

As grim as the outlook for the polar bear is, it is not yet hopeless. Unlike the terrestrial ice-sheets of Greenland, the melting of which may become irreversible on human-relevant timeframes, the Arctic sea ice, portions of which melt and reform every year, may be capable of relatively rapid recovery following climate stabilization. Assuming greenhouse emission targets can be met, including reductions of short-lived pollutants like black carbon and methane, the climate can be stabilized, and with subsequent reductions in atmospheric CO_2 levels, the Arctic sea ice can recover to levels supporting long-term viable populations of polar bears and other ice-dependant species.

The key to polar bear persistence then, is weathering the very bumpy ride through the next half-century. To shepherd the polar bear through the ensuing decades, we must reduce all other stressors on the species and its habitat and tailor national and international management of the sensitive Arctic ecosystem to the new reality of a rapidly changing Arctic. Listing the polar bear under the Endangered Species Act, protecting its critical habitat in the Chukchi Sea and elsewhere from oil development, and developing and implementing a recovery plan for the species, are essential steps in this process. The polar bear can not wait much longer for us to begin.

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RESPONSES BY KASSIE R. SIEGEL TO ADDITIONAL QUESTIONS FROM SENATOR BOXER

Question 1. What are the ramifications of holding the Chukchi Sea oil and gas lease sale prior to listing the polar bear?

Is it too late for the FWS to apply protections?

Had the polar bear been listed under the Endangered Species Act by January 9, 2008, the Chukchi Lease Sale 193 could not have proceeded absent substantial additional environmental review on the impacts to polar bears. At the same time that one Interior Department agency, the U.S.

Fish and Wildlife Service ("FWS"), failed to meet the mandatory, legally enforceable deadline for a final polar bear listing decision, another Interior Department agency, the U.S. Minerals Management Service ("MMS"), auctioned off millions of acres of prime polar bear habitat to oil companies for oil and gas development in the Chukchi Sea. Had the polar bear been listed by January 9, 2008 as the law required, the Chukchi Lease Sale 193, described below, would have been subject to the Endangered Species Act Section 7 consultation process for the polar bear, a rigorous environmental review designed to ensure that activities associated with the lease sale would neither jeopardize the continued survival of the species nor adversely modify its critical habitat. Rather than undertake a good faith analysis of the impacts of Chukchi Lease Sale 193 on the polar bear prior to holding the sale, the administration instead ignored its duty to do so by illegally delaying the polar bear listing until after the Lease Sale was completed. The administration deliberately handed out entitlements to oil companies for activities incompatible with polar bear conservation in prime polar bear habitat prior to analyzing their impacts on the species.

A. The Offshore Oil and Gas Leasing Process and Chukchi Sale 193

Offshore oil and gas leasing is carried out pursuant to the Outer Continental Shelf Lands Act, 43 U.S.C. § 1331–56 ("OCSLA"), which authorizes the Secretary of the Interior to grant leases for the exploration, development, and production of oil and gas resources from the submerged lands of the United States outer continental shelf. OCSLA establishes a five-step process for oil and gas development on the outer continental shelf. First, under Section 18, the Secretary must adopt a 5-year leasing program that sets forth a proposed schedule of lease sales. 43 U.S.C. §1344. Second, the Secretary may then sell any lease to the "highest responsible qualified bidder." Id. at §1337. Third, lease holders conduct oil and gas exploration pursuant to an approved exploration plan. Id. at §1340. This is followed by development and production of the oil and gas found. Id. at §1351. The fifth and final step of the OCSLA process is sale of the recovered oil and gas. Id. at §1353.

The most recent 5-year plan covers the years 2007–2012 and went into effect on July 1, 2007. The 2007–2012 Outer Continental Shelf Oil and Gas Leasing Program is the culmination of the administration's energy policy, furthering our national addiction to fossil fuels, contributing to global warming, and at the same time directly despoiling the habitat of polar bears and other imperiled wildlife. The program schedules 21 lease sales in eight planning areas across the Nation; 12 sales are scheduled for the Gulf of Mexico, eight off the coast of Alaska, and one off the coast of Virginia. A total of five sales, including Chukchi Sale 193, are scheduled for the heart of polar bear habitat in the Chukchi and Beaufort Seas, our nation's "Polar Bear Seas."

The Chukchi Lease Sale 193 was the first lease sale held under the 2007–2012 Outer Continental Shelf Oil and Gas Leasing Program. On February 6, 2008, the MMS offered thirty million acres of prime polar bear habitat to oil companies for leasing, and received $2.7 billion in high bids. The MMS then had 90 days to conduct a fair market valuation of the bids and decide whether or not to issue the leases. The Secretary of the Interior retained full discretion to reject any or all of the bids, and not to issue the leases. 30 C.F.R. § 256.47. The Secretary should have done so because the polar bear listing decision had been illegally delayed, and because the listing would call into question the ability of the high bidders to legally conduct oil and gas activities in the Chukchi Sea planning area. See 30 C.F.R. § 256.47(b). If the bids had been rejected, and the leases not issued, then the Minerals Management Service would simply have had to refund the deposits received plus any interest due. 40 C.F.R. § 256.47(e)(2)(h). The Secretary, however, chose not to do so, but proceeded to issue leases while continuing to illegally delay the polar bear listing decision.

The Center, along with a coalition of Alaska Native and conservation organizations has challenged the decision to hold the Chukchi lease sale. Native Village of Point Hope, et al. v. Kempthorne, et al., 08-cv–00004-RRB. The lawsuit, filed shortly before the lease sale, challenges the inadequacy of the environmental documents

conducted under the National Environmental Policy Act (NEPA) and under the ESA (for species other than the polar bear, which is not yet listed). A favorable court decision could invalidate the sale and the leases, and avoid an expensive taxpayer buyout of the leases and windfall profit for the oil companies. However, by illegally delaying the polar bear listing decision to hold the sale without analyzing the impacts of the sale on polar bears under the Endangered Species Act, the administration has deprived the polar bear of the protection it needs and deserves today, and has set up a future train wreck that may require yet another expensive taxpayer buy out of the oil company leases.

B. Overview of Impacts of the Chukchi Lease Sale 193

The Chukchi Sea is one of the most remote, extreme, and little studied areas of the planet. There is much about the ecology of the area that is still unknown to science. For example, there is no reliable population estimate for the Chukchi Sea population of polar bears, nor is there a reliable population estimate for ringed seals, spotted seals, ribbon seals, or bearded seals, or for many other species. Yet the information that is available indicates that we have every reason to be extremely concerned about the impact of oil and gas development on the polar bear and the marine environment.

According to the MMS's own EIS for Chukchi Lease Sale 193, there is a 40 percent chance of a large oil spill over the lifetime of the oil and gas activities to be carried out under the lease sale (MMS 2007: IV–20).[1] Polar bears that come into contact with oil will generally groom themselves in an attempt to clean the oil, will ingest it, and will die. For those few polar bears that do not die immediately, or that are subject to smaller concentrations of oil, they "would be very susceptible to the effects of bioaccumulation of contaminant associated with spilled oil, which would affect the bears' reproduction, survival, and immune systems and suppress the

Oil and gas development will impact polar bears in multiple ways in addition to oil spills. For example, seismic activities may disturb polar bears and/or their prey and could cause them to abandon an area all together. MMS acknowledges that some of these potential impacts, such as seismic activities in open water, simply have not been studied (MMS 2007: IV–164). These activities may interact with global warming in a cumulative and synergistic fashion. While a healthy bear population may be able to withstand some disturbance, for a population already stressed due to global warming, melting sea ice, and changing food availability, additional disturbance and energetic costs could be extremely harmful and could cause the death of individual bears, contributing to a population decline.

Oil and gas development activities will also increase human-bear interactions, which often prove fatal to the bears. The MMS admits that developments along the Alaskan Arctic coast "undoubtedly will increase the number of polar bear—human conflicts that occur" and that "even with the best mitigation measures in place, it is certain that some bears will be harassed or killed as a result of industrial activities in their habitat" (MMS 2007: IV–164).

Despite this information on the adverse impacts of oil development in the Chukchi Sea on the polar bear, the Department of Interior illegally delayed the polar bear listing decision while rushing to approve the Chukchi Lease Sale 193, thus avoiding its duty to ensure that the oil and gas activities will not jeopardize the continued existence of the polar bear.

C. The Consequences of the Listing Delay

The primary consequence of holding the lease sale prior to listing is that the procedural and substantive obligations of Section 7 of the ESA, which might preclude leasing in the first instance, were not be applied until after rights had already been transferred to the highest oil company bidders.

Section 7(a)(2) requires that:

Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure 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 of such species.

At the completion of consultation FWS issues a biological opinion that concludes whether or not the action is likely to jeopardize the species (or adversely modify any designated critical habitat).

During the course of consultation, Section 7(d) prohibits both agencies (e.g. MMS) and permit tees (e.g. the oil companies) from making "irreversible and irretrievable" commitments of resources.

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[1]The 95 percent Confidence Interval is 27–54 percent chance of a major oil spill.

After initiation of consultation required under subsection (a)(2) of this section, the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2) of this section.

In sum, if the lease sale had been held after the polar bear were listed under the Endangered Species Act, the MMS could not lawfully have accepted bids or issued the leases until after it had completed consultation with FWS and received a no-jeopardy biological opinion. We do not believe that the lease sale as proposed could lawfully receive a no-jeopardy opinion (see "jeopardy" definition, supra). Certainly as a procedural matter, because FWS stated in the polar bear listing proposal that it doesn't have enough information to designate the polar bear's critical habitat (areas that are essential to the survival and recovery of the species), FWS cannot at the same time affirmatively conclude that turning a huge swath of habitat into an oil and gas production zone will not jeopardize the species.

Because the sale was held prior to listing, only the requirements for a conference opinion applied.

Each Federal agency shall confer with the Secretary on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed.

16 USC § 1536(a)(4).

Critically important, the prohibition of irreversible and irretrievable commitment of resources does not apply for proposed species.

This paragraph does not require a limitation on the commitment of resources as described in subsection (d) of this section.

16 USC § 1536(a)(4).

In other words, even if the lease sales would ultimately result in jeopardy to the polar bear, MMS is not precluded from issuing them if the bear is not yet listed.

Once the bear is listed the provisions requiring reinitiation of consultation would apply because the sale has already occurred.

Reinitiation of formal consultation is required and shall be requested by the Federal Agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and:

(d) If a new species is listed or critical habitat designated that may be affected by the identified action.

50 CFR § 402.16. The key term here is "discretionary." We believe the Secretary retains discretion over the leases and would need to enter into consultation on the effects of the lease sale. However, under the Bush administration, Federal agencies have consistently taken the position that an action is complete once a permit or lease is issued and therefore reinitiation of consultation is not required. It is therefore not certain that consultation on the impacts of the lease sale will happen once the polar bear is listed.

Even if MMS and FWS do in fact reinitiate consultation over the Chukchi Lease Sale 193 when the bear is listed, it is an open question whether MMS would cancel or suspend the leases if there is a jeopardy finding. OCSLA states that MMS can suspend a lease if there is a threat of serious, irreparable, or immediate harm or damage to life (including fish and other aquatic life), or to the marine, coastal, or human environment.

43 USC § 1334(a)(1)(B). While we believe a jeopardy finding would meet this criteria we are unaware of MMS ever suspending a lease sale for reasons of a jeopardy finding. Following suspension, MMS can only cancel a lease for such reasons after 5 year of suspension, and after a hearing, with the lessee entitled to compensation. 43 USC § 1334(a)(2)(B) & (C).

While eventual listing of the polar bear would trigger ESA review of later stages of the oil development process (exploration and development) and might require retrospective review of the already-held leasing process, the key distinction is that lease rights will have already been passed to oil company bidders and such leases can only be suspended and ultimately canceled after a lengthy and costly process to the Federal Government, a process that to our knowledge has never been invoked for ESA reasons.

By holding the lease sale prior to conducting a review of the impacts to polar bears, the agencies also lost the flexibility to exclude some areas entirely from the leasing. The administration thus created precisely the "bureaucratic steamroller" that the ESA and our other environmental laws are designed to avoid. If the FWS were to go back and reinitiate consultation on the impact to the polar bear, and were to find that the oil and gas activities would jeopardize the polar bear, then those leases would have to be suspended and then likely bought back from the oil companies at great expense to the American taxpayers.

In sum, had the polar bear been listed prior to the lease sale, the sale could not have gone forward until the FWS had demonstrated that the sale would not jeopardize the continued existence of the species. Moreover, the final outcome of the consultation process would be judicially reviewable, ensuring accountability and compliance with the substantive standards of the ESA.

Question 2. How will listing the polar bear as a threatened species under the Endangered Species Act help to protect the polar bear?

Response. The Endangered Species Act is our nation's safety net for plants and animals on the brink of extinction, and our strongest and most successful law for the protection of imperiled wildlife.

The administration's lengthy delay in issuing a final listing decision deprives the polar bear of desperately needed protections afforded by the statue. While the listing process itself has benefited the species by raising awareness of its plight and generating new scientific information we would not otherwise have had, the polar bear will not receive the regulatory protection it needs and deserves under the Endangered Species Act until it is formally listed as threatened or endangered. Once this occurs, an array of statutory protections will apply.

Critical habitat will have to be designated for the species. As Congress recognized in passing the Endangered Species Act in 1973, it is not possible to protect an imperiled animal without protecting the areas where it lives. Sea ice is obviously essential to the species' survival so such areas will ultimately have to be designated as critical habitat. The Act also requires that a recovery plan for the polar bear be prepared and implemented. There is no hope for recovery, much less survival, of the polar bear absent substantial reductions in greenhouse gas emissions. Any legally adequate recovery plan must therefore include mandates to reduce such emissions.

Two of the primary Endangered Species Act regulatory mechanisms are contained in Sections 7 and 9 of the statute. 16 U.S.C. §§ 1536, 1538. Section 7 directs all Federal agencies to "insure through consultation" with FWS (or NMFS in the case of marine species) that all actions authorized, funded, or carried out by such agencies are "not likely to jeopardize the continued existence" or "result in the destruction or adverse modification" of "critical habitat" of any listed species." 16 U.S.C. § 1536(a)(2).

In contrast to the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321–4375, which requires only informed agency decisionmaking and not a particular result, and is therefore strictly procedural, Section 7 of the ESA contains both procedural ("through consultation") and substantive ("insure" the action does not "jeopardize") mandates for Federal agencies. As such, the statute can force analysis through the consultation process of the environmental effects of a given project and, if the project is determined to jeopardize a listed species or adversely modify its critical habitat, trigger modification or cancellation of the project so as to avoid such impacts.

Consultation under Section 7 results in the preparation of a biological opinion by FWS that determines if the proposed action is likely to jeopardize the continued existence of a listed species or adversely modify its critical habitat. If the action is determined to jeopardize a species or adversely modify its critical habitat, FWS must provide "reasonable and prudent alternatives" that would allow the action to proceed in a manner that avoids jeopardy and adverse modification. In making the jeopardy and adverse modification determinations, FWS must utilize the "best available science." 16 U.S.C. § 1536(a)(2). Through the Section 7 consultation process, the FWS can also require measures to minimize and mitigate impacts to listed species.

As exemplified in the seminal case Tennessee Valley Authority v. Hill, 437 U.S. 153 (1978), the Section 7 consultation process is the heart of the ESA. The Supreme Court stated that Section 7 "admits of no exception," and affords endangered species "the highest of priorities." 437 U.S. at 173–174. Through the Section 7 process, Federal agencies should examine the direct, indirect, and cumulative impacts of any action that may impact the polar bear. This includes not only actions that directly harm polar bears or their habitat, but also large sources of anthropogenic greenhouse gas emissions which contribute to global warming. While Bush administration officials have stated that global warming is "beyond the scope" of the Endangered Species Act, there is no reason greenhouse gas emissions which harm polar bears should be treated any differently than pesticides that harm salmon or logging that harms owls. (For further information on the application of Section 7 to greenhouse gas emission, please see written Testimony of Kassie Siegel to the U.S. Senate Committee on Environment and Public Works April 2, 2008 Hearing, at 18–19).

While Section 7 only applies to Federal actions and agencies, the prohibitions of Section 9 apply far more broadly, reaching the actions of private entities and corporations. Section 9 prohibits the "take" of listed species, which includes "harming" and "harassing" members of the species in addition to simply killing them directly.

Both the legislative history and case law support "the broadest possible" reading of "take." Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, 515 U.S. 687, 704–05 (1995). Activities otherwise prohibited by Section 9 can be permitted through Section 10 of the Act, which requires that the impacts to listed species be minimized and mitigated to the maximum extent practicable. Section 9 will clearly apply to direct impacts to polar bears and their habitat; it remains to be seen how and if Section 9 will be applied to greenhouse gas emissions.

Question 3. How would listing the polar bear as a threatened species under the Endangered Species Act protect polar bears specifically from the effects of oil and gas development?

Response. Oil and gas activities in polar bear habitat are a double-barreled threat to the species: they not only directly disturb and harm polar bears in their habitat, but also contribute to global warming. In order to save polar bears, we must both rapidly reduce greenhouse gas emissions and reduce other stressors, such as oil and gas development and oil spills, in their habitat.

Listing polar bears under the Endangered Species Act will provide broad protections to polar bears from oil and gas development through the operation of Sections 7 and 9 of the Act, described above. Because Federal permits are required for the majority of oil and gas activities in polar bear habitat, we anticipate that Section 7 will be the primary mechanism for protecting the species.

First and foremost, Section 7 consultation will force better and more informed decisionmaking relating to oil and gas activities, including a thorough consideration of changing conditions in the Arctic. While the ongoing changes in the Arctic are now readily apparent, for the most part, U.S. Federal agencies have utterly failed to incorporate this new reality into their decisionmaking affecting the region. With the possible exception of the Department of Defense, Federal agencies are making planning decisions and issuing permits, authorizations and leases in and affecting the Arctic with a near-total disregard for the rapidly changing conditions in the region. This is leading to uninformed and unwise decisionmaking negatively affecting the polar bear and the entire Arctic ecosystem. Through the Section 7 consultation process, Federal agencies will be required to fully consider changing conditions, under the "best available science" standard.

Federal agencies will also be required to thoroughly review the cumulative impact of their approvals and protect the polar bear from jeopardy or adverse modification of its critical habitat from the combined impact of many smaller approvals. This is vitally important as the Arctic changes rapidly and polar bear populations are increasingly stressed. For example, with less ice, more and more bears are stranded on land in areas that are increasingly subject to oil and gas activities. If polar bears are to survive in a seasonally ice-free Arctic, these areas must receive maximum protection. Endangered Species Act listing will require the consideration of the impact of oil and gas development on polar bears in a warming Arctic, including the consideration of the location, timing, and intensity of these activities. Any development that does go forward will have to be carried out in a manner than minimizes impacts and is compatible with the long term survival of the polar bear. Management tools available to the Fish and Wildlife Service include restrictions on the timing, location, and intensity of these activities and the incorporation of mitigation measures.

Oil spills pose a grave risk to polar bears because polar bears that are coated in spilled oil will almost certainly die, and because there is still no way to effectively cleanup oil in broken ice conditions. The Beaufort and Chukchi Seas contain some of the most extreme, remote, and inaccessible habitat in the world. Once the polar bear is listed, the Fish and Wildlife Service should require oil companies to demonstrate effective methods to deal with oil spills in polar bear habitat prior to proceeding with additional oil development activities. We believe that Section 7's prohibition against jeopardy or adverse modification of polar bear habitat should prevent additional offshore oil development in polar bear habitat at least until such time as new, effective measures to clean up spilled oil and prevent direct harm to polar bears, their prey, and the marine food chain upon which they depend have been demonstrated.

Senator BOXER. Thank you very much, panel. You were all really helpful.

We are going to have 6 minutes of questioning, and then we will come back and forth as required.

Mr. Horn, is there anything in the Endangered Species Act that says if a species is threatened by climate change, the ESA does not apply?

Mr. HORN. No, Madam Chair, it does not.

Senator BOXER. So then why is this suddenly what we are hearing from, you know, my colleagues here, Senators Inhofe and Barrasso and yourself, as if we are doing something wrong here. I mean, isn't the whole purpose of the Endangered Species Act to prevent the destruction of species and to save them?

Mr. HORN. The fundamental precept built into the statute is this notion, at least in terms of the threatened species, is this notion of foreseeable endangerment. And associated with that is the ability of the administering agency, in this case the Fish and Wildlife Service, to be able to intercede and deal with the particular issues.

Senator BOXER. I understand.

Mr. HORN. Therein lies the fundamental problem. No. 1, I am convinced that this situation does not cross the foreseeability threshold under the law. We have a presently healthy population. The trajectory looks fine. What is predicted is an intervening event in the form of ice melting 45 to 50 years out, which is predicted to reverse the current extrapolated population trends of the species.

Senator BOXER. Have you heard about the polar bears coming into town up in Greenland, where I visited to see the melt, that polar bears are now coming into town to search for food, where the melt is occurring in Greenland? Have you heard about that?

Mr. HORN. I have heard about that, and I have been in places like Point Hope and Barrow, Alaska when the polar bears came into town in the wintertime to feed on the whale carcasses taken by the local people.

Senator BOXER. Well, what is happening over there is they are reporting to us, and we were there for quite a few days, that the natives of the village there are killing the polar bears and it is very distressing to them. They have never had that happen, but they are losing their habitat. So you all agree that there is nothing in the Endangered Species Act that says if the cause is climate change, we don't act.

And then, are you aware, Mr. Horn, since you seem to waive off the notion of acting in a time-certain way, say, where everybody, you know, Babbitt and everybody else did this. Are you aware that this was a settlement that was agreed to and signed on the dotted line by the Interior Department? As a result of a lawsuit, they agreed to make a decision by January 1 and they signed on the dotted line. Are you aware of that?

Mr. HORN. I am aware of that. I can tell you from past experience that one of the fundamental problems is that the Department and the Fish and Wildlife Service are under such an avalanche of judicial orders and directives in which essentially its administrative discretion has been hijacked by the courts, that the agency is hardly in control of its schedule any longer. That is a fundamental problem that has afflicted them.

Senator BOXER. How many lawsuits are they facing in terms of endangered species right now?

Mr. HORN. I don't have those numbers at my fingertips. I know that the numbers have increased dramatically.

Senator BOXER. Well, if you don't know that, you can't say that. So my point is, I am a law-abiding person, and if I sign a court

settlement that says I have to do something by a date certain, I better do it or I could even, in another case in point—not this case—I might even have to go to jail. So the fact is that this is unlawful, and to see a former Government official sort of waive it off is distressing to me. I know you are a good person and you did good work in the Reagan administration because I know there were many more listings under the Reagan administration that we have had here by five-fold. But the point is, waiving this deal off is a bad signal to send to us and to our children.

Now, Dr. Inkley, Mr. Horn has said foreseeable future, we really shouldn't have to act on the polar bear. You spent some time in the environment there. Do you see signs of trouble?

Mr. INKLEY. Well, certainly yes, I have been in the Arctic, and it is very well established by the observations that have been made by satellite and by NASA that the ice is declining very rapidly. As a result of the observations that were made in 2007 when there was a record decline, one of the NASA scientists concluded that all of the ice in the summertime could be virtually gone by the year 2012. That is an incredible acceleration over the previous projections as to how fast the ice would be melting. So I think that what is happening in the Arctic is definitely, definitely within the foreseeable future.

Senator BOXER. Yes. I mean, the USGS says two-thirds of the world's polar bear population could be lost by 2050. Are we supposed to sit around and just watch it happen? Ms. Siegel, is that our role, just to sit around and let it happen and have a definition of foreseeable future as being 100 years?

Let me take that back. Mr. Horn's point is, if they were threatened sooner, we could act, but it is way in the future, 2050, two-thirds decline. Do you think that that is an important signal for us, that the USGS says two-thirds will be gone?

Ms. SIEGEL. Our window to act is now. There is still time to save polar bears if we take action today, but that window is closing. We are committed to additional warming beyond what we have already experienced from the greenhouse gas emissions that are already in the atmosphere. The Arctic is warming at nearly twice the rate of the rest of the planet. We need a full-court press on this problem now in order to save polar bears.

Senator BOXER. Thank you.

Senator Inhofe.

Senator INHOFE. Thank you, Madam Chairman.

Mr. Horn, you are the only one at the table who has had the privilege to actually run the ESA program, so you are in a position to make some observations. I think that you have said, you used the words expertise and capabilities, so I want to make sure that we get on the record that do you believe that the FWS is equipped and sufficiently funded to regulate and address the alleged cause of global warming, in other words, greenhouse gases?

Mr. HORN. Absolutely not. It is an agency of fish and wildlife professionals. It is not an agency of clean air emissions regulators. That is one of the fundamental problems associated with this issue.

Senator INHOFE. And when you were the Director, how busy was the agency? Were you adequately staffed at that time to carry out the duties that you had that are prescribed by statute and law?

Mr. HORN. I think every Secretary of the Interior that I have known for 20-some years would tell you that the Service has not had sufficient funds available to it through appropriations to deal with the number of listings, and that problem has simply gotten worse in the last 15 to 20 years.

Senator INHOFE. So you have observed it since you have been gone and feel that it has just gotten worse.

Mr. HORN. You have had endless petitions come in, and then of course when the agency gets behind the eight-ball because of its finite resources, it ends up with a whole welter of conflicting court orders, in which one judge says get it done on this day; the other judge says no, get it done this day. And the agency is sitting there with finite staff saying, which judge do I listen to first?

They are doing their best. The net result, though, is they are behind the schedule. They are behind the eight-ball very often.

Senator INHOFE. I have used as an example, and I cannot recall right now where I got it, you used some figures just in Canada alone, I have been saying, because I read it and it was a documented fact I believe at the time, of the 13 populations in Canada, 11 of those 13 are either growing or are stable. One of them that is not is the western Hudson Bay, which has been used quite a bit. Are those figures right? You quoted some figures. I think you were talking about total population, not just Canada. Is that correct?

Mr. HORN. Among the Canadian populations, Canada considers 11 to be stable and/or increasing; the western Hudson population, they have some problems with and there are a variety of issues about what are caused by those. So in general, the populations in Canada are doing very well.

Senator INHOFE. OK. And then compared to 30 or 40 years ago, the ranges they give us show that it is about four times the population of 50 years ago.

Mr. HORN. Well, in terms of polar bear conservation itself, the international treaties, the Marine Mammal Protection Act and a variety of activities undertaken by the U.S. Government, in cooperation with Canada and others, over the last 40 years have been extraordinarily successful and have yielded these three to four time increases in the bear populations from the mid–1960's.

Senator INHOFE. And based on your experience, do you agree that it would be difficult to legitimately establish links between greenhouse gas emissions in one part of the Country to affect a single polar bear population maybe in Alaska?

Mr. HORN. Therein lies the real problem. The Fish and Wildlife Service is obligated by consultation to look at these projects. Someone comes in to build a particular new highway interchange in some location, it has a Federal nexus through funding or a 404 permit, the agency is obligated to consult. How does it determine that the emissions attributable to that highway project are the ones that are causing the sea ice to melt? How do you make that connection? Is that connection capable of being made? And is the Fish and Wildlife Service the agency to do that?

I think the answer is no. And if they make no connection, then this listing of the polar bear basically turns out to be a gesture. If there is that type of connection, then Fish and Wildlife is essentially regulating all emissions and that it is not equipped to do.

Senator INHOFE. My concern would be that there are activist judges that would be trying to force this link. Do you agree with that?

Mr. HORN. Yes. And there is a real side problem that I addressed in my written statement about takings. There has been a recent spate of decisions from the courts that actions by State and local agencies to essentially allow their citizens to engage in activities, be it driving on a beach or trapping, in the case of Minnesota, can result in "takings" under ESA . If the permitted activity unintentionally takes a listed species, the State government is now culpable for violating the Endangered Species Act. My fear would be that if a State fails to regulate greenhouse gas emissions, is it going to be subject to a lawsuit that it is violating the taking prohibition in the ESA? Under some of these recent decisions, the answer would probably be yes.

Senator INHOFE. The Chairman is very generous in extending your time for an opening statement to 7 minutes. I appreciate that very much. But at the very end of your time, you are somewhat challenged by the Chairman in terms of not knowing the court orders and the procedures that are pending right now. Do you have any kind of a wild guess, educated guess, let's say?

Mr. HORN. My guess that it is in the dozens. I would be more than glad to talk to the agency and provide that information, either directly or ask them to provide it to you.

Senator INHOFE. Right. Thank you very much.

Thank you, Madam Chairman.

Senator BOXER. Thank you very much, Senator.

Senator Whitehouse.

Senator WHITEHOUSE. Thank you, Madam Chair.

I see that we have two issues to talk about here today. One is the underlying question of the merits of the designation of the polar bear as an endangered species. And the second is the administrative procedure and the propriety that has been engaged in here. It looks a little bit to this observer as if the endangered species determination was slow-walked on purpose in order that the Minerals Management Service could sign leases in order that the Administration could convey essentially a financial benefit on the lease applicants on the theory that once they had the lease in place, they then had a protected property interest that you have to buy them back out of. I just want to make sure, and let's start with the latter concern. I would like to ask each of you to speak to it.

Mr. Horn, let me just ask you real quick. I am trying to find the name of the organization that you are with. Is that a law firm?

Mr. HORN. Well, I am an attorney in town. I am also representing——

Senator WHITEHOUSE. So you are a practicing attorney right now. And Ms. Siegel, you are a practicing attorney as well?

Ms. SIEGEL. Yes, I am.

Senator WHITEHOUSE. Dr. Inkley, are you?

Mr. INKLEY. I am not an attorney. I am a certified wildlife biologist.

Senator WHITEHOUSE. Got you.

Well, on the first question, let me ask Ms. Siegel first. Is that the concern here, that this has been a deliberate effort to create a

protected property interest that taxpayers would then have to bail out by slow-walking the determination so that the leases could sneak in ahead of it?

Ms. SIEGEL. That is correct. That is one of the major problems with holding the lease sale prior to listing the polar bear. Under OCS, the Outer Continental Shelf Lands Act, under which this leasing is carried out, once the lease sale is held, if the oil companies cannot later develop those leases because of environmental concerns, the lease has to be suspended and then it has to be canceled, and oil companies are entitled to compensation and that is an extremely lengthy and cumbersome process.

Senator WHITEHOUSE. Not to mention expensive for taxpayers.

Ms. SIEGEL. Exactly, an expensive bail-out, a windfall profit for oil companies for a lease sale that should never have gone forward in the first place.

Senator WHITEHOUSE. And if you were to characterize the lease applicants here as a special interest, and what has been done to them as essentially conferring a benefit that if we had simply been patient and let the ESA process work its way through, we would not have put the Government in this jeopardy. This has had the effect or will have the effect as it goes forward of conveying a very significant taxpayer-funded benefit on a special interest. Correct?

Ms. SIEGEL. That is exactly correct. And you have to ask yourself, what was the rush with Chukchi lease sale 193? The Interior Department was under a statutory deadline to issue the polar bear decision. They ignored that deadline. There was no rush, no deadline for Chukchi sale 193. It was under the control of the Interior Secretary to put off that lease sale. He chose not to.

Senator WHITEHOUSE. Mr. Horn, as a lawyer, do you agree that there is a protected property interest that is created if these leases are entered into, and that therefore a benefit is being conferred on the lease recipients by virtue of this timing?

Mr. HORN. I am not in a position to comment extensively on the rights and privileges that go with an outer continental lease under the OCS Lands Act. I will say this as a factual matter, there have been a number of offshore lease sales conducted in the Beaufort and the Chukchi since the early 1980's with apparently no deleterious effects on the bears and no problems with property interests. So I add that in as a factual background to this question.

Senator WHITEHOUSE. You are saying that there have been circumstances in which leases have been entered into, subsequently restricted as a result of environmental restrictions and that the leaseholders had no property right that was affected by that?

Mr. HORN. When leases were issued in these circumstances, they are always attended by a rather rigorous set of terms and conditions, many of which include environmental stipulations and provisions to address any subsequent environmental issues that crop up. Those need to be incorporated into whatever the companies do to act under the lease that they have been provided.

Senator WHITEHOUSE. Do we know if the Administration took the prudent step to protect the taxpayers through the Minerals Management Service in writing into these leases a restriction so that in the event that the endangered species determination is made,

there is not a financial benefit conferred on these companies, just to protect the taxpayer? Do we know if that was done?

Mr. HORN. I am not in a position to comment on what the agency has done or not done. All I can tell you is that there have been a series of OCS lease sales.

Senator WHITEHOUSE. Dr. Inkley, do you know the answer to that question?

Mr. INKLEY. No. I would have to answer it from the perspective of a biologist in terms of what——

Senator WHITEHOUSE. Ms. Siegel, do you know the answer to that question?

Ms. SIEGEL. The analyses of the impacts to polar bears that should have been conducted under the Endangered Species Act to ensure that the lease sale could lawfully move forward once the polar bear was listed was not conducted. That was the impact of pushing through the lease sale before listing the bear, is that the Section 7 consultation, the procedural process, and the substantive determination was not made. It will not be made until after the lease sale has already been sold.

Senator WHITEHOUSE. OK. My time has expired. I thank the Chair.

Senator BOXER. Senator, thank you.

Senator Warner, so nice to see you.

Senator WARNER. Thank you, Madam Chairman, for holding this hearing. I attended the previous hearing that you held. I first want to express to you my profound appreciation for my conveying to you my concerns about certain aspects of this, and you graciously said that you would do it and carried it out.

So I would simply ask to put my statement in, since I don't seem to have a voice to deliver it. But I am privileged to serve as Ranking Member on the Subcommittee that has jurisdiction over this situation. I share with you the concern of the inability of the Department thus far to comply with the letter of the law.

At the same time, I have had the privilege of knowing Secretary Kempthorne for a very long time. I personally had two lengthy conversations with him this week on this subject. I was left with the impression that I think shortly he will be conveying to the Chairman, if he has not already done so, that he anticipates decisions which are before this full Committee today will be answered in compliance with the law here before early summer.

So I thank each of the witnesses for your testimony. I think we have an obligation toward this extraordinary animal, the polar bear. I once said in this room for what value it might be, it is America's panda bear and all Americans are in love with it. So I think if a vote is taken, it is likely to be a very significant vote, if that is necessary to take a vote some day.

I thank the Chair and I thank my colleagues.

Senator BOXER. Thank you.

Senator Barrasso.

Senator BARRASSO. Thank you, Madam Chairman.

I have just a couple of quick questions to Mr. Horn. I really want to get a handle on the impact of listing the polar bear in terms of what you refer to, I think your word was the expanded regulatory

scope. I have significant concerns of the impact on the communities in my State.

You made reference to an example where counties were held liable for driving on a beach. People come to recreate in the great State of Wyoming. They come to look at Yellowstone and the Grand Tetons in the summer, to ski in Jackson Hole in the winter. Many people are driving. Is that something that with this expanded scope of regulation that they could say, hey, what is the impact from those vehicles? I wondered if you could just expound on that a little bit.

Mr. HORN. There are two separate problems that crop up under the statute. I think first you have referenced the takings issue. You have had a series of lawsuits, and there was a recent decision just handed down Monday in the U.S. District Court in Minnesota that said that where a State allows an activity and that activity inadvertently or unintentionally results in the take or harm to a listed species, the State is now culpable for a violation of the Endangered Species Act and must stop allowing that activity. This occurred in Minnesota with trapping. It has occurred in Florida, where a city allowed people to drive on the beach and that was deemed to be a taking of sea turtles. There have been a variety of these cases.

The concern here is that those precedents, enable someone go to court and say that a locality by allowing activities that produce greenhouse gas emissions is causing Arctic sea ice to melt, harming the polar bear, and taking the polar bear. Is that local government now culpable under the ESA for allowing that activity to go on? We have four or five precedents along that line that I would anticipate creative attorneys to take and run with.

Then on the other side of the equation is Section 7 consultation, where the Service has already been pushed to incorporate climate change issues into their consultation. There is a Delta smelt case in California involving the Sacramento Delta. If the Service has to consider all these things and if emissions and their cumulative impact are causing climate change, which is causing sea ice melting, which is in turn harming the bears, Fish and Wildlife is going to be obligated to consult on virtually every activity that results in greenhouse gas emissions.

I just don't see how that agency undertakes that enormous task given its finite resources and the limitations on its skills and training. It is a professional wildlife agency, not an air regulating agency. But Section 7 is going to drive it into a wide array of emissions-related activities that it has never considered before.

Senator BARRASSO. Thank you very much.

Ms. Siegel, when he said creative attorneys and then pointed your way, I assume that he meant you. Could you address some of these issues about emissions under Section 7? Is it the intention of your organization if there is going to be a coal-fired power plant planning to be constructed someplace, if the polar bear is listed, that then you would say, well, we need to use all of our legal abilities to attempt to block that construction?

Ms. SIEGEL. It is extremely important that the Fish and Wildlife Service carry out the Section 7 consultation process in order to protect polar bears. I would like to note that while global warming is the primary threat to polar bears, they are threatened by other

things as well, such as oil and gas development, oil spills, overhunting in some areas, that operate in cumulative and synergistic ways in many instances with global warming.

One of the most important things we can do to help imperiled species through this period of rapid warming, to which we are already committed, to give them a better chance of making it, is to remove other threats that the species is facing. Section 7 will clearly be very successful in addressing other threats to polar bears.

We also believe, however, that the Fish and Wildlife Service has to address the fundamental problem here, which is greenhouse gas emissions, and that the Section 7 consultation process is the appropriate venue to do that in four major sources of greenhouse gas emissions authorized or approved by Federal agencies. We think it is only fair and right that every Federal agency do its part to comply with existing laws such as the Endangered Species Act, such as NEPA, that already address global warming.

As Justice Stevens wrote in Massachusetts v. EPA, global warming is not the kind of problem that an agency or legislature solves in one fell swoop. We have to whittle away at it over time. The Endangered Species Act is not a complete solution to global warming. We clearly need new Federal legislation capping and rapidly reducing greenhouse gas emissions, but we think that Section 7 of the Endangered Species Act is part of the solution and has an important role to play.

Senator BARRASSO. Well, that was a creative answer, but I take it as a yes. You said it is not a complete solution to global warming, so you do view the Endangered Species Act as part of a solution to global warming.

Next, if I could, Dr. Inkley, welcome, welcome as a graduate of the University of Wyoming. I am happy to see you here. I only have a few seconds left, and I would love to visit with you just on the biology of this. Have polar bears adapted to massive climate changes before over the centuries?

Mr. INKLEY. Well, the situation is that what we are experiencing right now is a very, very rapid climate change and the projections clearly indicate that two-thirds of the population will be lost by 2050. So while the climate on the planet Earth has always been changing and many species have had to adjust to that, what we are doing now through the release of greenhouse gases is an entirely different matter and we can project quite reliably that the polar bear population is on the way down.

I should point out that the status of polar bears in Canada, where there are some 13 populations, two of them have been depleted and are in the process of being restored. Those were depleted by hunting. Five of them are actually on the decline, and only six are stable. So I would like to correct the information that was presented before and point out that this is directly from a published article by the polar bear researchers from Canada, Dr. Andrew Derocher and Dr. Ian Stirling.

Senator BARRASSO. Thank you, Dr. Inkley.

Madam Chairman, my time has expired.

Senator BOXER. Yes. We will have another round just as long as you want to stay.

I want to correct the record on a couple of things. Let me just say, straighten it out, and then I will withhold. But I just want to say a couple of things.

First of all, 40 percent of this species are under threat, according to the leading scientists in the world. They sat here and told us this. Either we are going to fold up our tent and not deal with it, or we are going to deal with it. Now, I happen to think as a U.S. Senator from California, a State that treasures its wildlife and has a lot to protect, as a mother, as a grandma, that I am not going to fold up my tent and say, because we have this new threat, let's just forget the Endangered Species Act; it is not equipped to deal with it.

That is why I am such a strong supporter, Mr. Horn, of the Lieberman-Warner bill, because in that bill we recognize that, yes, the Fish and Wildlife Service is going to have to play a much broader role. In that bill, we have a whole title that is dedicated to wildlife. Both Senators Warner and Whitehouse played a big role in developing this particular part of the bill.

We will commit the dollars, because you are absolutely right. You can't do this under the current scenario. The fact is, Fish and Wildlife is going to play a major role as we combat global warming. We all are going to change. It is not going to be the same Fish and Wildlife Service it was in the Reagan years. There is no question about that. I was here when Ronald Reagan was President and I remember those years.

I also noted that, Mr. Horn, I am not surprised at your testimony because back then, a draft report made public by a department Fish and Wildlife Service recommended that all of the coastal plain within the Arctic National Wildlife Refuge be opened for oil and gas development. William P. Horn, Assistant Interior Secretary for Fish and Wildlife, said at a news conference—this is 1986—that the Arctic Wildlife Refuge offered the possibility of a super-giant oil field that does not exist anywhere else in the United States, and basically of course supported that big-time.

So you know, the fact that you would take this position is pretty consistent, I think, with what I see. I also see in your bio that you have an active legislative practice. I assume that is lobbying? Is that right?

Mr. HORN. Yes.

Senator BOXER. Which, by the way, fine. I don't have any problem with that. I don't know what you are exactly lobbying for, but you work primarily with the Energy and Natural Resources Committee, and it says "Mr. Horn has secured enactment of numerous statutory provisions." I would be interested in what those are.

I also wanted to ask you, one of your big clients is the Specialty Vehicle Institute of America. What is that, a specialty vehicle?

Mr. HORN. ATV manufacturers.

Senator BOXER. ATV?

Mr. HORN. All terrain vehicles, four-wheelers.

Senator BOXER. Got you.

So I think that your testimony, put in the context of what you do for a living, reflects exactly where you are, as does the two people sitting next to you, what their world is about. So I find it important testimony reflecting a lot of my colleagues here, especially

Senators Inhofe and Barrasso. I think particularly your point about the Fish and Wildlife Service never being able to deal with this is a really important point. We have to make sure that they can, because there is nothing in the Endangered Species Act that says we walk away when a species is endangered by climate change.

And by the way, how interesting, for 8 years the Bush administration took the position that the Clean Air Act didn't give them the authority to do a thing about greenhouse gas emissions, even though it said in the law explicitly that they could control every pollutant that had anything to do with climate change, but they didn't read that sentence, I guess. We had to spend a fortune in taxpayer money to litigate, litigate, litigate, and nine times the Bush administration has been found to be unlawful under the Clean Air Act, this Bush administration, nine times, and all that time wasted.

And now we have more litigation. They are abandoning their own agreement that they made to make this decision on time. They didn't have to sign that agreement. They could have said, we are not going to do it. But they signed an agreement that said they had to come up with a decision on January 1, and then Secretary Kempthorne—a very nice friend of mine, I had many talks with him—I think he couldn't be more wrong in saying that he has nothing really to say. He doesn't want to come up here until after he has made the decision. So I just think it is important to put into place where everybody is coming from.

Mr. Horn, I am not picking on you. I am just making a point that you have been consistent in your entire career in terms of your attitude toward the dangers of oil and gas drilling, perhaps, on habitat. Fortunately, in 1986, you didn't get your way and you are still not getting your way on that, and hopefully you never will, because imagine what that would have done to the species involved.

So I think this has been a really good intellectual debate here, but it also goes beyond that as to what the future holds for the Endangered Species Act. By the way, I didn't expect that we would get that. That is why I was a little stunned when Senator Barrasso kind of brought that up.

But if you are looking in the eyes of the scientists who are telling you without a question that 40 percent of God's creation is threatened, you have to make a decision as a human being and a legislator as to whether or not at that point it is just too hard, shrug your shoulders, and say Fish and Wildlife can't do it. Or you want to restructure the way Fish and Wildlife operates and give them the tools they need, which is what the Lieberman-Warner bill will do.

Senator Craig.

Senator CRAIG. Thank you, Madam Chairman. I will be short.

I must say, Mr. Horn, I love consistency. It is measurable. It is valuable, and it brings forth truthful and honest testimony.

But as a father and a grandfather, I, too, am passionately concerned that we make our public policy work and we don't attempt to use some as a surrogate and a block for others, and that it be done responsibly and effectively.

So let's step back and talk about the lease. There have been some leases offered, and probably some leases, and we don't know all of

the details of it, and that is consistent with continued policy. I know there might have been a rush to judgment or a push to judgment as it relates to the listing of the polar bear. We don't know what the science will conclude, but the process is underway and it is not terribly late in its process. We have watched other Administrations over the years be responsible and timely and miss deadlines.

So I guess my question is to someone who has been out on the front of the implementation of policy for the effective use of it. Mr. Horn, a lease sale is the beginning of a long process. I am quite familiar from an energy point of view with off-shore leasing and how it works. If the polar bear is listed, and it may be—I don't know what a legitimate process will bring—any actual exploration or development would be subject to ESA requirements. Would that not be true?

Mr. HORN. That is my understanding of the law.

Senator CRAIG. Is it also true that the lease sales you talked about as it relates to the polar bear were subject to the Marine Mammals Act, which caused a level of compliance as it related to habitat concern for the polar bear and the food sources of the polar bear?

Mr. HORN. Absolutely. The Marine Mammal Protection Act was enacted in 1972 and the variety of lease sales that were conducted in the 1980's and early 1990's in Chukchi and Beaufort, all of course were done in compliance with MMPA and its polar bear protective provisions.

Senator CRAIG. Now, in MMPA, Madam Chairman, I have a problem. My problem is endangered salmon species in the Snake and the Columbia system. MMPA has been so successful, and I say that in a positive sense, with bringing back seals and sea lions, that almost every salmon that now makes its way back to the Columbia and the Snake for spawning has got bite marks on it. And they sit right out in front of the fish ladders and consume fish in high quantities. And yet we have no way of managing reasonable numbers or rogue seals or sea lions as it relates to their phenomenal consumptive habits.

Be that as it may, sometimes in our great drive to create, save and bring balance, we create imbalance. It is true now with most of us who look at the overall upper Pacific environment, and I do because I and my State are subject to some of those rules. So balance is a concern and it is important. Saving species is also important, and all of us are passionate about it.

Ms. Siegel, you are an attorney?

Ms. SIEGEL. That is correct.

Senator CRAIG. Are you an advocate?

Ms. SIEGEL. I am.

Senator CRAIG. Are you a lobbyist?

Ms. SIEGEL. No.

Senator CRAIG. How can you advocate on policy and express your opinions about the value of policy from a professional and from your Center's point of view and not be a lobbyist? Simply because you are not a registered lobbyist? Is that the definition by which you respond in saying no?

Ms. SIEGEL. I am sorry, Senator, I don't understand the question.

Senator CRAIG. No, you are an advocate of a point of view and an interest, are you not, and the policies of your organization and the Center from which you work?

Ms. SIEGEL. I advocate for the protection of threatened and imperiled species and the habitats on which they depend. Yes.

Senator CRAIG. Yes. And you do reflect the Center for Biological Diversity's opinions?

Ms. SIEGEL. Yes.

Senator CRAIG. And you bring those opinions to Congress?

Ms. SIEGEL. Yes. I am here testifying.

Senator CRAIG. So you lobby in an unregistered way?

Ms. SIEGEL. Senator, my understanding is that testifying before Congress is not lobbying, so I am not sure that I——

Senator CRAIG. Do you only testify before Congress? You never come to the Hill to talk privately with any United States Senator as an advocate for the Center for Biological Diversity? Have you ever been in a U.S. Senator's office advocating for the Center?

Ms. SIEGEL. I have talked to staff for congressional members, yes.

Senator CRAIG. I am not objecting to that. We want your opinions and we want the Center's opinions. I was just a bit taken by the Chairman's suggesting that former Secretary Horn was a lobbyist or director, a former director. Lobbying is an elusive argument. You register, you don't register, but you come and you advocate. Please continue to come and advocate and be an advocate for your interests. That is the phenomenal value of our process. A lobbyist is an advocate and they do represent a point of view. Let us not belittle or attempt to belittle that word no matter how it is applied.

And don't act too confused, Ms. Siegel. You are an advocate. Please continue to do so. I respect that and I would love your point of view and come by our office and visit with us.

Ms. SIEGEL. Thank you.

Senator CRAIG. Thank you.

Thank you, Madam Chair.

Senator BOXER. The reason I raised the issue is because I know where those two are coming from on either end. I agree with you. We know they are advocates for their organization, but I didn't know about Mr. Horn. I had to read about it, that he represented these clients and that when he worked for President Reagan supported drilling in the wildlife refuge. I didn't know that, and I just wanted to lay that out because I know where these two are coming from. I think it is out there.

Senator CRAIG. Madam Chair, you were here during President Reagan's time, as was I.

Senator BOXER. And?

Senator CRAIG. And we served on committees in which we engaged Mr. Horn.

Senator BOXER. All right. I didn't remember him. I am sorry.

Senator CRAIG. I did. I knew him well. He did a great job for the President.

Senator BOXER. Right.

Senator CRAIG. Thank you.

Senator BOXER. When you support off-shore oil drilling, and you are drilling in the Arctic, you remember your heroes. When you

fight it, you may tend to forget. The fact of the matter is, I value all of your testimony. I just need to know where everybody is coming from because I think it is a perspective. What I have learned about my life is that everybody sees the world through his or her own prism of experience, and that is why I think it is important.

I want to talk about the Chukchi Sea. So Jeff, if you could move that out a little bit. Would you show us, if you have a pointer or a pen, the area of the drilling? It is the red. OK. Would you show us the area where 20 percent of the world's polar bears live?

I just want to put on the record that the Mineral Management Service's own environmental impact statement for Chukchi lease sale said there was the probability of a large oil spill, and that probability was between 33 percent and 51 percent, a large oil spill. So being that, it is a very good chance, unless this drilling stops, which hopefully it will in an effort to save the polar bear, how would such a spill affect polar bills and their habitat, Dr. Inkley?

Mr. INKLEY. Well, one would have to be very, very concerned about that. I would also point out that in addition to estimating it to be a 33 percent to 51 percent chance of a large oil spill, they also conclude that if such a spill would occur, it would have a likely significant impact on the polar bear as a result of that.

The way that the polar bear would be impacted by such a spill in this particular area is that obviously they have a very thick fur. If they become soiled by the oil, they immediately lose the ability to insulate. As a result, they can go hypothermic and die. In fact, the studies that have been done on the exposure of polar bears to oil has shown that it is basically fatal, not only because of hypothermia, but also because of the ingestion of some of the oil, the hydrocarbons, as they are trying to clean their fur.

Senator BOXER. Yes.

Mr. INKLEY. So it is definite that if a polar bear is soiled by an oil spill, it is not going to be a polar bear much longer.

Senator BOXER. Do you agree with that, Mr. Horn, in your old Fish and Wildlife protecting the species days?

Mr. HORN. Obviously, there can be adverse impacts on bears. All I know is that through the years, through the cooperative management efforts at Fish and Wildlife, Alaska Department of Fish and Game, they have been able to manage the extensive oil and gas programs on the North Slope with minimal impacts on the polar bear populations in that part of the world. I would assume that at the present time, the agencies would try to continue that successful track record that they have had over the last 25 or 30 years.

Senator BOXER. Yes. Mineral Management Service says there is a 33 percent to 51 percent chance that there would be a large oil spill. Ms. Siegel, do you see that as a threat to the polar bear, an oil spill in the Chukchi Sea?

Ms. SIEGEL. It is an enormous threat. As Dr. Inkley described, polar bears that come into contact with oil will die. Polar bears are particularly susceptible to oil spills in this environment because both the bears, their prey, and the oil all tend to concentrate in the cracks in the ice called leads. Polar bears are also naturally curious. They will actively ingest oil if they come into the vicinity where there is also spilled petroleum products.

Even bears that don't die immediately from an oil spill will be very susceptible even to very small trace amounts of oil, to bio-accumulation of this contaminant, and will have their reproduction, survival and immune systems affected, and this will suppress their recovery. These are statements from the Minerals Management Service's own final EIS for the Chukchi lease sale 193.

Senator BOXER. Right. I think that is the key, because regardless of what Mr. Horn says about how things have become better, we know that oil spills are a disaster. We just had one, a terrible accident in San Francisco Bay. With all the fantastic people, and I agree with you, Mr. Horn, we have dedicated people working, the Coast Guard, working as auxiliary groups, we lost thousands and thousands and thousands of birds.

Even if no oil spill were to occur, how does oil and gas development affect polar bears and their habitat, Mr. Inkley?

Mr. INKLEY. One of the concerns that one has to have as that area is developed is the amount of disturbance that would occur. We are talking about putting in a major industrial development here to extract that oil. Denning polar bears are of course very susceptible to disturbance because their young are not yet able to withstand the elements. Should a polar bear mother be disturbed and forced out of its den, it would not be a good situation for those cubs. So certainly, the whole infrastructure and activities associated with that have a potential to very much affect those polar bears.

I would like to go back to your previous question, if I may, for just a moment.

Senator BOXER. Sure.

Mr. INKLEY. One of the things that we have to understand about the lack of any reported impacts off-shore in terms of oil and gas development is nearly all of the oil and gas development that has occurred in Alaska has been on-shore. It has been terrestrial. We have the Northstar off-shore operation which is in place right now, and that is it. So we have very little experience with which to establish a track record of off-shore oil and gas development and how it would impact those polar bears. We need to enact a cautionary principle here and be very careful about how we go forward, and not assume because we have no track record that everything will be OK.

Senator BOXER. OK. I want to just stick with this Chukchi Sea because, Ms. Siegel, I couldn't agree with you more. You said it way more artfully than I did in my opening statement, that there is a rush to drill and no rush to list. And you have to put these two things together. Once again, if you look at the area and you look where 20 percent of the world's polar bears live, and by the way, one-half of the bears that are in America live in that area. So that is why a lot of our citizens care.

I want you to go over once again, if they had waited, and let's say there is a listing, what would have to go on before the drilling would be allowed to proceed? What type of studies?

Ms. SIEGEL. Had the polar bear been listed prior to Chukchi sale 193 taking place, the Minerals Management Service would have had to initiate formal Section 7 consultation with the Fish and Wildlife Service, and they would have had to fully analyze the im-

pacts of the oil and gas development on the polar bear and ensure that the activities did not jeopardize the continued survival of the polar bear or adversely modify its critical habitat if critical habitat was designated concurrently with listing, as the law requires.

One of the reasons we don't believe that they could have lawfully come to this conclusion, and by the way, during the consultation process, the agencies are prohibited from taking any irreversible or irretrievable commitment of resources such as handing out entitlements to the oil companies, so that would have to be held in abeyance.

One of the reasons we don't think procedurally the Fish and Wildlife Service could have approved the sale at this time is that the Service stated in the proposed rule that they couldn't designate the polar bear's critical habitat. They found it was not determinable, and they said that they didn't know what areas are essential to the survival and recovery of the species and which are not.

At the same time that they claim they don't know which areas are essential, we don't believe they can lawfully sacrifice millions of acres of prime polar bear habitat in the Chukchi for oil and gas development, and affirmatively claim that these activities won't jeopardize the continued existence of the species. We know that an oil spill would be catastrophic.

And of course, it is not just oil spills. Seismic exploration, where you have ships out there putting incredibly loud noises into the ocean, and increasing industrial development. Minerals Management said in its own EIS that as you increase industrial development along the Alaska coastline, bear-human interactions will increase. These interactions very often result in the death of the bear. The MMS said even with the best mitigation measures in place, it is certain that some bears will be harassed or killed as a result of industrial activities in their habitat.

What the Service did is instead of doing a good-faith analysis of the impacts, letting the scientists get to work——

Senator BOXER. You mean the Fish and Wildlife Service?

Ms. SIEGEL. Yes, both agencies. Instead of letting the scientists get to work, do this analysis, and let us know what their scientific conclusions are, instead the Interior Secretary set up the situation where that analysis was not done because the polar bear decision was illegally delayed.

Senator BOXER. Right. So again, the irony of the situation, rushing to grant the sale, and stalling on the listing. It just doesn't pass the smell test to me.

Ms. Siegel, is the Marine Mammal Protection Act and other statutes enough to conserve polar bear populations?

Ms. SIEGEL. While the Marine Mammal Protection Act provides substantial legal protection to polar bears, the Endangered Species Act is far more reaching and far more protective, and polar bears desperately need the additional protections of the Endangered Species Act.

Senator BOXER. Because of the habitat preservation?

Ms. SIEGEL. That is correct. Under the MMPA, there is no requirement to designate critical habitat. There is no requirement to appoint a recovery team and prepare recovery plans specifying the measures necessary to remove the species from the list. And per-

haps most importantly, there is no requirement akin to Section 7 of the ESA that requires the agencies to affirmatively demonstrate that their actions will not jeopardize the continued existence of the species.

Senator BOXER. Yes, that is an important point.

Last question for you, and last question. Have other governmental agencies weighed in on whether MMS has done enough to ensure that the polar bear will not be harmed by the Chukchi lease sale?

Ms. SIEGEL. They have. In fact, the National Marine Fisheries Service wrote to the Minerals Management Service twice about this. They wrote on April 11th, 2006 on the EIS for the 5-year drilling plan, and Chukchi sale 193 is the first lease under this plan. They called the proposed leasing schedule too compressed to allow for the necessary environmental review, particularly in the case of the North Aleutian Basin and the Chukchi Sea proposed sales. They recommended that these two areas be deleted from the leasing plan, and that the MMS instead undertake a scientific research program designed to obtain the data necessary to actually understand, analyze and mitigate the impact of oil and gas activities on species like the polar bear in the marine environment.

They wrote to the MMS again on the environmental impact statement for Chukchi sale 193 and again expressed real concerns about the impacts of the sale, and also again reiterated the data to describe marine mammals within the sale area and their habitat use of the area are lacking.

Senator BOXER. Let me ask you a question, and I don't know if you can answer this. You may need to do more research. But as I sit here and I listen to you, I see an agency that has just put blinders on and rushed to set this lease up. If I can follow that just by what you said and all the facts on the record, do you think there is a legal case to be made to stop that sale?

Ms. SIEGEL. We are in court challenging the sale right now under NEPA and Endangered Species Act claims for species other than the polar bear because the species is not listed. We certainly hope to have that sale overturned, but the outcome of any litigation is not certain.

Senator BOXER. I understand.

Ms. SIEGEL. We also believe that there is an explicit link between the delay and the Chukchi sale. However, the documents which we believe might display that link, the Administration is refusing to hand over under open Government laws. So we have yet another case in which we are suing under the Freedom of Information Act to obtain documents that we believe may show this.

Senator BOXER. Thank you for telling me that, because I am going to weigh in on that and try to get those documents immediately.

Ms. SIEGEL. Thank you.

Senator BOXER. Immediately.

Well, I just want to thank everybody. I am sorry Senator Craig isn't here because I had not ever seen a report that said that the reason that the salmon populations are down is because they are getting bitten by the seals. Everything I know says the reason the salmon populations are down is because of damming the rivers and

mismanagement of rivers. Now, I am just saying I will keep the record open for a couple of days to see if we can find anything that confirms that, but I have not heard that. That is a new theory.

I just want to say to all three of you that you have, really, it has been a very important panel. Mr. Horn, even though I was hard on you because I don't agree with you, you know how that goes, I think you made some very important points here, the main one being that as we look into the future and as we attempt to wrap our arms around global warming, we are certainly going to need a more robust Fish and Wildlife Service that has a little bit of a different mission. That gives me even more of a push to explain the Lieberman-Warner bill to colleagues because in fact it is recognized in the wildlife title in that bill. We will do that. So I think that was a very important larger point.

I want to say to the two of you on either side who were such passionate defenders of the bear, how important your testimony was. I think we have gotten some new facts here out on the record. I think that your case is absolutely compelling that you are making. I am terribly distressed at the Administration's stonewalling this decision. I think it is wrong. It is unlawful. I don't care how many other people did it. That has nothing to do with it. I mean, that is all we have to say to our kids—oh, it is OK, Billy down the street, you know, took illegal drugs so I guess I am not so upset that you tried it. No, that is wrong.

No, we don't sit here and say it is OK, because everybody is doing it. That is why society has so many problems. Right and wrong get lost. It is wrong. There is right and there is wrong. It is wrong. It is wrong that Mr. Kempthorne isn't here. It is wrong. I like him, you know. That has nothing to do with it. I like Mr. Horn, too. But it is wrong. And once we get to a point where we can't distinguish right from wrong, you know, we get in this fuzzy world of anything goes, you know, and that is not right.

You only have one planet. You only have one species of polar bear. There it is. It is losing its habitat and 2050 is around the corner, and USGS says that is when they are really in trouble, clinging to their habitat. When they get oil on them, I don't care how many beautiful volunteers you have, it doesn't work with animals in the wild like this. I am not willing to say goodbye to this species on my watch. Maybe others are, but I am not because I think my kids would really be mad at me, and my grandkids.

So we are going to do everything we can to save this species. And yes, it is indicative of a lot of things to come. And so although the polar bear may not look like the canary in the coal mine, in many ways they are one of the first to say, hey, look what is happening because of global warming. And we can't turn away unless we don't care, and I believe most of us do.

So thank you all. It has been terrific. We will get those documents because nobody has a right to withhold documents from the public. It is wrong. That is another right and wrong thing.

Thank you very much. We stand adjourned.

[Whereupon, at 11:50 a.m. the committee was adjourned.]

Sportsmen's Letter to Congress

Dear Senator/Representative,

On behalf of the undersigned organizations and the millions of Americans who hunt and fish, we strongly encourage you to cosponsor climate change legislation that includes dedicated funding for fish and wildlife conservation and restoration through a 'cap and trade' system and achieves a 2% per year reduction in pollution from carbon dioxide and other greenhouse gases.

Hunters and anglers have been, and remain today, the backbone of North America's monumental success in conservation and wildlife management in the last century. As hunters and anglers, we are concerned with climate change and its impacts on fish and wildlife. For example, trout populations are declining from increased water temperatures, wetlands critical to waterfowl populations are threatened due to increasing temperatures and sea level rise, and in some areas moose are disappearing due to hot summers.

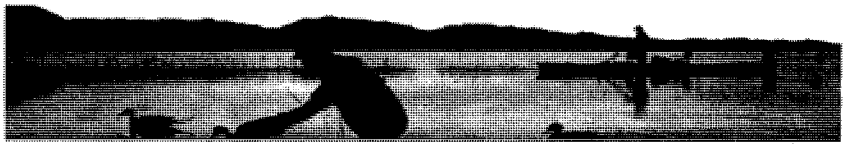
As a result of the known and predicted impacts to fish and wildlife from climate change, we ask that you cosponsor climate change legislation including a 'cap and trade' system that will reduce carbon dioxide pollution by 2% annually, or 80% by 2050, and channel new revenue to natural resource agencies for fish and wildlife conservation activities.

Current federal efforts to conserve fish and wildlife are having dramatic results, but they fall far short of what is needed for helping wildlife survive climate change. A dedicated revenue stream will enable state fish and wildlife agencies and other key agencies to incorporate climate change science into their work and to conserve America's long and cherished heritage of hunting, fishing and wildlife conservation.

We have used 'cap and trade' systems – and American ingenuity - successfully in the past to cut pollution. And, we can do it again to achieve an annual two percent reduction of greenhouse gases/carbon dioxide pollution through energy conservation, use of renewable and alternative energy, and development of new technologies. It can also help bring new growth industries to our cities and rural communities provide jobs and help bolster a stronger economy.

We who hunt and fish believe we have a moral responsibility to confront climate change in order to protect our outdoor heritage and our children's future. Accordingly, we ask you to cosponsor legislation that reduces greenhouse gas pollution 2% annually through a cap and trade program and provides wildlife conservation funding to help wildlife survive climate change.

Sincerely,



Buck Creek Hunting Club
Alaska Alpine Adventures
Great Alaska Adventure Lodge
North American Bear Foundation, Alaska
Northern Sportsmen Network
Prince William Sound Eco-Charters
Trout Unlimited, Juneau Chapter
Augusta Area Chamber of Commerce
Arkansas Wildlife Federation
Grand Prairie Chapter of AWF
Jackson County Wildlife Federation
Lee Owen Deer Camp
Northeast Arkansas Flyfishers
River Valley Wildlife Federation
White River Conservancy
Yell County Wildlife Federation
Arizona Antelope Foundation
Arizona Predator Callers
Arizona Wildlife Federation
Northeast Arizona Sportsman's Alliance
Phoenix Varmint Callers
Southern Arizona Wildlife Callers
Trout Unlimited, Arizona State Council
White Mountain Flyfishing Club
AquaFly, Inc.
California Sportfishing Protection Alliance
California Trout
Coastside Fishing Club
Federation of Fly Fishers, Northern California Council
Federation of Fly Fishers, Solano Fly Fishers
Golden West Women Flyfishers
Granite Bay Flycasters
Grasslands Water District & RCD (130+ duck clubs)
Izaak Walton League, California Division
Izaak Walton League, Westwood Village
Izaak Walton League, Whittier Chapter
Mark Rockwell Fishing Guide Services
Mission Peak Fly Anglers
Trout Unlimited, California State Council
Trout Unlimited, L.A. Chapter
Trout Unlimited, Modoc/Alturas Chapter
Trout Unlimited, North Bay Chapter
Trout Unlimited, Redwood Empire Chapter
Trout Unlimited, South Coast Chapter
Wilderness Fly Fishers of Santa Monica, California
Alpine Anglers
The Angling Bookstore
Trout Unlimited, Colorado State Council
Trout Unlimited, Cherry Creek Anglers
Trout Unlimited, Denver Chapter
Trout Unlimited, St. Vrain Anglers Chapter
Trout Unlimited, West Denver Chapter
CT/RI Coastal Fly Fishers
Trout Unlimited, Connecticut State Council
Trout Unlimited, Hammonasset Chapter
Delaware Nature Society Young Waterfowlers
Airboating Magazine, LLC
Anchor Point Construction LLC
Apalachee Outfitters
Bass On Line, Inc.
Black Dog Marine, Inc.
Captain Rachel Charters
Capt. Squeaky Kelly
D.O.A. Lures
Friends of the Florida Keys National Marine Sanctuary
Florida Wildlife Federation
Indian Riverkeeper
North Swell Media and Consulting
Nunnco, Inc.
Snook Foundation
Snook Nook
Georgia Wildlife Federation
Trout Unlimited, Georgia State Council
Trout Unlimited, Gold Rush Chapter
Trout Unlimited, Rabun Chapter
Hawaii Fishing and Boating Association
'Ilio 'ulaokalani Coalition
Mauna Loa Outfitters
Na 'Imi Pono
Oahu Big Game Fishing Club
Parker Ranch Hunt Club
Trout Unlimited, Hawaii Chapter
Fayette County Thundering Toms Chapter, National
Wild Turkey Federation
Hawkeye Fly Fishing Association
Iowa BASS Federation
Iowa Bowhunters Association
Iowa City Sportsman's Club
Iowa Wildlife Federation
Izaak Walton League, Boone Valley Chapter
Izaak Walton League, Floyd County Chapter
Izaak Walton League, Green Bay Chapter
Izaak Walton League, Johnson County
Izaak Walton League, Palisades Chapter
Izaak Walton League, Rice Lake Chapter
Izaak Walton League, Three Rivers Chapter
Izaak Walton League, Wapsi Valley Chapter
Izaak Walton League, Worth County Chapter
Trout Unlimited, Iowa State Council
Wagner Conservation Coalition

Whitetails Unlimited, Iowa Chapter
Idaho Wildlife Federation
Trout Unlimited, Idaho Panhandle Chapter
Trout Unlimited, Illinois State Council
Trout Unlimited, Gary Borger Chapter
Hoosier Flyfishers
Indiana Wildlife Federation
Izaak Walton League, Griffith Chapter
Izaak Walton League, Michigan City Chapter
Izaak Walton League, Wabash Chapter
Michiana Steelheaders
Kansas Wildlife Federation
League of Kentucky Sportsmen
American Sportsmen Against Poachers
Avoyelles Wildlife Federation
Conservation Force
East Ascension Sportsman's League, Inc.
Louisiana Wildlife Federation
Berkshire Hatchery Foundation, Inc.
Friends of Oxbow National Wildlife Refuge
Izaak Walton League, Berkshire Chapter
Massachusetts Wildlife Federation
Society of Conservation Biology, New England
Trout Unlimited, Massachusetts/Rhode Island
Trout Unlimited, Greater Boston Chapter
Trout Unlimited, Taconic Chapter
Downeast Salmon Federation
Izaak Walton League, Maine Chapter
Spencer Pond Camps
Maine Wilderness Guides Organization
Trout Unlimited, Maine Council
Trout Unlimited, George's River Chapter
Weatherby's The Fisherman's Resort
American Hunters and Shooters Association
Ducks Unlimited, Piscataway Creek Chapter
Izaak Walton League, Capitol Youth Chapter
Maiden Point Gun Club
Trout Unlimited, Adams County Chapter
Trout Unlimited, Youghiogheny Chapter
Battle Creek Steelheaders
Cheboygan Area Sportfishing Association
Cheboygan Sportsmans Club
Conservation Resource Alliance
Federation of Fly Fishers-MI
Flygirls of Michigan, Inc
Grand River Fly Tyers
"Great Lakes Council of the Federation of Fly Fishers, Inc."
Izaak Walton League, Dwight Lydell Chapter
Izaak Walton League, Fenton Chapter
Izaak Walton League, Lock City Chapter
Michigan Darkhouse Angling Association
Michigan Division, Izaak Walton League
Michigan United Conservation Clubs
Tip of the Mitt Watershed Council
Trout Unlimited, Michigan State Council
Trout Unlimited, Adams Chapter
Trout Unlimited, Ann Arbor Chapter
Trout Unlimited, Arnold J. Copeland Chapter
Trout Unlimited, Challenge Chapter
Trout Unlimited, Charles A. Fellows Chapter
Trout Unlimited, Clinton Valley Chapter
Trout Unlimited, Copper Country Chapter
Trout Unlimited, Fred Waara Chapter
Trout Unlimited, Headwaters Chapter
Trout Unlimited, Iron County Chapter
Trout Unlimted, Kalamazoo Valley Chapter
Trout Unlimited, Leon P. Martuch Chapter
Trout Unlimited, Mason-Griffith Founders Chapter
Trout Unlimited, Miller Van Winkle Chapter
Trout Unlimited, Muskegon-White River Chapter
Trout Unlimited, Ottawa Chapter
Trout Unlimited, Paul H. Young Chapter
Trout Unlimited, Perrin/Lansing Chapter
Trout Unlimited, Pine River Chapter
Trout Unlimited, Schrems West Michigan Chapter
Trout Unlimited, Two Heart Chapter
Trout Unlimited, Vanguard Chapter
Trout Unlimited, William B. Mershon Chapter
West Michigan Hackers
American Fisheries Society, Minnesota Chapter
Ann Lake Sportsmen's Club
Becker County Sportsmen's Club
Belle Plaine Sportsmen's Club
Bradford Sportsmen's Club
Byron Sportsmen's Club
Cannon Falls Sportsmen's Club
Deer River Sportsmen's Club
Delano Sportsmen's Club
Fertile Community Conservation Club
Fish Lake Sportsmen's Club
Flensburg Sportsmen's Club
Fox Lake Conservation Club
Frontenac Sportsmen's Club
Gopher State Sportsmen's Club
Holloway Rod and Gun Club
Jackson County Conservation Club
Kenyon Sportsmen's Club
Key Cities Conservation Club
Lake City Sportsmen's Club

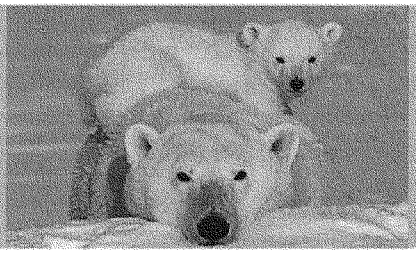
Lake Superior Steelhead Association
Laughing Trout Flyfishing Club
Lewiston Sportsmen's Club
Martin County Conservation Club
Minnesota Conservation Federation
Minnesota Fish and Wildlife Employee's Assoc.
Minnesota Trout Unlimited Council
Minnewawa Sportsmen's Club
Minn-Kota Sportsmen
Montgomery Sportsmen's Club
New Brighton Sportsmen's Club
New Market Sportsmen's Club
New Prague Sportsmens' Club
Norman County Rod and Gun Club
North Country Bow Hunters SCI
Osseo Conservation Club
Pheasants Forever, Mississippi Longtails Chapter
Pheasants Forever, Scott County Chapter
Plymouth Gun Club
Prior Lake Sportsmen's Club
Rainbow Sportsmen's Club
Red Wing Wildlife League
Sauk Centre Conservation Club
Snake River Valley Conservation Club
Southland Sportsmen's Club
Southwest Metro NWTF
St. Joseph Rod and Gun Club
Tri Lakes Sportsmen's Club
Trout Unlimited, Minnesota Council
Trout Unlimited, Headwaters Chapter
Trout Unlimited, Hiawatha Chapter
Trout Unlimited, Twin Cities Chapter
United Northern Sportsmen's Club
Wbeatland Twin Lakes Sportsmen's Club
Wildlife Society, MN Chapter
Willmar Sportsmen's Club
Women in the Wilderness
Wright County Federation of Sportsmen's Clubs
Conservation Federation of Missouri
Soutb Side Division of Conservation Federation of Missouri
Missouri B.A.S.S. Federation Nation
Missouri Smallmouth Alliance
Missouri Waterfowl Association, West Side Chapter
Southwest Missouri Fly Fishers
Mississippi Wildlife Federation
Anaconda Sportsmen
Big Sky Upland Bird Association
Custer Rod and Gun Club
Federation of Fly Fishers - MT
Hellgate Hunters and Anglers
Kootenai Valley Trout Club
Linchan Outfitting Co.
Montana Trout Unlimited
Montana Wildlife Federation
Orion--The Hunters Institute
Russell Country Sportsmen
Trout Unlimited, Big Blackfoot Chapter
Trout Unlimited, Bitter Root Chapter
Trout Unlimited, Flathead Valley Chapter
Trout Unlimited, George Grant Chapter
Trout Unlimited, Madison Galatin Chapter
Trout Unlimited, Missouri River Chaper
Trout Unlimited, Westslope Chapter
Edgemont, LTD
Guilford County Wildlife Club
Headwaters, LTD
Johnston County Wildlife Association
Lake Norman Wildlife Conservationists
Mountain Wild
North Carolina Falconers Guild
North Carolina Habitat and Wildlife Keepers
North Carolina Trout Unlimited
Trout Unlimited, Blue Ridge Chapter
North Carolina Wildlife Federation
Kindred Wildlife Club
Lewis and Clark Wildlife Club
North Dakota Wildlife Federation
Stutsman County Wildlife Federation
Izaak Walton League, Wayne Chapter
Nebraska Wildlife Federation
Trout Unlimited, Nebraska Chapter
Wildlife Society-Wayne State College
A.J.'s Bait and Tackle
Bickford's Sport Center
Carroll County Fish, Game and Shooting Club
Dive Winnipesaukee
Friends of the Suncook River
Hot Spots Outfitters
Lone Pine Hunters Club, Inc.
Manchester Fly Fishing Association
Morse Sporting Goods
New Hampshire Council of Trout Unlimited
New Hampshire National Wild Turkey Federation
Nor'Easters Snowmobile Club
Paugus Bay Sportshop
Place In the Woods Trading Post
Steve's Sportsmens Den
Story's Sport Shop
Suds and Soda Sports Shop

Taylor's Trading Post
Tim Moore Seacoast Guide Service
Trout Unlimited, Great Bay Chapter
Trout Unlimited, Merrimack River Valley Chapter
Trout Unlimited, Pemigewasset Chapter
Wildlife Taxidermy Studio and Sports Center
W.S. Hunter & Co. Flyfishing Outfitters
Bayshore Saltwater Flyrodders
Izaak Walton League, Ocean County Chapter
Shore Wildlife
Trout Unlimited, Ernest Schwiebert Chapter
Albuquerque Wildlife Federation
New Mexico Wildlife Federation
Southwest Consolidated Sportsmen
Trout Unlimited, Truchas Chapter
The Diana Project
Nevada Wildlife Federation
Trout Unlimited, Great Basin Chapter
Trout Unlimited, Lake Tahoe Chapter
Trout Unlimited, Southern Nevada Chapter
Trout Unlimited, Croton Watershed Chapter
Trout Unlimited, Great Bay Chapter
O. Mustad & Son (USA), Inc
Trout Unlimited, New York State Council
Trout Unlimited, Conhocton Valley Chapter
American Fisheries Society, Ohio Chapter
Columbiana County Federation of Conservation Clubs
Izaak Walton League of America, Ohio Division
Izaak Walton League, Anthony Wayne Chapter
Izaak Walton League, Capitol City Chapter
Izaak Walton League, Delta Chapter
Izaak Walton League, Fairfield Chapter
Izaak Walton League, Hamilton Chapter
Izaak Walton League, Medina Chapter
Izaak Walton League, Mt. Healthy Chapter
Izaak Walton League, Seven Mile Chapter
Izaak Walton League, Wadsworth Chapter
League of Ohio Sportsmen
Safari Club International, Southwest Ohio Chapter
Silvertip Productions
Allen Stie, Inc.
American Sportsmen's Club, Oklahoma Chapter
Boggey River Ranch
Brogden Ranch
Country Boy Hunting
Double T Outfitters
Extreme White Tail Hunting Service
Oklahoma Wildlife Federation
On the Water and in the Woods with Cody and Cody
Revive the Outdoors with Cody and Cody
Rocky Top Ranch
Southern Oaks Lodge -
Specialty Outdoor Services
Trails End Guide Service
Trophy Bass Guide Service
Trophy Bass Secrets (TV Show)
Wind Song Adventures
Association of Northwest Steelheaders
Backcountry Hunters and Anglers, HQ
Backcountry Hunters and Anglers, Oregon Chapter
Bad Cat River Boats
Berkley Conservation Institute, Pure Fishing
Dielman's NW River Guides
eNRG Kayaking
Extreme Marine & Outdoor
Federation of Fly Fishers, Oregon Council
Frank Amato Publications
Ifish.net
Izaak Walton League, Oregon Division
Izaak Walton League, Silverton Chapter
Jim Teeny, Inc.
Johns Fishing Service
Lows Fishing Adventures
MACATRAC Professional Accessory Systems
Mr. Shur-Cure Egg Bait & Preserver
Native Fish Society
Northwest Angling Experience
Northwest Sportfishing Industry Association
NW Guides and Anglers Association
Oregon Anglers
Oregon Council of Trout Unlimited
Oregon Marine Trade Associations
Oregon Trout
Trout Unlimited, McKenzie & Upper Willamette
Wild Salmon Center
Ben Turpin Guide Service
Cambria County Federation of Sportsmen's Clubs
Clouser Fly Fishing - Guide Service
Cross Current Guide Service
Dave Rothrock Guide Service
Delaware Valley Women's Fly Fishing Association
Evening Hatch Fly Shop
Fly Fishing Show East
Fly Fishing Show West
Glendorn Lodge
Izaac Walton League of America, PA Division
Izaac Walton League, Berks County
Izaak Walton League, Brownsville Area
Izaak Walton League, Fairmount Springs
Izaak Walton League, Franklin County

Izaak Walton League, Greater Pittsburgh
Izaak Walton League, Harry Enstrom
Izaak Walton League, John Harris
Izaak Walton League, Lancaster Red Rose
Izaak Walton League, Lebanon County
Izaak Walton League, Oil City
Izaak Walton League, Pinchot
Izaak Walton League, Uniontown
Izaak Walton League, Red Lion
Izaak Walton League, York
Joe Humphreys Enterprises
Johnstown Sportsmen's Association
Mike Heck Guide Service
Monroe County Federation of Sportsmen's Clubs
Penns Creek Guides
St. Clair Tremont Trap and Field Club
Seven Springs Mountain Resort
Susquehana Fishing Tackle
The Sporting Gentleman
Tom Baltz Guide Service
Tom's Fly-Fishing Service
Tri County Trout Club
Trout Unlimited, Adams County Chapter (PA)
Trout Unlimited, Allegheny Mountain Chapter
Trout Unlimited, Arrowhead Chapter
Trout Unlimited, Blair County Chapter
Trout Unlimited, Bucks County Chapter
Trout Unlimited, Chestnut Ridge
Trout Unlimited, Cumberland Valley
Trout Unlimited, Delco Manning
Trout Unlimited, Doc Fritchy Chapter
Trout Unlimited, Donegal Chapter
Trout Unlimited, God's Country Chapter
Trout Unlimited, Iron Furnace Chapter
Trout Unlimited, Kettle Creek Chapter
Trout Unlimited, Muddy Creek Chapter
Trout Unlimited, Pennsylvania Council
Trout Unlimited, Perkiomen Valley Chapter
Trout Unlimited, Oil Creek Chapter
Trout Unlimited, Spring Creeks Chapter
Trout Unlimited, Tiadaghton Chapter
Trout Unlimited, Valley Forge Chapter
Yellow Breeches Outfitters
West Chester Fish, Game and Wildlife
West Chester Gun Club
Buckeye Brook Coalition
Federated Rhode Island Sportsmen's Clubs, Inc.
Manville Sportsmen's Rod & Gun Club
Rhode Island Saltwater Anglers Association
Trout Unlimited, Narragansett Chapter
Trout Unlimited, Northern Rhode Island Chapter
Wood River Fly Fishing
Goodwill Plantation Hunt Club
McClellanville Kitchen Table Climate Discussion Group
South Carolina Wildlife Federation
Tri-State Bass Club
Trout Unlimited, Chattooga River Chapter
Trout Unlimited, Mountain Bridge Chapter
Trout Unlimited, Saluda River Chapter
Trout Unlimited, South Carolina Council
29/90 Sportsmen Club
Beadle County Sportsmen
Black Hills Sportsmen
Brookings Wildlife Federation
Deuel County Sportsmen
Firesteel Sportsmen
Grass Lake Conservation Club
High Plains Wildlife
Hecla Sportsmen Club
Izaak Walton League, South Dakota Division
Izaak Walton League, Rapid City Chapter
Jerauld County Fish and Game
Jones County Rifle and Pistol
Lake Cambell Wildlife Club
Lake Traverse Area Wildlife Federation
Marshall County Sportsmen
Oahe Sportsmen Club
South Dakota Wildlife Federation
South Shore Sportsmen
Sportsmen's Club of Brown County
St. Clair Tremont Trap and Field Club
Stumpshooters Archery Club Inc.
Tony Dean Outdoors
Whetstone Sportsmen
Tennessee Wildlife Federation
Trout Unlimited, Hiwassee Chapter
Coastal Backwater Marine
Getaway Adventures Lodge
Getaway Adventures Outfitters
Greenwolf Society
Gunstream Land Corporation
Kayak Anglers Society of America
Kayaking Angler
My Texas Waters Foundation
Rockport Fly Fishers
Seagrass Management, LLC
Texas Conservation Alliance
Texas Wader
Trout Unlimited, Texas State Council
Utah Wildlife Federation

Belmont Bay Gunning Club
Trout Unlimited, Virginia Capital
Trout Unlimited, Vermont State Council
Bob's Merchandise, Inc.
Brett's Salmon and Steelhead Guide Service
Columbia Basin Waterfowl
Everett Steelhead and Salmon Club
Federation of Fly Fishers, Washington
Greywolf Fishing Club
Izaak Walton League, Seattle Chapter, WA
McGrew/Peterson Family
Northshore Senior Center Fishing Club
Northwest Women Flyfishers
Olympic Fly Fishers of Edmonds
Overlake Fly Fishing Club
Pacific Fly Fishers
Puget Sound Sportsfishing
Trout Unlimited, Ballard Trout and Salmon
Trout Unlimited, Clark County Chapter
Trout Unlimited, North Kitsap Chapter
Trout Unlimited, Northshore Chapter
Trout Unlimited, Rainshadow Chapter
Trout Unlimited, Tacoma Chapter
Washington Council of Trout Unlimited
Washington Wildlife Federation
Wild Steelhead Coalition
Almond Rod and Gun Club
American Wild Turkey Hunting Dog Association
Ashland/Bayfield County Sportsmen
Association Conservation Clubs Trempealeau County
Augusta Area Sportsmens Club
Badger Dachshund Club Inc.
Badger Fishermen's League
Bangor Rod & Gun Club
Beaver Dam Conservationists Inc.
Berlin Conservation Club
Big 4+ Sportsman Club
Bloomer Rod & Gun Club
Boscobel Sportsmens Club
Brown Co Conservation All
Brule River Sportsmens Club
Butte Des Morts Conservation Club
Calumet Co Conservation Alliance
Carter Creek Sportsmen's Club
Cataract Sportsman Club
Central St. Croix Rod & Gun Club
Central WI Gun Collectors Association Inc.
Central WI Shoot to Retrieve
Central WI Sportsmen's Club
Challenge the Outdoors Inc.
Chippewa Rod & Gun Club
Chippewa Valley Outdoor Resource Alliance
Columbia County Sporting Alliance (Pardeeville)
Columbia County Sporting Alliance (Portage)
Columbus Sportsman's Association Inc.
Coon Valley Conservation Club Inc.
Crystal Lake Sportsmens Club, Inc.
Dane County Conservation League
Daniel Boone Conservation League Inc
De Pere Sportsman's Club
Delton Sportsmen Club
Door County Fish Farm & Game Club
Door County Rod & Gun Club Inc.
Dousman Gun Club
Dunn County Fish & Game Association
Eau Claire Rod & Gun Club
Farmers & Sportsmen's Club
Fin 'N' Feather Sportsman's Club
Flambeau Area Sportsman Club
Florence County Forestry & Parks Department
Forest County Association of Lakes Inc.
Forest County Walleye Association
Fort Atkinson Wisconservation Club
Friends of MacKenzie Center
Friends of the Brule River & Forest
Globe Conservation Club
Great Lakes Sport Fishermen Ozaukee Chapter
Green Bay Duck Hunters Association
Green Bay Great Lakes Sport Fishermen
Grellton Conservation Club
Hayward Rod & Gun Club
Hope Rod and Gun Club
Horicon Marsh Sportsmens Club (Mayville Gun Club)
Horicon Rod and Gun Club Inc.
Hudson Rod and Gun Club
Jefferson Sportsmen's Club
Kiel Fish and Game Inc
Koenig's Conservation Club
Lake Poygan Sportsmen's Club
Lakeshore Fishing Club
Lakeview Rod and Gun Club
Little Wolf River Houndsmen's Club
Madison Area Dachshund Club
Manitowoc County Coon Hunters
Manitowoc County Fish & Game Proteetive Association
Millston-Knapp Sportsmens Club
Milwaukee Casting Club
Milwaukee Police Officers Conservation/Sportsman Club
Monches Fish & Game Club

Mosinee Sportsmen's Alliance
Nekossa Conservation League
North Bristol Sportsman's
Northeast WI Great Lakes Sport Fishermen
Oakland Conservation Club
Oconomowoc Sportsman's Club Inc.
Oconto County Sportsmans Alliance
Osseo Rod and Gun Club
Outagamie Conservation Club
Outdoor Inc. Conservation Club
Padus Nicolet Gun Club
Pewaukee Lake Sportsmen Club
Prairie du Chien Rod and Gun Club
Racine County Conservation League Inc.
Racine County Line Rifle Club Inc.
Richfield Sportsmens Club
Rio Conservation Club
Sauk Trail Conservation Club
Shadows on the Wolf, Inc.
Shawano Gun Club Inc.
Sheboygan Area Great Lakes Sport Fishermen
Sheboygan County Conservation Association
Sheboygan Rifle & Pistol Club Inc.
Shoto Conservation Club
Slinger Sportsman Club
Smerke's Sportsmen's Club
Southern Clark County Sportsman's Club
Southern Milwaukee 1400 Fishing & Hunting Club
Sparta Rod & Gun Club
Stan Plis Sportsmans League Inc.
Star Prairie Fish & Game Association
Sturgeon for Tomorrow N Chapter
Sugar River Coon Hunters Association
Suscha-Fale Sportsmen's Club
Town of Boulder Junction Shooting Range
Trempealeau Sportsmans Club
Triangle Sportsmen's Club
Tri-County Sportswomen's Club
Trout Unlimited, Aldo Leopold Chapter
Trout Unlimited, Green Bay Chapter
Trout Unlimited, Harry and Laura Nohr
Twin City Rod & Gun Club
Walleyes for Tomorrow Inc.
Watershed Watchers
Watertown Conservation Club
Waukesha County Conservation All
West Bend Barton Sportsman Club
WI Association Field Trial Clubs
WI Association of Beagle Clubs
WI Association of Sporting Dog Clubs
WI Bow Hunters Association
WI Coon Hunter Association
WI Council of Sportfishing Organization
WI Deer Hunters Association
WI Deer Hunters Inc.
WI Federation of Great Lake Sport Fishing Clubs
WI House Outdoorsmen Club
WI Hunter Education Instructor Association
WI Muzzle Loading Association Inc.
WI Rifle and Pistol Association
WI Sharp-Tailed Grouse Society
WI Taxidermist Association
WI Trappers Association Inc.
WI Waterfowl Association Inc.
Wild Ones Natural Landscapers Ltd.
Wilderness Sportmen's Club Inc.
Wildlife Society, WI Chapter
Willow Aces Inc.
Wilton Rod & Gun Club
Wings Over Wisconsin
Winnebago Conservation Club
Winnebagoland Conservation Alliance
Wisconsin Wildlife Federation
Yahara Fishing Club
Trout Unlimited, West Virginia State Council
Trout Unlimited, Kanawha Valley Chapter
High Country Flies
Izaak Walton League, Travelle Chapter
Trout Unlimited, Jackson Hole Chapter
Trout Unlimited, Snowy Range Fly Casters
Wyoming Wildlife Federation



NATIONAL WILDLIFE FEDERATION

A Letter from Scientists to the United States Congress Urging Action to Address the Threats of Global Warming to Wildlife and Ecosystems

FEBRUARY 2008

"We write to you to convey our sense of urgency. Global warming is already causing serious damage and disruptions to wildlife and ecosystems, and reliable projections call for significant additional damage and disruptions. To fulfill the nation's longstanding commitment to conserving abundant wildlife and healthy ecosystems for future generations, Congress must craft legislation that greatly reduces greenhouse gas pollution and generates substantial dedicated funding to protect and restore wildlife and ecosystems harmed by global warming."

– 612 Scientific Experts Concerned About Global Warming and Its Effect on Wildlife and Natural Resources, including

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February, 2008

A Letter from More Than 600 Scientists to the United States Congress Requesting Adequate Funding to Address the Threats to Wildlife Posed by Global Warming

Dear Members of Congress,

The undersigned signatories are leading researchers and practitioners from the various disciplines of biological science. We understand that Congress is currently considering a number of proposals to reduce U.S. emissions of greenhouse gases (GHGs) and thereby confront global warming. We applaud this effort. Global warming represents, by far, the greatest threat ever posed to the planet's living resources, which provide the foundation for our economy and our quality of life. We write to you to convey our sense of urgency. Global warming is already causing serious damage and disruptions to wildlife and ecosystems, and reliable projections call for significant additional damage and disruptions. To fulfill the nation's longstanding commitment to conserving abundant wildlife and healthy ecosystems for future generations, Congress must craft legislation that greatly reduces GHG pollution and generates substantial dedicated funding to protect and restore wildlife and ecosystems harmed by global warming.

The following examples of damage and disruptions to wildlife and ecosystems caused by GHG pollution and global warming are among the most noteworthy:

- Melting polar ice caps
- Thawing permafrost
- Acidification of the oceans
- Sea level rise
- Intensified storms
- Warming of rivers, streams, lakes and estuaries
- Declining snowpack on mountains and earlier runoff
- Drought
- Catastrophic fires
- Pest infestations
- Spreading pathogens and invasive species
- Changes in phenology (seasonal events) and distributions of wildlife populations, separating predators from prey and otherwise disrupting ecological communities.

Each of these disturbances to ecosystems, by itself, poses a serious threat of extinction to numerous plant and animal species. Yet none happens in isolation from the other forces that also imperil species, such as habitat destruction and fragmentation, the spread of invasive species and unsustainable harvest of resources for human consumption. Global warming combines with each of these non-climatic factors to place enormous stress on the planet's biological wealth.

If provided with sufficient funding, managers of wildlife, land and water have a number of tools at their disposal to ameliorate threats to ecosystems and to avert mass extinctions. Feasible actions include:

- *Maintaining healthy, connected, genetically diverse populations.* Small isolated populations are more prone to local extirpations than larger, more widespread populations. Although managers already encourage healthy populations, global warming increases the importance of this goal and will likely require adjustments in population targets and in the design of habitat corridors.
- *Reducing non-climate stressors on ecosystems.* Reducing other human-induced stressors such as toxic pollution and habitat loss will minimize negative synergistic impacts with global warming and increase the resiliency of habitats and species to the effects of climate change and variability.
- *Preventing and controlling invasive species.* Rapidly changing climates and habitats may increase opportunities for invasive species to spread. Extensive monitoring and control will be necessary to limit the negative impacts of invasive species.
- *Reducing the risk of catastrophic fires.* Global warming could lead to more frequent fires and/or a greater probability of catastrophic fires. Managers can use prescribed fires and other techniques to reduce fuel load and the potential for catastrophic fires.
- *Protecting coastal wetlands and accommodating sea level rise.* Managers can defend against the negative impacts associated with sea level rise through conservation easements and the acquisition of inland buffer zones to provide an opportunity for wildlife to migrate inland.
- *Adjusting yield and harvest models.* As fish and wildlife populations respond both directly and indirectly to climate through changes in habitats, their productivity and sustainability may increase or decrease. Managers may need to adapt yield and harvest regulations both in anticipation and response to these changes.
- *Considering global warming models as well as historical data when making projections.* Managers must be aware that historical climate, habitat and wildlife conditions are not indicative of future conditions. Projections and planning should take into account expected changes in climate.
- *Employing monitoring and adaptive management.* Due to uncertainty concerning global warming, wildlife managers must anticipate the impacts to wildlife and use monitoring data to quickly adjust management techniques and strategies. Traditional, long-practiced methods and strategies will not be as effective as conditions change.
- *Identifying new opportunities.* Managers must be ready to anticipate and take advantage of new opportunities. For example, if climatic conditions leave existing agricultural areas unusable for agriculture, they could become important wildlife conservation areas with the appropriate agency and landowner collaboration.

Each of these essential steps comes with a price tag. Inevitably, managers of the nation's wildlife, land and water resources will need billions of dollars annually to develop and implement science-based strategies for conserving wildlife and ecosystems threatened by global warming. To make this conservation work feasible, Congress should ensure that substantial revenues generated by any climate change legislation be dedicated to conserving the wildlife and ecosystems that would otherwise be lost or badly degraded by global warming.

We thank you for your consideration of this urgent matter.

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Environment and Public Works Committee – Chairwoman
410 Dirksen Senate Office Building
Washington, DC 20510

Honorable James Inhofe
Environment and Public Works Committee – Ranking Member
456 Dirksen Senate Office Building
Washington, DC 20510

Re: Sporting and Conservation Groups' Opposition to Import Ban on Polar Bear Trophies from Canada

April 2, 2008

Dear Chairwoman Boxer and Ranking Member Inhofe:

The undersigned groups strongly oppose any actions that would ban the importation of trophies of polar bears legally taken from healthy populations in Canada, including a listing of the species under the Endangered Species Act ("ESA"). This letter focuses on the impacts of an import ban arising from a listing under the ESA and Marine Mammal Protection Act ("MMPA"). An import ban would harm polar bear conservation and management in Canada and would do nothing to reduce the number of polar bears harvested in Canada. An import ban also would severely harm the economic well-being of the native communities that must live with the polar bear on a day-to-day basis. A ban on polar bear imports from Canada has no foundation in science or good policy.

The central premise of any ban appears to be that because of alleged threats to the polar bear's survival as a species from global climate change, all other causes of mortality must be reduced to the greatest extent possible. An import ban would remove an incentive for U.S. hunters to hunt the polar bear in Canada. But a ban would *not* decrease polar bear mortality from hunting. The native holders of tags not used by U.S. hunters would simply use them to harvest polar bears for subsistence purposes. In other words, the annual "quota" the Canadian provincial governments create determines the number of polar bears harvested each year, regardless of whether some are sport hunted or all are taken in subsistence hunts. Because these quotas are set at sustainable levels, the U.S. and Canadian governments repeatedly have determined that properly regulated subsistence and sport hunting are not a threat to the polar bear populations.

In addition, sport hunting by U.S. hunters supports polar bear conservation in a number of ways. Under the MMPA, each import permit includes a $1,000 fee to support polar bear research and conservation in the United States and Russia. This has resulted in close to $1,000,000 in funds for research and conservation since 1994. The $30,000-50,000 U.S. hunters pay per hunt benefit the native communities (in the amount of approximately $2,500,000 per year), encouraging

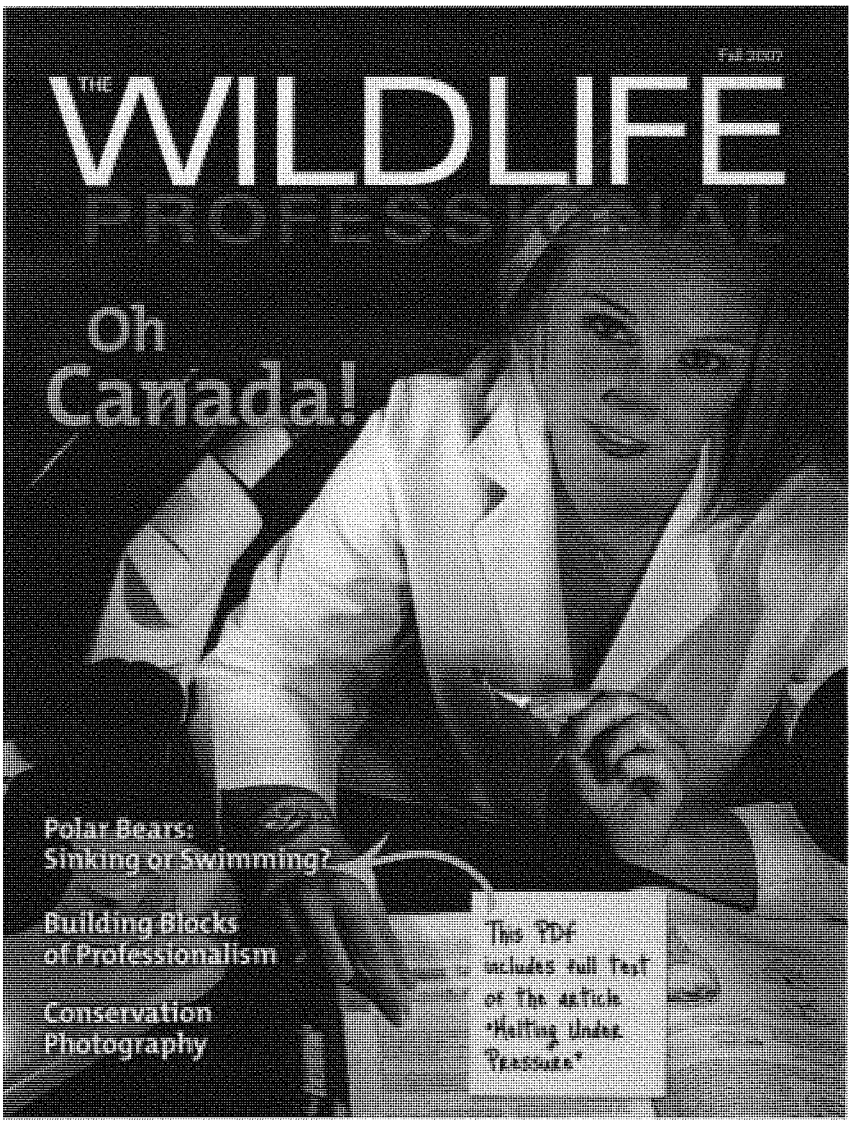
conservation by the local communities and the provincial governments. In fact, the Nunavut government in Canada spends about $1,000,000 per year on polar bear research and management.

Sport hunting also helps promote sound scientific management of polar bears. Under the MMPA, the U.S. government allows imports of polar bears only from populations scientifically proven to be well-managed and sustainable. The requirement further encourages the Canadian governments to manage (*e.g.,* set harvest quotas for) the polar bear in a sustainable manner. This management scheme has contributed to the rebound of overall population from roughly estimated numbers around 6,000-8,000 in the 1960s and 1970s to estimated numbers around 20,000-25,000 today.

In short, an import ban arising from an ESA/MMPA listing will not reduce polar bear mortality in Canada, will harm current successful polar bear conservation and management, and will harm cash-strapped native communities in Canada. For all these reasons, the undersigned sporting and conservation groups oppose a polar bear import ban.

Sincerely,

Archery Trade Association
Boone & Crockett Club
Bowhunters Preservation Alliance
Campfire Club of America
Congressional Sportsmen's Foundation
Conservation Force
Dallas Safari Club
Houston Safari Club
National Rifle Association
National Shooting Sports Foundation
National Trappers Association
National Wild Turkey Federation
North American Bear Foundation
Pope & Young Club
Quality Deer Management Association
Ruffed Grouse Society
Safari Club International
The Wild Sheep Foundation
Texas Wildlife Association
U.S. Sportsmen's Alliance
Wildlife Management Institute


Fall 2009
THE WILDLIFE PROFESSIONAL
Oh Canada!
Polar Bears: Sinking or Swimming?
Building Blocks of Professionalism
Conservation Photography
This PDF includes full text of the article "Melting Under Pressure"

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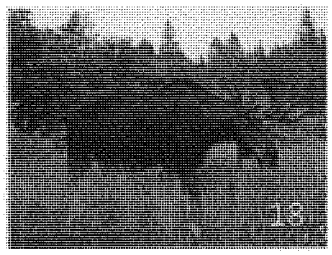
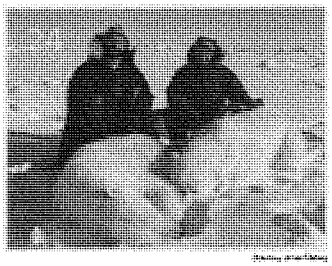
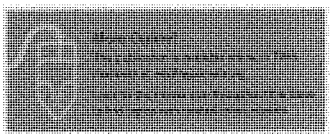
Fall 2007







HEALTH AND DISEASE

Melting Under Pressure

THE REAL SCOOP ON CLIMATE WARMING AND POLAR BEARS

By Ian Stirling and
Andrew E. Derocher

Credit: G. Thiemann

Ian Stirling is a Senior Research Scientist with the Canadian Wildlife Service. He has studied polar bear ecology for 36 years and won a Special Recognition Service Award from The Wildlife Society in 1997 for his contributions to research and conservation of polar bears.

Courtesy of Andrew Derocher

Andrew Derocher is a Professor in the Department of Biological Sciences, University of Alberta, Edmonton. He has studied polar bears for 24 years, was the polar bear project leader for the Norwegian Polar Institute for seven years, and is currently the Chair of the IUCN/SSC Polar Bear Specialist Group.

Recent press coverage about the long-term survival of polar bears and the loss of sea ice in the Arctic due to climate warming has been substantial. In response to a petition from the Center for Biological Diversity and other organizations, the U.S. Fish and Wildlife Service proposed in January 2007 to list polar bears as threatened because of the possibility that "all or a significant proportion of the total population will become endangered in the foreseeable future" (defined for the purpose of the assessment as 45 years). Habitat loss of sea ice is the central justification for the proposed listing. In response, contrarian articles continue to appear in the popular press, questioning climate warming in general and, more specifically, denying the potential negative effects on polar bears. Such articles generally exhibit a poor understanding of polar bear ecology and selectively use information out of context, which results in public confusion about the real threat to polar bears due to loss of sea ice.

Further confusion was introduced in Nunavut, Canada, when local ecological knowledge reported sightings of more polar bears around certain settlements in recent years. This was interpreted as evidence that the populations were increasing, which led to allowable harvest levels being increased, despite scientific evidence that the populations were declining in two areas and a lack of current population data for a third population (Stirling and Parkinson 2006). Polar bears have home ranges that often exceed 200,000 km2 (Garner et al. 1991; Mauritzen et al. 2001) and roam far beyond the purvey of hunters based on or near the coast; therefore, it is simply not possible to develop a population perspective from anecdotal observations of polar bears. Further, regional observations may also be affected by factors difficult to measure locally, such as large-scale shifts in the distribution and abundance of prey species or of sea ice.

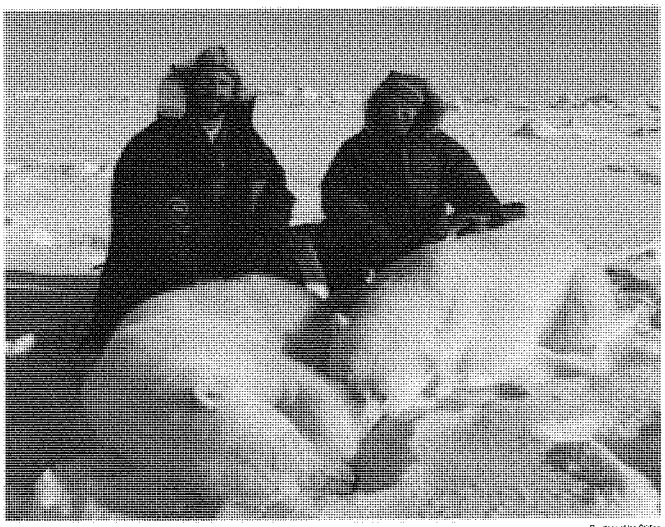
Polar bears are the largest of the terrestrial carnivores and males are roughly twice the mass of females. Females first breed at four to six years of age, usually have two cubs born in snow dens on land (although some are born in dens on the sea ice), and cubs stay with their mothers for two and a half years before weaning; therefore females cannot breed more often than every three years. Both sexes can live 20 to 25 years or more and, over most of their range, their primary prey is ringed seals and bearded seals. Polar bears are uniquely adapted to thrive on sea ice and are dependent on it as a platform for hunting seals, seasonal movements, summer refuge, traveling to ice or terrestrial refuge areas, finding mates, and breeding.

Assessing the Facts

Superficially, polar bears might appear secure. They are widely distributed throughout the ice-covered seas of the circumpolar Arctic, especially in their preferred habitat, the annual ice over the biologically productive waters of the continental shelf where ringed seals are most abundant. They still inhabit the majority of their original habitat and their worldwide abundance, in 19 subpopulations, is estimated at 20,000 to 25,000 (IUCN/SSC Polar Bear Specialist Group 2006). Historically, the conservation of polar bears, as well as other arctic marine species, has assumed the arctic marine ecosystem to be relatively stable and ecologically predictable over the long term (MacDonald et al. 2003). Thus, until recently, once estimates of population size and demographic parameters were made for a subpopulation and estimates of sustainable harvest were made, it was assumed that little other than harvest monitoring was required until another population estimate could be made. In Nunavut, the jurisdiction with the largest harvest of polar bears worldwide, most populations have not been monitored long enough to assess a trend in numbers, let alone possible effects of climate change. Further, because the inventory cycle for population assessment in Nunavut is every 15 years, most populations lack two estimates made sufficiently far apart to allow determination of whether they are increasing, decreasing, or staying the same. Additional concerns arise from using model projections to estimate future population trends in relation to harvesting, based on short-term mark-recapture studies, because they cannot account for unknown but likely fluctuations in environmental conditions.

Inuit and scientists agree that climate warming is having a significant negative impact on sea ice in the Arctic. In a 2006 study, Josefino Comiso, a senior research scientist at NASA's Goddard Space Flight Center, reported low ice extents in the Arctic during winter and other seasons in 2005 and 2006. Overall, the winter ice anomalies correlated well with both surface temperature anomalies and wind circulation patterns, and because historical satellite data indicated a positive trend in winter temperatures and a negative trend in the length of ice growth period, Comiso concluded it is likely that the winter ice cover will continue to retreat in the near future. In a recent review of long-term trends in ice cover and causative mechanisms, Serreze et al. (2007) also reported negative linear trends in arctic sea ice extent in the polar basin from 1979 to 2006. The trends were negative in every month and most dramatic in September, with a decline of 8.6 ± 2.9 percent per decade. The authors wrote, "Given the agreement between models and observations, a transition to a seasonally ice-free Arctic Ocean as the system warms seems increasingly certain (p. 1536)" and "Although the large scatter between individual model simulations leads to much uncertainty as to when a seasonally ice-free Arctic Ocean might be realized, this transition to a new Arctic state may be rapid once the ice thins to a more vulnerable state (p. 1533)." If these projections are correct, such a significant loss in the total ice habitat will have profound negative effects on polar bears.

In several polar bear populations in the Hudson Bay-Foxe Basin and Eastern Arctic areas of Canada, the ice melts completely in summer, forcing all bears in those populations to spend several months on shore until freeze-up in autumn (Stirling and Parkinson 2006). Toward the southern extent of polar bear range, in Western Hudson Bay, polar bears feed extensively on the sea ice during spring and early summer before the ice melts. Then, all bears in the population fast while on shore for at least four months until the sea ice refreezes and the bears can resume hunting. Pregnant females fast for eight months, during which time they give birth to cubs weighing approximately 0.6 kg and nurse them up to 10 to 12 kg when they leave their maternity dens and return to the sea ice to hunt seals again. Gagnon and



Courtesy of Ian Stirling

Andrew Derocher and Ian Stirling study the population dynamics, behavior, and biology of populations of polar bears in the Western Hudson Bay.

Gough (2005) reported that in Western Hudson Bay, between 1971 and 2003, the mean annual temperatures increased at most weather stations with trends varying from a minimum of 0.5°C per decade at Churchill to 0.8°C per decade at Chesterfield Inlet. Further south in James Bay, the temperature has warmed at about 1°C per decade. Skinner et al. (1998) reported that during April through June, the temperature near Churchill and over the adjacent offshore ice had warmed at a rate of 0.3 to 0.5°C per decade from 1950 to 1990. Comiso (2006) reported a similar warming trend from data collected from 1981 to 2005. Apparently in response to this well documented warming pattern, breakup of the sea ice in Western Hudson Bay now occurs about three weeks earlier on average than it did only 30 years ago. (Stirling et al. 1999, Stirling et al. 2004, Gagnon and Gough 2005, and Stirling and Parkinson 2006).

Polar bears are large animals and they got that way by eating seals, not berries.

Signs of Decline

The trend toward progressively earlier breakup of the sea ice has had significant effects on the polar bears of Western Hudson Bay. The most important time for polar bears to feed on ringed seals is from late spring to breakup, when newly weaned ringed seal pups, up to 50 percent fat by wet weight and still naïve to predators, are abundant. Thus, over the last 30 years, the polar bears in Western Hudson Bay have been forced to abandon hunting seals on the sea ice at the most important time of year and begin their fast on land following breakup at progressively earlier dates. There is a significant negative relationship between the date of breakup and the condition of both adult male polar bears and adult females accompanied by dependent young (Stirling et al. 1999). Also, as a consequence of steadily declining conditions, the average mass of lone (and suspected pregnant) adult female polar bears has declined from approximately 290 kg in 1980 to about 230 kg in 2004 (Stirling and Parkinson 2006). Derocher et al. (1992) reported that no female weighing less than 189 kg in the fall was recorded with cubs the following year, suggesting that polar bear females below that mass will no longer reproduce. More recently, Regehr et al. (2007) (In Final Review) demonstrated that the decline in survival of cubs and subadults was significantly correlated to breakup date, i.e., the earlier the breakup, the poorer the survival. The progressively earlier breakup brought on by climate warming, in combination with the failure to adjust a harvest rate that was no longer sustainable, caused the population to decline from about 1,200 animals in 1987 to 935 in 2004. A similar pattern of earlier breakup of sea ice is now evident in southern Hudson Bay (Gagnon and Gough 2005), and a corresponding decline in the condition of polar bears of different age and sex classes between mid-1980s and the mid-2000s has been reported (Obbard et al. 2006). A decline in population size will likely follow, if it has not already started.

The renewed prediction of continued climate warming from the Intergovernmental Panel on Climate Change (IPCC) in January 2007 indicates that the long-term negative changes to the sea ice will continue to be unidirectional in the foreseeable future. However, the effects of climate warming on sea ice and polar bears will vary in timing and rate of change in different regions. For example, in Hudson Bay/Foxe Basin and the Eastern Canadian Arctic (Baffin Bay and Davis Strait region), the sea ice melts completely each summer. Bears survive the summer using their stored fat with opportunistic augmentation by scavenging, feeding on vegetation, and sometimes hunting other marine mammals. Polar bears, however, obtain the vast majority of their annual energy intake by hunting seals from the sea ice surface. Thus, suggestions that today's polar bear populations will be able to obtain replacement energy sources are fanciful: Polar bears on land in Western Hudson Bay are in

Polar bears now spend more time on the shore as their sea ice habitat melts.

a hibernation-like physiological state of fasting (Ramsay and Stirling 1988). Since their most important feeding period is from mid-April until breakup, bears in these populations are likely to be affected before other areas by progressively earlier breakup caused by climate warming. In comparison, in the Beaufort and Chukchi seas (part of the polar basin), ice is breaking up earlier and freezing later, although some multi-year ice remains throughout the summer, up to a few hundred kilometers offshore over the deep polar basin and near the north-western islands of the Canadian Arctic Archipelago (Serreze et al. 2007). Climate-related effects on populations of polar bears in the Canadian Arctic Archipelago have not yet been identified, but Nunavut does not maintain a research program that would be capable of detecting such change. Claims by some that climate warming has increased the size of the subpopulation in Davis Strait, Canada, are unsupported by data. An ongoing mark-recapture study indicates that the population of polar bears there is larger than previously thought. However, polar bears are probably more abundant in Davis Strait because of the combined effects of a large increase in the harp seal population and the conservative harvest level, which has been in place for decades (Stirling and Parkinson 2006). Yet neither possible factor that could stimulate an increase in numbers is related to climate warming.

At this point, it is uncertain how the documented and predicted patterns of seasonal ice reduction and permanent loss will affect all the different populations of polar bears or their distribution and movements. The pathways through which polar bears in different ecological circumstances are, or will be, affected are only partly understood and should be investigated through multi-disciplinary research. However, if the climate continues to warm and negatively affect the duration, extent, and thickness of arctic sea ice as predicted, it will ultimately have a negative effect on all populations.

Media Mix-ups

Against this extensive backdrop of long-term studies that document the negative effects of continued climate warming on sea ice and polar bears, and projections by the IPCC that those trends will continue, the press continues to cite minority contrarian opinions as if they have equal credibility. One oft repeated example is, "Of the 13 [polar bear populations] in Canada, 11 are either stable or increasing in size" (e.g., *Edmonton Journal*, 31 December 2006, among other publications). In fact, at the 2005 meeting of the IUCN

Credit: iStockPhoto/JohnPitcher

Recent research indicates that melting sea ice has seriously affected the reproductive ability and survival of polar bears.

Polar Bear Specialists Group in Seattle, scientists and managers from the five Arctic nations with polar bears unanimously agreed to a status report that concluded that of the 13 populations within Canada, or shared with Greenland, two were severely depleted from previous overharvesting and were being managed for recovery, five were declining, and the rest were recorded as stable, except for one which was reported as increasing based on a computer projection model using extrapolated demographic data.

Another regularly repeated statement is that climate warming may be good for polar bears and that they will just adapt somehow and switch to terrestrial diets, including berries. It is possible that in the short term, the sea ice habitat of polar bears in the heavy ice of the farthest northern areas of Canada and Greenland, over the continental shelf, may improve temporarily as the climate continues to warm. However, as the patterns of ice loss mirror those in more southerly areas, the bears will ultimately be negatively affected as well. Similarly, even if there is little ice remaining, some

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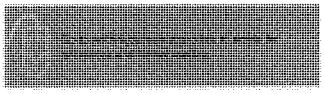

Melting Under Pressure
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polar bears may be able to augment their diets and survive for variable periods of time by scavenging, preying periodically on larger marine mammals such as walruses, and eating vegetation as available. However, research has shown that the large size of coastal Alaskan brown bears cannot be attained solely by eating berries (Welch et al. 1997) and, further, that large body mass is closely related to the amount of animal matter in the diet (Hilderbrand et al. 1999). It is particularly telling that the smallest black bears and brown bears in the world are found in the Arctic tundra near the coast of northern Labrador and the Beaufort Sea, respectively, because terrestrial food resources at high latitudes are meager. Polar bears are large animals and they got that way by eating seals, not berries. Their survival in anything like the large numbers present today is dependent on large and accessible seal populations and vast areas of ice from which to hunt.

Dire Reality

Using both field observations of hunting behavior and size-specific metabolic requirements, Stirling and Øritsland (1995) estimated that, on average, a polar bear requires 45 ringed seals (or ringed seal equivalents) per year to survive (larger bears would require more and smaller bears less). Hunting of harp seals, bearded seals, and walruses would reduce the number of ringed seals needed but the message is clear that large numbers of polar bears require enormous numbers of ringed seals or equivalents (most species of which also require ice for pupping and molting). In crude numbers, 20,000 polar bears would require about 900,000 ringed seals (or ringed seal equivalents) each year, the majority of which would be pups. Although the total population size of ringed seals is unknown, estimates range between 5 and 7 million, making them one of the most abundant seal species in the world. Like polar bears, however, they are highly evolved to live and breed in association with sea ice so that their reproductive success and total population size will almost certainly decline as the sea ice disappears.

In the long term, the loss of an iconic species such as the polar bear is but a symbol of much larger and hugely significant changes that will occur in many ecosystems throughout the world if the climate continues to warm and especially if, as projected by the IPCC, such warming is largely a consequence of excess anthropogenic productivity of greenhouse gases. For polar bears, habitat loss is the most critical single concern. The symptoms of climate warming on polar bears are becoming clearer. Highly specialized species are particularly vulnerable to extinction if their environment changes, and polar bears fit that prescription. If the population of the planet is truly concerned about the fate of this species, we need to collectively reduce greenhouse gas production significantly and quickly. ■

The Power of Conservation Photography
continued from page 30

be purchased is the empathy and sense of urgency necessary to create awe-inspiring images that move people to take actions to ensure that the wild world persists.

So, although the similarities between traditional nature photography and conservation photography are many, the most outstanding difference lies in the fact that the latter is born out of purpose. From the early achievements of Ansel Adams in capturing the imagination of the American public with his well-crafted images of wild America, to the brilliantly executed images made by National Geographic's "Nick" Nichols during the epic trek made by Dr. Michael Fay across the Congo (which has recently led to the creation of an entirely new protected area system in Gabon), conservation photography has a well-established, yet seldom recognized record.

In traditional nature photography the subject is defined by aesthetics; in conservation photography the subject must also be defined by conservation priorities. Beyond documenting nature, conservation photography answers to the mission of protecting nature. This is a discipline limited by specific places and issues and its purpose is to elicit concerns and emotions that affect human behavior. We need to advocate for shooting the whole scene and not just the select pieces that we, the architects of the image, choose to show the public.

As conservation challenges continue to grow around us, the need for the kinds of images that touch people's hearts and change people's minds is also growing. Photographers of great conviction have already traced the path for us. It is our job to show the way to the legions of new photographers who are not yet a part of the conservation movement. ■

Permanent Removal of California Sea Lions at Bonneville Dam

March 2008

Seals and sea lions -- collectively known as pinnipeds -- that prey on at-risk stocks of salmon and steelhead, especially at choke points in rivers below dams, have been a persistent problem along the entire West Coast for a decade or more. The problem is particularly nettlesome because the populations of most salmon and steelhead are depleted and the populations of pinnipeds generally are robust, with California sea lions, for example, currently at about 238,000 animals coast-wide. In the past five years or so California sea lions below Bonneville Dam on the lower Columbia River have become especially troublesome.

Although the dam is almost 150 miles from the Pacific Ocean, California sea lions have been showing up earlier and staying longer every spring. They've been consuming increasing numbers of adult salmon and steelhead congregating just below the dam in preparation for swimming further up the Columbia to spawn.

NOAA Fisheries Service, and other state and federal agencies and tribal entities, have been aggressively testing and using hazing techniques on these Bonneville animals for three years, using rubber buckshot, firecrackers, noisemakers and other deterrents, but with little success. Last year, for example, in spite of months of hazing, California sea lions ate an estimated 3,900 adult salmon and steelhead, more than four percent of the returning population. Because those figures reflect only what was officially observed within a small area immediately downstream from the dam, it's likely that predation at Bonneville was considerably higher, but took place unobserved.

Background: In late 2006, Washington, Oregon and Idaho applied to NOAA Fisheries Service, under a provision of the Marine Mammal Protection Act, for authority to "lethally remove individually identifiable California sea lions that are having a significant negative impact on at-risk salmon." The marine mammal law lays out an extensive process, including requirements for public notice and comment, on the application process, as well as the empanelling of a task force to make recommendations to the agency.

- **December 2006:** The states submitted their application to remove individually identifiable California sea lions preying on salmon at Bonneville Dam.
- **January 2007**: NOAA Fisheries Service officially accepted the application, saying it contained sufficient information to move forward and requested public comment on the application for a 60-day period.
- **September 2007:** NOAA Fisheries Service convened a task force, which held three public meetings to discuss the application and relevant information.

- **November 2007:** The task force submitted its report to NOAA Fisheries. It recommended (with one dissenting opinion) that the agency approve the states' application and provided two options for lethal removal. The report was posted on the agency's web site.
- **January 2008:** NOAA Fisheries released a draft environmental assessment for public comment. It outlined four alternatives, including the agency's proposed one: lethal removal of a limited number of California sea lions at Bonneville Dam. NOAA Fisheries also evaluated the effects of its proposal on threatened or endangered species in the area.

Summary: On Mar. 18, 2008, NOAA Fisheries Service authorized the three states to use lethal removal only on individual sea lions that are highly identifiable (natural markings or man-made ones like branding), and that continue to eat salmon, after deterrence methods are unsuccessful. Authorization is for as many as 85 nuisance animals annually, but the agency estimates the actual number will be closer to 30 a year.

The states have the option of killing qualified sea lions directly or capturing and holding them for a brief period to see if they can be placed in a public display facility. NOAA Fisheries and representatives of zoos and aquariums have compiled a list of pre-approved permanent holding facilities interested in receiving a limited number of captured sea lions as an alternative to euthanasia. It's highly unlikely, however, that such facilities would be able to accept more than one or two dozen animals during the five-year period when the states are authorized to remove sea lions.

In addition, the states will form an animal-care committee, approved by the agency, to advise on standards for humanely capturing, holding and killing predatory sea lions. The states will implement specific safety standards to protect the public if any firearms are used.

NOAA Fisheries Service is the federal agency, under the U.S. Department of Commerce, with responsibility for protecting marine mammals and endangered marine life. NOAA Fisheries Service works to conserve, protect, and recover species under the Endangered Species Act and the Marine Mammal Protection Act

NEWS FROM NOAA
NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION • US DEPARTMENT OF COMMERCE

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FOR IMMEDIATE RELEASE
March 18, 2008

NOAA Says Three States Can Remove Certain Sea Lions That Threaten Protected Salmon

NOAA's Fisheries Service is granting authorization requested by Washington, Oregon and Idaho to permanently remove a number of California sea lions that are eating imperiled salmon and steelhead congregating below Bonneville Dam before moving up the Columbia River to spawn.

Today's action allows these states to target only individual sea lions that continue to eat salmon after deterrence methods have proven unsuccessful.

The agency's authorization responds to a request in 2006 from the three states to "lethally remove" predatory sea lions under a provision of the Marine Mammal Protection Act. Under this authorization, the states may shoot or capture and remove individually identified sea lions preying on salmon below Bonneville Dam.

Under the marine mammal law, states can ask for permission to kill individually identifiable sea lions or seals that are having a "significant negative impact" on at-risk salmon and steelhead, and NOAA's Fisheries Service can grant that permission, if certain legal standards are met.

Any animals that are captured may be euthanized if no permanent holding facility can be found for them. NOAA's Fisheries Service and representatives of zoos and aquariums are compiling a list of pre-approved permanent holding facilities interested in receiving a limited number of captured sea lions as an alternative to euthanasia. NOAA has authorized the states to remove as many as 85 animals annually, but estimates that only about 30 animals will be removed each year, given the conditions in its authorization.

The states will implement specific safety measures and form an animal-care committee, approved by the agency, to advise on standards for humanely capturing, holding and killing predatory sea lions.

Building on more than two decades of experience in attempting non-lethal deterrence of sea lions in the Pacific Northwest, NOAA's Fisheries Service along with state, tribal and other federal agencies, tested a wide range of non-lethal deterrence methods to discourage the sea lions from foraging at the dam, but these efforts have been largely unsuccessful.

State and federal biologists conservatively estimate sea lions ate at least four percent of returning adult fish at Bonneville in 2007 – nearly 3,900 fish – up from an estimated half a percent just six years ago. The actual number is likely much higher, since many fish kills by sea lions were out of sight of observers.

Sea lions injure fish, as well as kill them. According to observers, monitoring salmon and steelhead migrating past the dam, fish with scars from sea lions have increased from 11 percent in 1999 to 37 percent in 2005. Close to a third of the salmon and steelhead eaten by the sea lions are from stocks listed under the Endangered Species Act and considered important for the survival of the species.

As part of the marine mammal law's requirements, NOAA's Fisheries Service convened a special task force last fall to make recommendations about the states' request. Nearly all task force members said last November that the federal agency should grant the states' request. NOAA released a draft proposal for public comment in January that included as one of its four alternatives the action it is authorizing today.

The National Oceanic and Atmospheric Administration, an agency of the U.S. Commerce Department, is dedicated to enhancing economic security and national safety through the prediction and research of weather and climate-related events and information service delivery for transportation, and by providing environmental stewardship of our nation's coastal and marine resources. Through the emerging Global Earth Observation System of Systems (GEOSS), NOAA is working with its federal partners, more than 70 countries and the European Commission to develop a global monitoring network that is as integrated as the planet it observes, predicts and protects.

EDITORS NOTE: Public documents pertaining to this authorization, including the *Federal Register* language, letter of authorization to the states and more are available online at: http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/Sec-120-Authority.cfm

On the Web:
NOAA Fisheries Service: http://www.nmfs.noaa.gov

Seal & Sea Lion Facts of the Columbia River & Adjacent Nearshore Marine Areas

(March 2008)

Pacific harbor seals, California sea lions and Steller sea lions frequent the lower Columbia River and adjacent nearshore marine areas. Other pinnipeds, such as northern fur seals and elephant seals, are occasionally present in this area, but not in great numbers or for very long.

The most recent census of California sea lions placed their population at about 238,000 animals. California sea lions are present in the lower Columbia during much of the year except in summer months (June-August) when most animals return to breeding rookeries in southern California. With the exception of a few females, all California sea lions in the Pacific Northwest are sub-adult or adult males.

There are two stocks of Steller sea lions in the North Pacific. The stock found off California, Oregon and Washington, British Columbia and Southeast Alaska – referred to as the Eastern stock – numbers about 31,000 animals. Steller sea lions are present year-round at the mouth of the Columbia River.

Several stocks of Pacific harbor seals make up the species in West Coast waters. The Oregon/ Washington coastal stock is estimated to be about 25,000 animals. They're present throughout the year at the mouth of the Columbia.

All seals and sea lions are protected by the Marine Mammal Protection Act (MMPA). The Eastern stock of Steller sea lions is also listed as a threatened species under the federal Endangered Species Act (ESA).

During a typical day in May, some 3,000 Pacific harbor seals, 1,000 Steller sea lions, and 800 California sea lions can be seen resting on haul-out sites (such as jetties) in the Columbia River estuary. These seals and sea lions feed in both the Columbia River and adjacent nearshore marine areas. They eat a variety of marine and estuarine prey, including squid, smelt, herring, flatfish, perch, pollock, hake, rockfish and salmon. Based on scat samples collected from several Pacific Northwest estuary and ocean sites (including the Columbia River estuary), salmon species generally make up 10-30 percent of these animals' diet.

During the spring migration of smelt, lamprey, salmon and steelhead, it's common for seals and sea lions to follow these prey species into fresh water upstream of Longview, Wash. (river mile 67), up to Willamette Falls (RM 129) and Bonneville Dam (RM 145). As many as 300 seals and sea lions are known to feed in these upriver areas. Some of these animals stay for a couple of days in fresh water, and others for longer. During these freshwater hunting trips, some of these animals feed heavily on salmon and steelhead.

ODFW began a California sea lion capture and marking operation in the Columbia River at Astoria, Ore., in 1997, as numbers of sea lions foraging for salmonids in upriver areas continued to increase. The goal of this project was to apply permanent, individually identifiable marks to California sea lions using the Columbia to: 1) observe the movements and activities of individual sea lions in the river; 2) describe foraging patterns of individual animals; and 3) document the recurrence of individual sea lions at specific foraging areas from year to year.

By 2006, nearly 1,000 California sea lions had been captured at the Astoria trap; 621 of which were permanently and uniquely marked with "C" brands. Of those 621, 47 have been observed foraging for salmon in the area immediately below Bonneville dam. Four other California sea lions branded at other locations (Puget Sound, Wash., and San Miguel Island, Calif.) have also been observed below Bonneville Dam, for a minimum of 51 permanently marked sea lions observed at the dam. Eight individually marked California sea lions have been observed feeding on salmon in the area below Willamette Falls, two of which have also been observed at Bonneville Dam.

No estimate is available for the total percentage of spring salmon or steelhead consumed by seals and sea lions in the Columbia or Willamette rivers. However, direct observation of winter steelhead killed in a small area below Willamette Falls, 1996-2002, ranged from 0.3 percent to 5.5 percent of the adult return. In the tailrace of Bonneville Dam, the numbers ranged from 0.4 percent of the spring run of salmon in 2002, and increased to more than 3.4 percent in 2005. These estimates pertain only to the Willamette and Bonneville study areas, and do not represent the total pinniped impacts on salmon and steelhead in a given year in the Columbia Basin.

In comparison, California sea lions at the Ballard Locks, in Seattle, Wash., were documented in the 1990s to consume as much as 60 percent of the annual run of winter steelhead.

The MMPA and ESA include provisions that allow federal, state and local governments (employees or officials in the course of their duties) to intentionally take marine mammals, if the taking is done in a humane manner and is for: (a) the protection or welfare of the mammal; (b) the protection of the public health and welfare; or (c) the **non-lethal removal** of nuisance animals.

Implementation of non-lethal deterrence methods on nuisance seal and sea lions is costly and results are variable. Federal and state biologists have found that nuisance seal and sea lion feeding patterns can be disrupted through the use of non-lethal deterrence, but no one technique (or combination of techniques) has been universally effective. For example, fish and wildlife agency personnel using various hazing techniques have been only modestly successful at reducing California sea lion predation on salmon and steelhead below Bonneville Dam. However, the same non-lethal hazing methods have been very successful in reducing Steller sea lion predation on Columbia River white sturgeon in the same area.

Members of the public may take steps to deter problem seals and sea lions from damaging their property, fishing gear, and catch. There are methods *(PDF 30KB)* property owners and fishers may consider for use under the appropriate conditions. **Note:** Some of the methods listed (such as loud noise or pyrotechnics) may not be appropriate for use in some areas, or are subject to prohibition under federal, state or local ordinances. The presence of Endangered Species Act-listed species in some areas may advise against the use of certain methods. Please consult with appropriate authorities to determine if such prohibitions exist in your area, or if ESA-listed species may be encountered.

More information on West Coast pinnipeds, their impact on fish stocks, and the increasing interaction between pinnipeds and humans is available at http://www.nwr.noaa.gov/Marine-Mammals/index.cfm.

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